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Improving timeliness and cooperation

4

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THE NEED FOR THE SEMINAR "SHORT-TERM STATISTICS - IMPROVING TIMELINESS AND CO-OPERATION" IN THE IMPLEMENTATION PHASE OF SHORT-TERM STATISTICS

Gunter Schäfer, Eurostat

The implementation of the Short-term Statistics (STS) Council regulation is currently in a critical phase. The Regulation went into force in June 1998 and foresaw an implementation period of 5 years. The seminar just comes at a moment when half that period is over.

At this moment in time, roughly 40% of the 38 indicators of the STS Regulation can be considered operational meaning that European aggregates are produced with a statistically satisfying coverage and a timeliness that is either within the delay specified in the Regulation or not too far away from it. The Member States are currently in the preparation phase for new surveys to cover missing national indicators or working on required adaptation of existing statistics to satisfy the requirements of the Regulation. Common definitions for the variables and the concept of Main Industrial Groupings (MIGS) have been agreed in co-operation between Eurostat and the Member States.

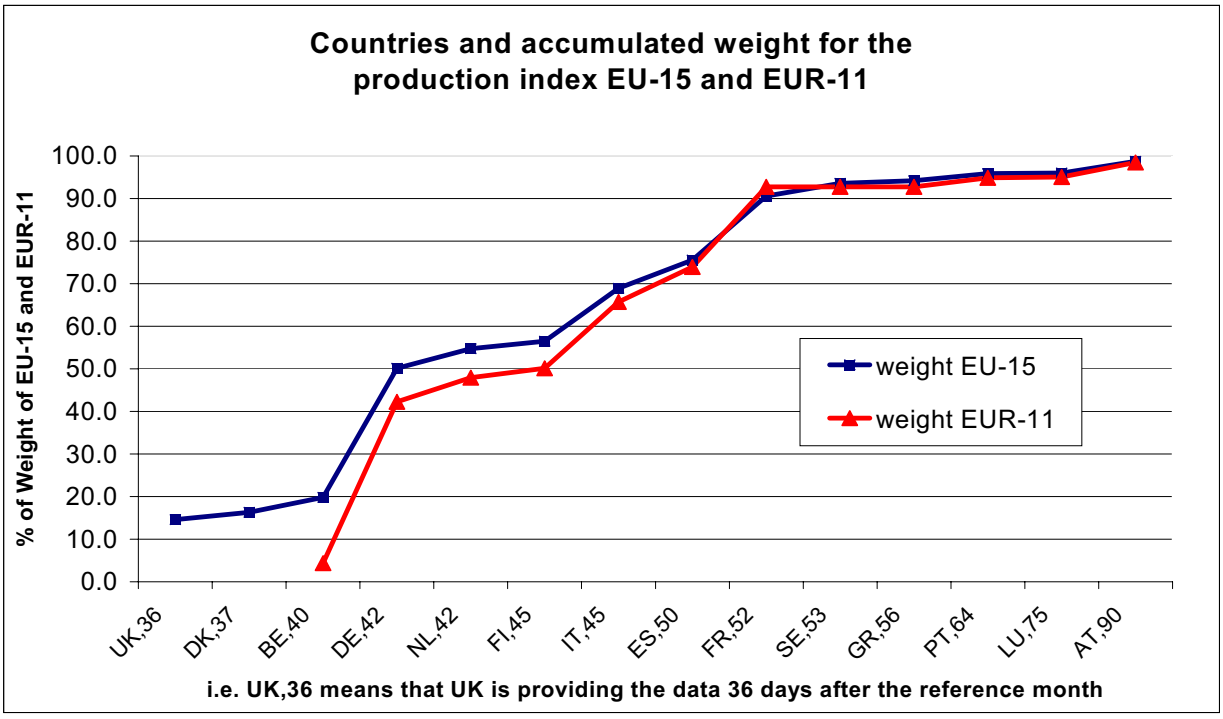
The current moment in the middle of the implementation period is also a good opportunity to review the responses of users of short-term statistics and economic decision-makers to the statistics that are already published.

One point that is always raised by users and third parties in relation to short-term statistics is the delay in the availability of the statistics after the reference period. It is often deemed longer than desired for economic and monetary analysis. An important indication of the desirable timeliness has been given by the paper of the European Central Bank (ECB) titled "Statistical requirements of the European Central Bank in the field of general economic statistics" published in August 2000.

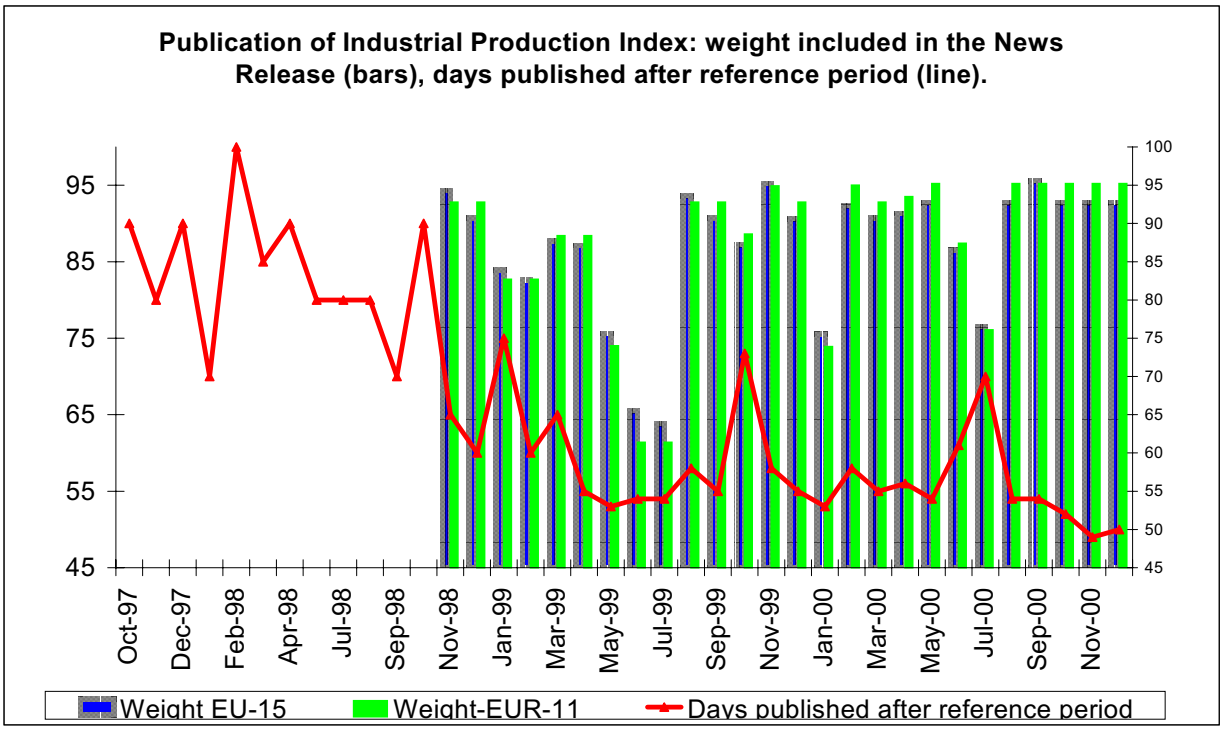
The following table provides a comparison of the actual situation with the requirements as stated in the paper:

	Desirable	Current
Industrial Production	30-40 days	50-55 days
Industrial Turnover	30-40 days	~ 80 days
Industrial Output Prices	30-40 days	33-36 days
Retail Trade	30-40 days	63-67 days
Production in Construction	30-40 days	~ 70 days

One of the main problems in the timeliness issue is the divers situation of the Member States. While some of them provide the data relatively early, other Member States take much longer. The distribution of the data arrivals at Eurostat for industrial production shown in the following graph is a typical example for short-term statistics indicators. The graph shows the situation at the end of the year 2000.



Looking at the timeliness, one should not forget the significant progress that has been achieved over the last years. The following graph shows the reduction in the time needed by Eurostat for the calculation of the European industrial production index. The improvements in the timeliness have been achieved without reduction of the weights of the Member States data that has been included. It has remained well beyond 80% except for holiday periods and New Year.



The European Monetary Union has created a high degree of urgency for such analyses beyond the national economies of the European Union. The point of the timeliness is also in the main focus of attention by the ECOFIN Council. In 1999, it already demanded improvements in the timeliness of the most important indicators of STS and other statistics for business cycle analysis and inspired a specific action plan. Regular follow-up reports monitor the progress in the action plan.

The seminar addresses exactly this critical point of timeliness. It attempts to explore the conditions under which improvements can be made in certain indicators and/or the general co-operation in the context of the STS.

In the planning of the seminar, the following topics have been identified as important.

1. National best practices to achieve timely creation of short-term indicators;
2. Usage of agreements between the NSIs and Eurostat to improve timeliness, such as embargoes and confidentiality agreements;
3. Usage of fast estimates for national aggregates with details later;
4. Analysis of the trade-off between quality and timeliness;
5. Comparisons with short-term statistics outside the European Union;
6. Requirements of monetary policy for short-term service statistics;
7. Legal issues

It was also considered important for the seminar to reflect on the issue of finding an adequate balance in the trade-off between timeliness and quality of the statistics.
The seminar aims at treating pragmatic issues. Thus, it is less oriented towards research but more towards issues of implementation and the exchange of best practices.

The contributions to the seminar can roughly be seen in three groups:

1. General consideration on fundamental approaches to reduce the delays in short-term statistics and the discussion of working practices that are suitable to contribute to a reduction in the delays, particularly in the data collection phase.

2. Methodological reflections and means for improving timeliness, such as increased use of estimations, the impact of improved timeliness on statistical quality, the role of revisions, and the usage of qualitative surveys for fast quantitative short-term statistics. This group of contributions also contains a brief comparison of European practices with the US. This comparison sheds some light on the different methodological approaches and working practices.

3. Concrete national initiatives to improve the timeliness of the industrial production index. This index is the one that is best established among the STS indices and has been frequently seen as exemplary for the timeliness issues of European short-term statistics.

Certainly, the seminar cannot answer all the questions posed on the timeliness, nor can it address all the indicators on a level of detail dedicated in the seminar to the production index.

However, the seminar is suitable to show the full complexity of the subject and to point out the major factors involved in reducing the delays. It also illustrates useful statistical work practices, in particular, in national efforts focused on the industrial production index that may also be employed in the context of other indicators.

IMPROVING THE TIMELINESS OF SHORT-TERM STATISTICS

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SUMMARY

The challenge facing the European short-term statistics system at the beginning of the new millennium is how to meet the markedly increased demand for up-to-date statistical data on economic trends. On the timeliness front, the national statistical institutes (NSIs) and Eurostat have to find a way of harmonising EU statistics and appreciably speeding up their availability. This article examines a number of methods - some of them highly developed, others at the conceptual stage - which could be used at the national and EU level. It concludes with the recommendation that measures to speed up European statistics be phased in over time, starting with those which can be launched without a prohibitively high level of investment and which more or less fit in with normal practice. These include the introduction of more rapid, state-of-the-art methods of collecting and publishing data at national level, supplemented by harmonised approximations at European level where data are missing. Another question examined is the extent to which it is possible to speed up the supply of data from companies to NSIs and of aggregated statistical results from NSIs to Eurostat (possibly under embargo/compiled with the aid of national approximations). For the time being, speeding-up measures which entail more rigorous business-process redesigns for NSIs remain a bridge too far.

INTRODUCTION

The adoption of the STS Regulation in mid-1998 was a major milestone for the system of short-term statistics operated by the European Union and its Member States. The scope of observation was extended to include the economically ever more relevant services sectors, and the statistical definitions applied were largely harmonised both between the Member States and between the various sets of statistics themselves. Apart from ensuring better coverage, the STS Regulation also set strict deadlines for the supply of data to Eurostat. With their general acceptance of the STS Regulation, the European national statistical institutes (NSIs) jointly took a major step forward along the road towards meeting the markedly increased demand for up-to-date figures on the EU and EMU.

Now that the system is up and running, the question arises as to whether the current STS Regulation and its implementation in actual operational practice are adequately geared to users' wishes. Reactions from the media and the political sphere[1] would suggest that this is not yet the case. It also emerges from an international user survey[2] that the demand for short-term data appreciably exceeds the relatively limited supply currently provided by NSIs. Where short-term statistics are found particularly wanting from the users' perspective, however, is on the timeliness front. The fact that this is a serious concern in relation to European statistics is illustrated by Table 1, which highlights the major difference in timeliness between the producer prices and production indices of the European Union compared with the USA and Japan.

[1] In response to what the monetary authorities consider to be the inadequate implementation of the STS Regulation, the ECOFIN Council has been pushing hard for its accelerated introduction by Member States, and. European short-term statistics have been described in the media (Reuters) as “too few, too late”.

[2] See findings of the international survey “User needs with respect to short-term statistics on trade and services”, Voorburg Group working paper of the Rome seminar, 1998.

Table 1. Time lag (days) for producer prices and production indices (year 2000)

	European Union	United States	Japan
Production-index	55	15	< 30
Producer prices	35	15	8 – 10

TIMELINESS AND CURRENT DISSEMINATION PRACTICE

There are growing calls from users for more up-to-date statistics. Possible ways of meeting this need cannot, however, be considered separately from other quality aspects, above all statistical reliability. Amongst other things, typical NSI yardsticks such as degree of coverage (response) and statistical variance spring to mind in this context. A clear trade-off exists between timeliness and quality. All other things being equal, early data dissemination generally means reduced reliability. What is more, quality enhancement through a higher response rate, for example, can also be used to bring dissemination forward. For the user, on the other hand, it is mainly a question of credibility. The main criterion for regarding data as credible is that they should be produced in an indisputably sound manner, with any subsequent revisions being so minimal that affected users need make little or no adjustment to their economic assessments or decisions.

Users on the monetary and economic policy side[3] have pointed to the urgent need for up-to-date statistics on meso- and macro-economic variables, in particular overall figures for industry, possibly broken down over a limited number of aggregates, the construction sector, retailing, etc. At the other end of the user spectrum are the national branch organisations, which naturally call for more detailed data on their own specific branches and those of their clientele.

As regards publishing policy, most NSIs have hitherto scarcely differentiated between the various user objectives. Aggregate figures are published at the same time as and in many cases in a similar way to detailed underlying branch figures. During the preceding statistical process, too, data are collected, analysed and grossed up in the same production operations. In a number of cases, this cycle is repeated after publication to include questionnaires submitted late or subsequently corrected during the editing phase, and the figures are adjusted (revised) in the next publication. In keeping with sound statistical practice, an effort is usually made during the data collection process to ensure that enterprises of major economic importance are at all events included at the earliest possible stage. This approach is reflected in the STS: in the setting of deadlines, a distinction is made mainly between large and small countries, not between aggregates and its underlying NACE breakdowns[4].

The bottom line of the "all at once" publishing policy generally espoused at present, however, is that the rapid dissemination of aggregate figures is offset by the less rapid availability of statistics at more detailed levels. The key question is: what measures can be taken to bridge the gap between demand for the more rapid provision of (aggregated) figures and their actual availability, while at the same time maintaining reliability and credibility.

[3] ECB (Requirements in the field of general economic statistics, August 2000) and IMF (Special Data Dissemination Standard).

[4] During the preparatory work on the STS conceptual design, a proposal was put forward to the effect that a shorter deadline be set for aggregated data than for breakdown figures. At the time, however, this did not receive sufficient support from Member States, with the exception of the Retail module of the Regulation.

The gap between the actual publication of (detailed figures) and the desired rapid aggregates – as expressed by the ECB - is illustrated in Table 2.

Table 2. Current time lag (year 2000) STS deadlines, ECB requirements,timeliness gap (days)

	Current time lag	STS deadlines	ECB requirement*)	Timeliness gap**)
Production-index	55	45	35	20
Producer prices	35	35	35	0
Turnover (retail)	63 *)	60	35	28
Persons employed	90	90	45	45

*) average of indicated interval of period
**) gap between current time lag and ECB requirements.

Strikingly, the gap is widest for the value, volume and labour market variables, there being hardly any gap in the case of prices. The gap will be partly narrowed down over the years 2001 to 2003 as the derogations granted to Member States on this point expire. If no further measures are taken, however, the gap between STS deadlines and the requirements of main users will persist over the medium term.

MEASURES TO IMPROVE TIMELINESS

In principle, there are two types of measures which can be taken in order to improve timeliness.

The first package of measures requires an amendment to the STS Regulation itself and involves "simply" shortening the official deadlines, possibly combined with an increase in the frequency/periodicity of the statistics, e.g. from a quarterly to a monthly basis. Such measures are, by their very nature, legally binding. What is more, they are not methodological and thus lie outside the scope of this paper. Nor is any consideration given to the possibility of setting up new and faster statistics or of collecting the data directly at European level rather than via the individual Member States.

In addition to the above-mentioned legal measures, however, there are also numerous possible approaches which are, by their nature, optional and above all methodological. On the one hand, there are measures which can be or already have been taken at national level by the NSIs concerned. On the other, there are measures which Eurostat can apply in order to speed up the production of EU statistics in general and of EU totals in particular.

AT NATIONAL LEVEL:

1. Re-design of the sampling frame with the primary aim of fast reliable aggregates. Generally speaking, the traditional sampling approach is geared towards obtaining reliable detailed stratified data, and according to statistical theory the aggregates produced will then offer at least the same reliability. However, the procedure does not guarantee that reliability for the aggregates will be achieved at an earlier stage than for underlying details. One way to overcome this is to speed up the collecting and editing process for the strata which are most relevant for the aggregates[5]. Another way to achieve aggregate

[5] Speeding up the larger firms' strata is not the same thing as speeding up the production of data on larger firms within the strata. The latter process is likely to have some statistical drawbacks (i.e. bias) where the growth trends of larger firms within a stratum differ from those of smaller firms within the same stratum. The former process will also cause biased averages if the calculation across strata is done without a proper weighting system.

reliability sooner is to increase sample size for strata which are relatively more important for the aggregated figures[6]. All in all, the suggested re-designing exercise should aim to place more emphasis on strata (and NACE activities) which have a relatively greater bearing on the business cycle. Finally, it goes without saying that whatever the optimisation procedure, (a) the sample should be of the panel type rather than fully independent[7] and (b) the sample and grossing up framework should address changes in the population of the Business Register in a timely and efficient manner[8].

2. Switching the observation time-frame from an end-of-period survey to a mid-period one. This applies to input and output prices where timeliness can be significantly improved by adopting a mid-period approach. This has already been effectively implemented in several Member States[9]. For variables such as turnover, new orders and production, however, such an approach is inappropriate both from a theoretical and practical point of view[10].

3. Earlier transmission of questionnaires to the firms and tighter official deadlines for firms' responses and receipt of data from secondary (fiscal) sources. However, this approach is effective only if firms are both willing and able to respond earlier, and the administrative burden is not disproportionate. Therefore, the message has to get across to firms and tax authorities alike that a timely response on their part is crucial not only for the national figures but also for European-level statistics. This calls for closer co-operation between NSIs and firms and their associated federations and/or between NSIs and tax authorities. To this end, NSIs could also offer technical "assistance", e.g. in the form of EDISENT[11], which facilitates fast and easy retrievals from company accounts. Finally, it goes without saying that the data request should be more or less tailored to a firm's bookkeeping practice, thus speeding up the process of completing the questionnaire.

4. Reducing the time it takes to get forms to NSIs by using more efficient means of data transmission. This basically means avoiding the postal transmission of forms. Besides more traditional media such as fax or CATI, the Internet nowadays provides new and fast alternatives, e.g. the transmission of encrypted electronic questionnaires[12] by e-mail. These measures for reducing postal delays also apply for the transmission of reminders to non-responding firms. Experience shows that timeliness and efficiency can be enhanced significantly by sending reminders by fax or e-mail (instead of paper), especially where options include automatic retrieval from a database and subsequent transmission in bulk.

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[6] In the case of index-type statistics, the sampling procedure might be improved even further by basing allocation on (the variance of) first differences of a variable instead of (the variance of) absolute figures.

[7] One exception where fully independent samples provide more or less equivalent statistical results is when the variable observed is growth-related.

[8] It is recommended that indices should not be affected by register changes, which do not reflect a change in the reality outside of the statistical office. The correction for these register changes is easiest using a chain-index, since in that case a backward projection of the situation in the current period can be used to adapt the grossing-up frame of the previous period, leaving older periods unaffected.

[9] For instance, in the UK and Finland.

[10] One exception where mid-period observation for turnover and production might be valid is when the variable is observed in terms of a firm's business trend development. Such an approach is adopted in the qualitative business survey, which explains why the resultant figures roughly correspond to quantitative growth patterns, especially near turning points. However, in practice their quantitative accuracy remains rather limited.

[11] One example from which all Member States can benefit concerns the development of an EU-statistical module within internationally used business software for overall accounting of, for example, SAP. These systems are widely used, especially by larger firms.

[12] Electronic questionnaires basically appear in two different forms: either as a flat document or as some sort of data-entry machine possibly combined with some simple error detection functions.

5. Efficient and effective data-entry by the NSI. Besides data-entry in bulk, scanning paper forms with an Optical Character Reader (OCR) has proved to be highly efficient, especially when organised in a central unit (economies of scale)[13]. In addition to the efficiency gain, the quality of the raw input can be improved at the data-entry stage by automatic correction of obvious and simple statistical errors such as the so-called "1000-error".

6. Re-design of the editing process: top-down editing for the sake of timely and reliable aggregates. Re-design is aimed at automatic detection and classification of outliers. Top priority is attached to those outliers which are most in need of editing for the sake of reliable aggregates. Lower priority goes to those which are mainly significant with respect to the sub-aggregates, i.e. more detailed NACE activities. The top-down approach for detecting top-priority cases starts with the selection of sub-aggregates which have a significantly above-average bearing on the aggregated mean. The procedure is repeated for each selected sub-aggregate down to the level of strata, where the usual procedure for detecting outliers (firms) comes into play. The detection procedure for lower-priority outliers is the same, except that the starting point is the sub-aggregate level. Following automatic detection, the editing process should of course solve the highest-priority problems first before addressing the lower-priority ones. Lead-time for aggregate production can be further reduced if the top-down procedure also incorporates the detection and solving of significant non-responses. For monitoring the decreasing change in outcomes and for determining the moment where editing does not contribute significantly anymore, it is important that, during the editing phase, the system provides feedback on the extent to which the (sub-)aggregates change during outlier editing. It is not unlikely that at least 80% of the overall improvement is achieved by merely solving 20% of worst cases.

7. Introducing approximations by using more timely information that is highly correlated with the set of statistics concerned (for example electricity consumption figures, business sentiment data on turnover, production, new orders, employment and prices), possibly combined with auto-regressive modelling. In fact, the STS allows use of these associated variables for a few sets of statistics only, e.g. those on new orders. Although this approach might improve timeliness, it should be used with the utmost caution for reasons of quality. In practice, the forecasting capability of associated variables is limited to the trend cycle of the variable estimated. If such approximation were used on a permanent basis, this would not pose any real problems in terms of revisions. However, if it is only employed temporarily as a first nowcast, revisions are bound to occur as soon as "hard" data enter, especially for highly volatile variables such as turnover and production. As well as providing less quantitative accuracy, varying national approximation methods are a further impediment to EU-wide harmonisation.

8. Re-design of publication scheme: dissemination of timely, highly aggregated estimates first, followed by more details afterwards. There are basically two approaches here, one where final aggregated and detailed figures are disseminated at one and the same time, and the other where there is a split in the production process between aggregates (taken care of first) and breakdowns (taken care of later), as explained in point 6. In the first approach the publication lead-time can be reduced by the use of fast electronic

[13] For example, in the UK.

dissemination tools[14] for detailed data and even faster press or Internet releases for the aggregates; this avoids the time-consuming process of printing paper forms. If, however, sufficient reliability at the aggregated level is reached at an earlier stage, earlier dissemination can be considered. This second approach should be clearly communicated to the public, since credibility is at stake and small revisions of the aggregated data are likely to occur in-between subsequent releases. If re-design along these latter lines is undesirable from the point of view of national publication policies, the measure mentioned under point 9 offers a good alternative.

9. Earlier transmission of national aggregates to Eurostat under strict embargo. This measure has already been proposed by Eurostat together with the guarantee that such national data will be used only for the calculation of EU totals, not to be published or otherwise disseminated outside Eurostat's STS unit. This approach also offers the flexibility that is occasionally needed when official deadlines cannot be met due to unforeseen national circumstances. It ensures that EU deadlines set well in advance can be met even if the compilation and transmission of unrestricted regular data at national level are affected by temporary hold-ups.

10. Assigning more personnel more efficiently. The production cycle for individual sets of short-term statistics often contains several peaks and troughs. Given the limited resources available, day-to-day operational practice is fraught with the risk of delay - due to a sudden drop in the number of available statisticians (illness or holidays, or general understaffing) during periods when they are needed most. In this respect, staff assignment definitely affects timeliness, although this effect is difficult to quantify exactly. Balancing out peaks and troughs usually involves some sort of economies of scale (more mass), where the tasks assigned to each statistician encompass several sets of statistics spread out over time. Even though economies of scale can be achieved in any type of organisation (product versus process orientated, hierarchical versus matrix approach), an actual yield is delivered only if the production cycles of the sets of statistics involved have different peak & trough patterns. The time pattern of release dates for short-term statistics as a whole thus has to be optimised to some extent (see also point 12).

AT EU LEVEL:

11. Estimating missing national data (not to be published!) solely for the purpose of calculating EU totals. The estimates are subsequently replaced when actual national data are entered. It is already standard Eurostat practice to estimate missing values by ARIMA modelling. However, this approach is tenable only where occasional figures are all that is missing and sufficient hard data are available from non-missing countries. Revisions should be limited, and Eurostat's hard-data threshold is well above 60%. If, on the other hand, missing values of a particular country are more persistent, e.g. if values are not forthcoming over a prolonged period of time or are not available at all, ARIMA methods become most doubtful given the ups and downs of the business cycle. The more or less "straight-line" approach of ARIMA cannot keep track of up- and downswings and tends to deviate from reality exponentially as time goes on. The problem here is more crucial than the relatively small revision problems in the case of some occasionally missing values. In fact, it significantly biases the European figures. The use of additional correlating variables (see point 7) might improve this situation. If pursued at Eurostat level, this might

[14] The UK and Denmark, for example, publish aggregated data first in the form of press releases, followed by more detailed electronic data for which a charge is levied.

also guarantee some degree of methodological harmonisation. From a practical point of view, however, it puts a major burden on Eurostat because it means a substantial increase in the volume of data that has to be additionally collected outside the STS framework. It is therefore suggested that the national STS data already available at Eurostat should also be taken into consideration, as they are likely to be influenced by the same national business cycle as the missing variables. Given the general perception within the EU that short-term economic movements interrelate more and more[15] across the various Member States, approximations for one country could also be modelled[16] using existing STS data for other countries and for the EU as a whole. As an example of these interrelated movements, EU production indices have been examined and the results are shown in the annex.

12. Narrowing down differences in release dates across countries. This improves the mass in terms of coverage of countries and therefore improves the quality of initial results. For reasons of timeliness, the point of convergence taken should be that of the fastest (larger) countries. Albeit purely imaginary, taking the fastest larger country (De, Fr, UK, It) would, at this moment, result in the following deadlines and timeliness "gaps".

    Table 3. Time lags (days)

	Based on fastest larger country	Timeliness gap*)
Production-index	36 (De)	1
Producer prices	27 (De)	-8
Turnover (retail)	14 (UK)	-21
Persons employed	46 (De)	1

    *) gap between time lag fastest larger country and ECB requirements.

    However, care should be taken to ensure that the points of convergence across the various sets of short-term statistics are not crowded together in a tight timeframe, as this would detract from national efficiency (see point 10).

13. Stimulating and facilitating countries' effective implementation of measures at the national level - for example, by providing harmonised technologies and methodologies, as well as expertise, and by setting up working groups and seminars with a view to spreading national best practices with respect to measures for improving timeliness.

Besides the measures set out above, Eurostat has a pronounced facilitating capability in general, and further impetus for improving the timeliness of European statistics can be provided by way of targeted financial and technical[17] support.

[15] Comprehensive empirical evidence of significant correlation between EU Member States in terms of output, employment and prices is given by Wyne and Koo's *Business Cycles under Monetary Union: A Comparison of the EU and US,* published in Economica (2000) 67, 347-374.

[16] Besides the nowcasting of missing national data, the same model-based approach can be employed for backcasting purposes. The accuracy of backcast estimates might even be better than the forecasted ones since hard additional information from the annual structural business statistics - if incorporated in the model - constrains the outcomes to yearly "reality".

[17] See footnote 11 for an example at the EU-level.

ASSESSMENT AND CONCLUSION

In the short term, the end of derogations in connection with the implementation of the STS Regulation will mean that European statistics will at all events keep the promise of meeting statutory deadlines. It is already clear, however, that this will not go far enough towards meeting users' requirements for up-to-date information. As an alternative to directly wielding the instrument of mandatory legislation, several options are available to provide the further impetus needed to improve timeliness and to get the process off the ground.

It is not the case that all the above-mentioned alternatives are of equal standing in terms of their theoretical and practical feasibility. A quick-scan assessment by Member States[18] and the ECB - in which participants were asked to give their opinion on the alternatives put forward for speeding up the provision of statistics - highlighted the fact that three groups of measures[19] can be singled out.

I. High-feasibility measures: re-design of publication scheme; reducing the time it takes (postal delay) to get forms to NSIs; efficient and effective data-entry[20]; estimating missing national data (at the European level); spreading best practices and stimulating and facilitating countries (at the European level).

II. Lower-feasibility measures: earlier transmission of questionnaires; introducing approximations (at the national level); earlier transmission of national aggregates.
III. Scarcely feasible measures: re-design of the sampling frame; redesign of the editing process; assigning more personnel more efficiently; narrowing down differences in release dates across countries.

The package of measures (I) regarded as being the most feasible approach to actually speeding up short-term statistics calls for an appropriate effort on the part of all involved (NSIs and Eurostat). At the national level, this involves above all the use of more rapid methods for data collection and publication, whereas at European level the emphasis is on provision of a back-up facility in particular - the use of approximations in the case of (temporarily) missing national data - and on the stimulating role of Eurostat in general. Prioritisation of this type of measure is to be recommended. At the other end of the feasibility scale are major business-process redesigns which go to the very heart of statistical processing (package III) and the associated organisational set-up. On average, certainly over the short term, these are not regarded as particularly promising, also on account of the uncertainties and major investment associated with them. Finally, there is the more policy-related question (package II) as to whether the straightforward earlier transmission of data (from companies to the NSI and from the NSI to Eurostat at the aggregated level, with the aid of national approximations where necessary) can take place in such a way as to pose no risk to the credibility of the particular set of statistics and of the NSI. This is a very topical issue and the first requisite steps have been taken[21] with the aim of obtaining more definite findings.

[18] In addition to the ECB, Austria, Belgium, Germany, Denmark, Luxembourg, the Netherlands, Finland and the United Kingdom took part in the assessment of alternatives.
[19] The "switching the observation time-frame" measure is not taken into account here as it relates solely to prices. Virtually all Member States strongly advised against using it as a general measure for other statistics.
[20] While the measure designed to achieve efficient and effective data-entry was not included in the assessment, it is also regarded as highly feasible, as it is of a similar nature to measures for "reducing the time it takes to get forms to NSIs"
[21] In 2000 a pilot project was launched with the aim of substantially reducing the production-index lead-time through the earlier supply of data (under embargo and/or with the aid of national approximations or just by speeding up the regular statistical process).

ANNEX: INTERRELATED MOVEMENTS OF PRODUCTION INDICES ACROSS THE EU

Table 4. Cross-correlation coefficients (R) between Member States' 5-months smoothed y-o-y growth rates of production indices (1995-2000) *)

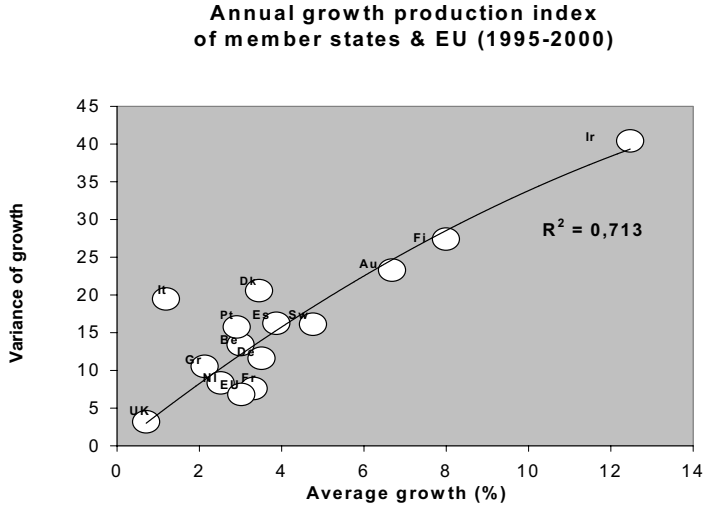
	Au	Be	Ge	Dk	Es	Fi	Fr	Gr	Ir	It	Nl	Pt	Sw	UK
Austria	1													
Belgium	0,81	1,00												
Germany	0,91	0,87	1,00											
Denmark	0,62	0,73	0,66	1,00										
Spain	0,74	0,70	0,68	0,55	1,00									
Finland	0,79	0,75	0,83	0,66	0,72	1,00								
France	0,77	0,67	0,75	0,47	0,92	0,69	1,00							
Greece	0,72	0,60	0,75	0,35	0,42	0,45	0,56	1,00						
Ireland	0,17	0,19	0,29	-0,05	0,50	0,24	0,56	0,24	1,00					
Italy	0,64	0,73	0,79	0,64	0,58	0,56	0,64	0,53	0,52	1,00				
Netherlands	0,77	0,64	0,77	0,53	0,60	0,56	0,72	0,60	0,20	0,72	1,00			
Portugal	-0,55	-0,41	-0,36	-0,26	-0,37	-0,39	-0,17	-0,26	0,08	-0,18	-0,17	1,00		
Sweden	0,73	0,84	0,81	0,80	0,58	0,84	0,52	0,54	0,17	0,68	0,48	-0,43	1,00	
United Kingdom	0,54	0,80	0,68	0,38	0,45	0,47	0,50	0,52	0,38	0,72	0,59	-0,18	0,60	1,00
European Union	0,89	0,88	0,96	0,69	0,80	0,81	0,86	0,70	0,44	0,87	0,81	-0,32	0,80	0,73
Monetary Union	0,89	0,86	0,96	0,67	0,82	0,81	0,88	0,69	0,46	0,86	0,81	-0,31	0,77	0,70

*) excluding Luxembourg because of data availability problem.

Table 5. Lead *) of y-o-y growth of the production index of the Member States compared to the EU total, in terms of number of months (1995-2000)

Au	Be	Ge	Dk	Es	Fi	Fr	Gr	Ir	It	Nl	Pt	Sw	UK
-1	1,5	0	2	1	0	-1	-2	-4	0,5	1	-11	1	2

*) determined by shifting the Member State series until highest correlation with EU is reached



A COMPLETE SYSTEM OF DATA CAPTURE TO IMPROVE TIMELINESS OF SHORT-TERM STATISTICS

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SUMMARY

The usefulness of short-term statistics for analysing the economic cycle and influencing economic and monetary policy is highly dependent on their timeliness. Of the steps that may be taken to ensure timeliness, National Statistical Institutes should focus on technological innovation and on making the tools used by businesses to respond to the statistical surveys both user-friendly and efficient. This paper describes a trial run carried out with a complete system that allows data to be captured whether it has been transmitted by mail, fax, the Web, or any other channel which may be used to return the questionnaires.

I. THE NEED FOR TIMELINESS IN SHORT-TERM STATISTICAL SURVEYS

Council Regulation (EC) No 1165/98 concerning short-term statistics states which statistical indicators each National Statistical Institute must produce and sets deadlines for the dissemination of those indicators. Today, more than two years after the Regulation entered into force, these deadlines are still not being met by certain countries and for certain indicators.

It should not be forgotten that, while the procedure to prepare the Regulation was running its course (activities of technical working parties, meetings of the European Council, approval of legislative bodies, transition period, need to adapt national statistical systems to the new needs for economic statistics) an extremely important event took place: the birth of EMU, Economic and Monetary Union. In addition to bringing forward the full implementation of the Regulation, this event created new needs and purposes for economic statistics. In order to carry out the activities expected of it, the European Central Bank has made a series of requests to which the European Statistical System must give some response. So, while National Statistical Institutes were already experiencing difficulties complying with the new Regulation on short-term statistics, additional demands were arising with regard to the comprehensiveness of the indicator set to be produced and the timeliness of the data's dissemination.

When the Ecofin Council approved the second report on the statistical requirements for monitoring Economic and Monetary Union produced by the Economic and Financial Committee, it asked Eurostat and the ECB to draw up an Action Plan to improve statistical information on the European economy and to thus improve economic and financial policy. A large section of the Action Plan is dedicated to short-term statistics, for which timeliness is considered indispensable.

Most of the short-term statistics referred to in the Regulation are calculated from data collected in statistical surveys of businesses: production, turnover, new orders, occupation, earnings, prices, etc. Only a small number of sources are administrative. Enterprises are

• Sections I, II, III and VI were written by M. Politi, while sections IV and V were written by R. Balestrino.

therefore likely to receive an ever-increasing number of requests for information, to which they must reply in an ever-shorter time. Optimising the process of producing of the surveys is one way that Statistical Institutes may meet the new requirements (timeliness and comprehensiveness) brought about by monetary union and avoid making replying to the surveys an excessive burden on enterprises.

II. INNOVATION IN THE PRODUCTION PROCESSES OF SHORT-TERM STATISTICAL SURVEYS OF ENTERPRISES

Respondents to statistical surveys of enterprises (industrial, construction, retail and services) generally share a number of characteristics: the enterprises generally have a cooperative attitude towards surveys carried out by the National Statistical Institute, although, at the same time, they are extremely aware of the increase in the statistical burden insofar as the more requests are made by the national statistical system, the greater the cost to the enterprises of responding to the various surveys. Minimising the statistical burden for enterprises has always been a concern of Istat, which is why it has tried to plan its surveys so that they are carried out as efficiently as possible.

Efficiency, with regard to short-term statistical surveys of enterprises, means the following:

- Updating the reference archive efficiently. In order to construct representative samples, capture the effect of the demographic dynamic of enterprises and contact respondents correctly, the archive must be complete and continuously updated. Enterprises judge harshly any archive of the Statistical Institute which contains old or erroneous information. Short-term statistical surveys therefore require the archive to be updated in real time.
- Sending questionnaires to enterprises on time.
- Making it as easy as possible for enterprises to respond. It is a duty of statisticians to examine every possible way of assisting enterprises in replying to surveys.
- Shortening the time taken to collect data. The results of the survey could then be made available more quickly, and enterprises could receive feedback to the information they supplied and take good advantage of it.
- Make targeted, well-motivated requests. Where there is no response, the enterprises which have not replied, and only those, should quickly be contacted.

Istat has taken a number of steps to meet these needs, the most important of which are the following:

- Designing user-friendly questionnaires. Over the years, the questionnaires have been changed a number of times in order to meet enterprises' requests. For example, shuttle questionnaires have been created.
- Using a single post box as the return address for the questionnaires from each survey. Pre-paying postage on the return envelopes, so that enterprises do not have to cover the cost of postage.
- Preparing computerised procedures to make targeted, rapid requests to enterprises which have failed to reply. In this way, repeated reminders will not be sent to those who have already replied.
- Using an automated system to stamp and post questionnaires.
- Using an automated system to send reminder faxes or letters in real time to enterprises that have not replied.

As can be seen from the needs described above and the action taken to meet them, there has been a continuous process aimed at improving two aspects of short-term economic statistics: quality and timeliness. One of the ways this can be achieved is clearly by introducing innovative technologies into process of producing statistical information.

III. A COMPREHENSIVE DATA-CAPTURE SYSTEM

Having enterprises respond to the short-term statistical surveys solely by fax has made a significant contribution to the timeliness of short-term economic statistics. In addition, enterprises reacted very positively to the request.

This approach has many advantages.

For enterprises:
- Rapid fulfilment of the obligation to reply: it takes less time to send a fax from one's own office (or a room nearby) than to post a letter.
- Ease of use: fax machines are not particularly difficult to use.
- Low cost: sending a fax is cheaper than having a messenger post a letter.
- Immediate confirmation of receipt: the transmission report provides immediate confirmation that the questionnaire has been received, which may be useful in case of a dispute with Istat.
- Reduces the irritation caused by mistaken requests: as the responses to the questionnaires arrive at Istat immediately, reminders will take into account the most recent arrivals, and only those who have not replied will be contacted.

For Istat:
- Questionnaires are available very quickly.
- The problems connected with relying on the mail, such as delays and losses, are avoided.

If data are to be received by fax, two conditions must be met: the questionnaires must not be too long (no more than 4-6 pages), and the telephone lines must never be busy. The respondent must not be faced with a bottleneck that wastes his time. The Statistical Institute must therefore have a fax server that can handle several telephone lines.

Starting from the fact that a fax is simply an image file (*.tiff) which has been transmitted over a telephone line, and using recently-developed technologies, Istat has carried out a study on using a fax server with character recognition for statistical surveys [3]. The trial was carried out on questionnaires for the monthly turnover survey, using an application with both hardware and software components. A number of questionnaires with hand-written responses were faxed and then "read" by the recognition engine. In a nutshell, this experiment resulted in a 0.7% rate of incorrectly recognised characters at the end of the recognition process. This has encouraged us to continue this approach.

Over the last few years, use of the Web to exchange information has grown exponentially. At the beginning of 1999, it was estimated that 10% of enterprises had access to the Internet, but it can now be said that practically all medium- and large-sized enterprises have access. An additional incentive was provided by the enterprises themselves, as many showed they were willing to submit the questionnaires over the Web. This motivated us further, and, inspired by the need to improve timeliness, we searched for a comprehensive product that was capable of capturing data from paper (mail or fax) and the Internet (directly from websites or by e-mail).

Of the various products that are commercially available, we settled on one which included all of the following phases in a single software package:
- data capture using every method available to enterprises;
- data registration;
- preliminary data checks and subsequent correction of errors;
- data archiving.
-

IV. TELEFORM - A DATA-GATHERING PROGRAM THAT USES MULTIPLE TECHNOLOGIES

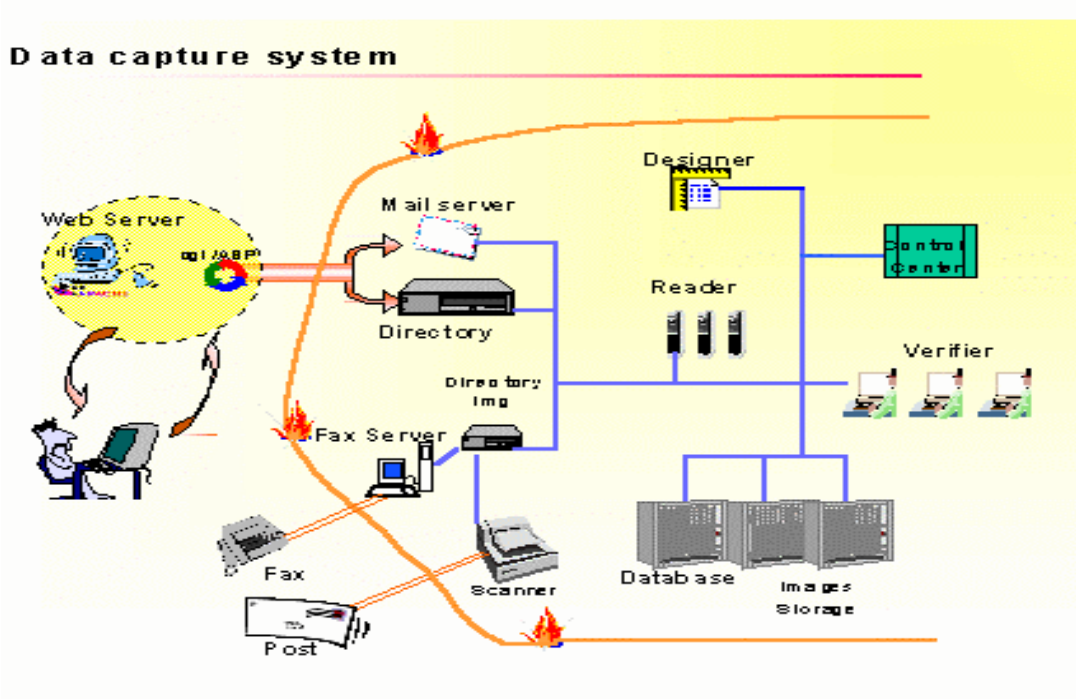
Istat has recently completed a trial run of the monthly surveys of enterprises' industrial production using the Teleform program, a very interesting example of a multi-technology approach [1] [4] to data gathering.
Teleform 7.0, produced by Cardiff (USA), is dedicated to the processing of forms in both paper and digital format. It is therefore highly suitable for gathering data efficiently in a statistical environment where various methods of responding are to be made available. The ability to process both paper and electronic copies is what makes this product stand out.
Paper questionnaires can be returned by mail or fax, as usual. In the first case, the questionnaire must be scanned. In the second, if a fax server is available at the place of production, the scanning step is unnecessary. In both cases, the scanner and the fax server can be incorporated in the Teleform system. This makes it possible to build up a single archive containing the images of the forms, whether the source is the scanner or the fax server. In a subsequent step, OCR/ICR is used to automatically recognise type-written or hand-written characters, marksense is used for tick boxes, and bar codes are read. Pre-existing paper forms can be processed, or, in an ideal situation, they can be designed from the ground up. Digital forms are delivered to users by e-mail, or made accessible on the Web. The data received electronically can be fed into the same data set as data from automatic character recognition.

Teleform is a modular system which can be expanded according to the requirements imposed by the workload. Three main modules – Designer, Reader and Verifier – make up its architecture (Figure 1).
Designer is the point-and-click interface that makes it possible to create new forms from scratch or automate existing forms. It allows all the checks and verifications needed to interpret the documents once they are loaded to be defined beforehand. Once a form has been defined, it can be produced automatically in various formats, such as traditional paper, as a fax document, or as a PDF or HTML file.
Reader is Teleform's heart. It handles document scanning, capturing images from fax servers, importing images from existing directories, any merging of output with data in the archive, identification of documents from among those stored in the system, and recognition of data. If electronic forms are used, Reader handles mail server management, document capture, form identification and creating the output data set.

Teleform automatically works out paper forms, although some manual touching-up is required. The Verifier interface allows the operator, with the aid of the image, to quickly verify and correct any characters that the OCR/ICR engines are unsure about. Verifier also solves any cases where characters have been recognised, but violate any validation rules set when the form was defined.

A PDF module has been developed in partnership with ADOBE Systems. Using it, a digital version of the module from a definition prepared in Designer can be generated. The digital module can be published online [2] or sent by e-mail and processed automatically. In either case, once the respondent has filled out the form and submitted it, Teleform takes over the process and converts the output into an automatic e-mail to the producer of the form. Even if the user prints the PDF form and fills it out manually, automatic processing is still possible, simply by scanning in the form or retrieving it from the fax server.

Fig. 1 – Teleform Architecture



In order to fill out a PDF form, the user must have access to the Internet and have Acrobat Reader 4.0 (available at no charge on the Web). The standard approach, using e-mail, is for the user, using his browser, to open the PDF form that Teleform has sent as an attachment, fill it out, and submit it. If the user wishes to fill out the form off-line, he must save the attached file. He may then open it and fill it out, although certain guidelines must be followed. The data is returned to Teleform within the body of an automatically generated message rather than as an attachment, thus keeping the security risk to the receiver low.
HTML forms are also generated automatically on the basis of the definition prepared in Designer. The two distribution methods – Web and e-mail – are again available. However there is currently one drawback for users who wish to use Netscape, as they must have version 6.0 or above.

Teleform also includes a module that allows forms to be personalised by including different information for each user. The information must be stored in specific tables that the system recognises and dynamically associates with the forms. This makes it possible to print personalised forms, or send personalised e-mails and faxes.
A programming language is also available. Called “BasicScript”, it resembles Visual Basic, and allows image evaluation to be customised using ad hoc checks, arithmetic calculations, field comparisons, and calls to external applications. However, BasicScript code cannot be used in the digital versions (PDF and HTML) of the form. In this case, ad hoc checking modules need to be implemented in JavaScript.

In addition to the ASCII format, Teleform is able to provide output in the formats used by the most common Windows databases (e.g. CSV, Excel, Access, Paradox, Sybase, etc.) as well as more sophisticated programs (e.g. Oracle) via an ODBC interface. In addition, scripts can be used to personalise output, thus extending the connectivity of the product to the production environment.
The network version of Teleform includes the control centre module, which makes it possible to coordinate the system's activity and control the access and functions available on each workstation. It also provides statistics on each phase: scanning, preparation, checks, etc. and enables the overall productivity of the environment to be monitored, as well as that of each station and worker, thus bringing to light any bottlenecks in the process.

V. THE TRIAL-RUN AND ITS RESULTS

A trail-run was carried out to check whether it would be possible to use Teleform for the short-term statistical surveys of enterprises. The Teleform data capture system was installed on an intranet running on the Windows NT platform. However, in order to increase the number of data capture channels available to it, the system interacted with other Windows environments and Unix platforms (mail server, web server, etc.), both within the intranet and on the Internet.
As regards responses on paper, 200 forms from the monthly survey of industrial production were processed using both of the available means of data capture: scanner and fax server [3]. The form was designed from scratch using Designer. 200 copies were printed out and filled out in different handwriting. The completed forms were scanned in at the Institute's data capture laboratory, then sent by different fax machines of varying quality to the Institute's central fax server as a way of simulating fax returns from the responding enterprises. Thus, two image files were generated: one from direct scanning of the paper forms, the other from the fax server. The latter method comes closest to reproducing real-world conditions, as currently enterprises most often return the filled-out forms by fax. It is therefore necessary to check that the inevitable "noise" added to the image by the fax machine does not lower the quality of the final result in terms of the data captured. The following procedures were applied to each of the two files:

- automatic character recognition (varying the "confidence" threshold for the character recognition, set by default at 80%, but which may be customised);
- verification by a human operator;
- export of data;
- analysis of results in comparison to a "perfect" file.

All automatic character recognition software is based on one or more recognition engines which interpret the characters by comparing them with character models stored in internal libraries. The confidence threshold for this recognition can be changed. Once it is set, the recognition step produces one of three results:

1. the character is identified correctly
2. the character is identified incorrectly (false positive or ambiguous)
3. the character is rejected (and will be verified manually)

The most sensitive part of the recognition phase concerns the second case - keeping false positives to a minimum is the main quality objective. The third situation is equally important, but for reasons of cost. Rejected characters can be positively identified, but only using costly

human intervention. The confidence threshold must therefore be set at the level which best balances the level of quality desired with the intervention required to ensure it is achieved.

The results were analysed using a program developed specifically to compare the files exported by Teleform with the "perfect" files obtained by conventional double entry of the 200 forms being processed and reconciliation of the discrepancies. The output of the conventional and automatic methods was compared, byte by byte, to produce the number of correct characters at the end of the process (following manual correction of unclear characters). Table 1 gives the statistics of the form. Tables 2 and 3 give the results obtained using images from the scanner and the fax server respectively.

The forms fit on one A4 page. There were 28 473 non-blank characters on the forms, which is sufficient to ensure the results of the recognition tests are significant. The average number of characters per form was 143, which conforms to real-world conditions. The information to identify consisted solely of numbers, so no indicators for character type were calculated. The average time required for automatic interpretation was two seconds per image.

Analysis of the results of the scanned data capture shows that, at an 80% confidence threshold (Teleform default), the average time required for a human operator to verify the forms was nine seconds per form, or a total correction time of 29 minutes. There were 1 488 ambiguous characters (5.2% of significant characters), of which 850 (55.4%) needed to be corrected (the others were correct, although the recognition engines were "unsure"). At the end of the process, 99.47% of the total number of significant characters were correctly recognised.
When the confidence threshold was raised from 80% to 90%, which marginally increases the manual correction time, the already-high quality of the exported data increased (to 99.79%). Conversely, when the confidence threshold was lowered to 70%, the number of characters which had to be double-checked dropped to 2.8%, and correction time decreases to 19 minutes. Unsurprisingly, however, the number of false positives increased, leading to a final recognition rate of 99.26%.

The results for the forms on the fax server produced no surprises. Overall, the level of quality was still very high and comparable to the level for the Scanner, but, as projected, slightly more time was required to verify the images that were not directly scanned in. Confidence threshold settings of 70%, 80% and 90% resulted in data quality at the end of the process of 99%, 99.29% and 99.67%, and total correction times of 26, 32 and 57 minutes, respectively.

In conclusion, the trial run of using Teleform to process the paper forms was highly satisfactory, and the data quality which can be achieved is fully in line with the quality standards for the production of statistics applied by Istat.

Table 1 – Industrial Production Form: general statistics

Forms	Significant characters	Blank characters	Total characters	Average number of characters per form	Average variables per form	Average interpretation time
199	28473	27363	55836	143	21	2 sec

Table 2 - Industrial Production Form: Scanner

Confidence level	Forms needing verification	Characters verified		Characters changed		Correct characters at the end of the process		Average correction time	Total correction time
		No	**% of signif.**	**No**	**% of verif.**	**No**	**% of signif.**		
70	158	797	2.8	790	99.1	28269	99.26	7 sec	19 min
80	190	1488	5.2	850	55.4	28322	99.47	9 sec	29 min
90	199	3421	12.0	940	26.0	28412	99.79	14 sec	47 min

Table 3 - Industrial Production Form: Fax server

Confidence level	Forms needing verification	Characters verified		Characters changed		Correct characters at the end of the process		Average correction time	Total correction time
		No	% of signif.	No	% of verif.	No	% of signif.		
70	191	948	3.3	826	87.0	28188	99.0	8 sec	26 min
80	191	1723	6.1	902	52.4	28270	99.29	10 sec	32 min
90	199	4162	14.6	1018	24.5	28380	99.67	17 sec	57 min

The electronic forms were tested in PDF format, as this format is very common in business environments, and because the reproduction is faithful to the original both on screen and in print. What is more, the viewer for the forms is available free of charge, and does not allow the forms themselves to be modified. Using the simple program Acrobat Reader 4.0, the forms on the Istat website (or provided by e-mail) can be filled out and returned to the data capture system in a way that is completely transparent to the user. Teleform can be directly integrated into a POP server on any platform (we used an SMTP/POP3 server), from which the data e-mailed by the respondent can be extracted. The transmission procedure is completely transparent – all the respondent need do is click on the "send" button. The electronic questionnaire produced for the test includes personal information and a large number of checks on fields. We checked that the control tables could be accessed and that the program could be integrated in the production environment. We also checked that it was possible to use an existing data capture website running on Unix (Apache 1.2.4 server under AIX 4.2), as well as our recently-purchased Topcall fax server.

In sum, the trial run was satisfactory and leads us to conclude that it would be feasible to use Teleform to improve the data gathering process.

VI. CONCLUSIONS

The trial run demonstrated the potential that could be freed up by using a complete system of data capture. Such a system would simplify the response procedure, thus making it easier to meet the requirements of the survey rapidly, while minimising the statistical burden and cost. The most significant advantages for Statistical Institutes are:

- surveys are completed considerably more quickly;
- efficiency is increased via the automation of a series of phases, freeing up resources for other activities.

For these reasons, and having completed the trial run, Istat has decided to progressively implement this system for use on short-term statistical surveys from 2001. This, in conjunction with other action, will improve the timeliness of short-term statistics in the near future.

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COLLECTION OF PRICES BY A CALL CENTER USING BLAISE-CATI

('COMPUTER-ASSISTED TELEPHONE INTERVIEWING')

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SUMMARY

EU Regulation 1165/98 on short-term statistics prescribes the collection, amongst others, of output prices with a well-specified scope, form, level of detail, timeliness, etc.
At present the Belgian output prices system is not compliant with Regulation 1165/98. Because of limited resources the new survey and calculation methodology which is needed, should combine the lowest possible cost with the highest possible quality. Having identified three possible ways of conducting a prices survey, we opted for an outbound call center rather than a classical approach or an inbound call center.
The advantages of an outbound call center, its low response burden, high cost-efficiency, guaranteed data quality and very rapid results, more than offset its one main disadvantage : the complexity of the implementation process, which consists of developing methodologies and software, settling practical and organisational matters and training operators and IT support.

1. OUTPUT PRICES : THE PROBLEMS

EU Regulation 1165/98 on short-term statistics prescribes the calculation of output price indices on the domestic market, non-domestic markets and globally, at a monthly frequency for industry (Nace 10-41, with some exceptions); they should be available as non-corrected indices within 1 month and 5 days (domestic and non-domestic markets) or 1 month and 15 days (globally) at the 2-digit level of Nace, as well as for main industrial groupings.
At present Belgian output prices are not fully compliant with Regulation 1165/98. Only domestic output price indices are calculated, some Nace 2-digit divisions are missing, the sampling and weighting methods present serious shortcomings and the survey method is rather labour-intensive and costly. In order to comply, a new price indices survey has to be set up taking into account the rather limited resources of Statistics Belgium.

2. THREE POSSIBLE SOLUTIONS

Output price information can be collected in several different ways. We were able to identify three methods which Statistics Belgium might use. The first one we call 'the classical way', the second one is an automated inbound call center, the third one an outbound call center.

2.1. The classical way

The classical way is exactly what its name suggests, it also is the method by which price information was collected in Belgium until now: respondents typically complete paper forms which are sent in by mail or fax (or even, in some cases, collected in person at the enterprise); input in a database is done manually and quality checks using previous data take place after data have been entered.
This approach has some disadvantages:

- it is rather costly because of its labour-intensive nature;
- burden on respondents is relatively high : each month they have to complete a paper form and mail or fax it back ;
- timeliness can be a problem because of the relatively time-consuming procedure, but mostly because of problems with respondents returning forms too late or not at all and because a lot of time and effort goes into checking data quality and correcting errors.

The main advantage of this approach is of course that it is classical: it is time-tested and familiar, easy to implement and no complex routines have to be installed.

2.2. Inbound call center

An inbound call center collects information by having respondents call in by telephone; they are then automatically guided through very specific questions and the information they provide is entered automatically into a database. Immediate checks of replies and additional clarifying questions are possible by carefully programming the response structure.

The disadvantages:

- the initiative rests mainly with the respondents ; they have to maintain, month after month, the discipline to call in at the appointed time and to provide the information required in a conscientious way ; this may be a lot to expect ;
- data quality is not guaranteed, even after some automatic checking of plausibility; additional data controls may still be needed.

The first advantage of an inbound call center is the lower response burden, compared to the classical approach, although a fair and continuous amount of discipline is needed. Another advantage is its high cost-efficiency, because no human operators are needed for data collection and input; still, some human intervention might be needed to ensure continuing collaboration of respondents and to check data quality.

2.3. Outbound call center

An outbound call center also collects data by telephone, but respondents are contacted actively by operators. Interviews are computer-assisted: respondent-specific questions appear in the right order and in very great detail on the screen, guiding operators through the interview; data are entered immediately into a database. New data are immediately cross-checked with previous information, making verification of any anomalies or inconsistencies possible while respondents are still on the telephone.

The only disadvantage of this approach is its organisational complexity. In order to implement an outbound call center, a host of methodological, software, database, equipment and personnel problems have to be solved and integrated into a smoothly co-operating whole.

3. OUR SOLUTION : AN OUTBOUND CALL CENTER

After careful consideration of the advantages and disadvantages of each approach, Statistics Belgium opted for an outbound call center to collect output prices. Cost-efficiency and respondent-friendliness are significantly higher than in the classical method. Although the advantage over an inbound call center is less obvious, we still considered the outbound call center to offer a better trade-off between data quality and timeliness on the one hand and resources needed on the other hand. The most promising feature, in our opinion, is the possibility for immediate verifications, which guarantees the highest possible quality at the shortest possible delay.

The Statistics Belgium (outbound) Call Center was not created solely for the purpose of collecting output prices ; from the start our intention was to use the experience gained for other surveys, both new ones and existing ones which still use paper forms. The Call Center might well develop into one of the major data sources of Statistics Belgium.
The efficiency of the Call Center is largely determined by the way it is computer-assisted. The software used is Blaise, a statistical data capture programme developed by CBS (Statistics Netherlands), which consists of several different modules; the one relevant here is the CATI module (CATI = Computer-Assisted Telephone Interviewing). Not only does Blaise-CATI support overall management of a survey (storing addresses and other relevant information on respondents, managing appointments and interview calendars, assigning respondents to operators, etc.), it also can guide an operator step-by-step through a specific interview and it allows immediate checks against predetermined limit values or previous data. Responses are stored in a Blaise file which can easily be converted to the DB2-database format we use.
In addition to these changes in survey procedures, the survey methodology and the database architecture were also updated.

4. THE IMPLEMENTATION PROCESS

Setting up an outbound call center in Statistics Belgium for the collection of output prices using Blaise-CATI was quite a complex matter, mainly because so many different aspects, most of them new to us, were involved: software development, technical installations, organising a new Unit, IT and operational training, methodological development, etc.. All of these had to be tackled more or less simultaneously and integrated into a smoothly running whole.
After the initial decisions about the survey approach to use, the actual implementation process started at the end of 1999, with a visit by the implementation team to the CBS Call Center in Heerlen (Netherlands), to take a look at how Blaise-CATI operated there. Although the CBS surveys are different in nature from the one we were planning (aimed at households rather than enterprises), we did obtain a very good idea about how a computer-assisted call center operates and we received a lot of very valuable practical information.
As a result of this visit, we decided to adopt Blaise-CATI as software. Shortly after we signed the license agreement and started training of the IT people who are going to be responsible for Blaise-CATI development and support.
In the mean time the survey methodology was developed: based upon a PPS (proportional per size) sample of sales values of 8-digit Prodcom products (from our monthly Prodcom survey), respondents and type products across all industry were selected. DB2 database tables were created to store both raw price data and output price indices.
Also simultaneously the Call Center was equipped technically (telephone connections, PC's) and operators were selected and trained in telephone interviewing techniques and in the use of Blaise-CATI.
The IT team then developed, in narrow collaboration with the operators, interview screens as user-friendly as possible ; this also involved connections with the databases, both for data input and for extraction of previous data against which to check new data. Operators had to familiarise themselves with jointly using telephone and PC.
At the next stage first contacts were established with respondents in the sample, one Nace 4-digit activity at a time, in order to ask them if they were willing to co-operate; as an incentive they were promised monthly feedback on price evolutions in their own Nace 4-digit activity. Those agreeing to participate were then asked for help in identifying a very specific contact person for the survey and in further narrowing down product specifications (because in most

cases even 8-digit Prodcom products are still categories composed of many different products and product types) to an absolutely individual product and type.
Finally the survey went into production for the first 4-digit Nace activities: each month, in principle during the third week, contact persons receive a telephone call asking for the price of one or more very specific products. Based upon this information, output price indices for those 4-digit Nace activities are calculated and sent back to the respondents having contributed.

5. FUTURE DEVELOPMENTS

At present we are in still in the stage of acquiring experience with a wholly new unit, software, methodology and survey method. This means that databases, survey screens, ways of establishing first contact and so on still have to be adapted fairly regularly.
By September 2001 the survey should cover all industry and somewhat longer time series should be available, allowing calculation of aggregates and indices with a common base year. Once the survey is fully operational, we expect to be able to provide output price indices within one week after the end of the reference period. All normal dissemination products (press releases, graphs, tables, electronic files, web pages, etc.) will then also be available.

ESTIMATION PROCEDURES FOR MONTHLY RETAIL STATISTICS

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SUMMARY

The Federal Statistical Office plans to introduce the following measures with a view to accelerating the transmission of monthly retail statistics to Eurostat:

- a new estimation procedure;
- a dialogue during processing;
- combination of the advance information communicated for ECB purposes with the complete results provided for by the STS Regulation;
- organisation of online notification.

Taken together, these measures should accelerate the transmission of results by approximately two weeks. The first (new estimation procedure) will be examined in greater detail below.

PROBLEM

Efforts to ensure a more up-to-date presentation of the economic cycles revealed by the monthly retail figures are frequently hampered by the failure of certain Providers of Statistical Information (PSIs) to transmit their data in time. Although business statistics that are late in arriving can be used for retroactive corrections, they are of no value for initial results processing. Figures must be available from every PSI in time for tabulation. If data are not supplied or are incomplete or implausible and if they cannot be quickly collected, completed or rendered plausible, estimates provide the only option.

The "better" the estimates, the earlier tabulation can begin. Thus, a "good" estimate enhances statistical timeliness. What constitutes a "good" estimate and ways of testing estimation procedures will be examined below. The aim is to provide Germany with a procedure which will make it possible to produce a higher percentage of individual enterprise statistical estimates, without any loss of quality. This should speed up the monthly transmission of retail statistics to Eurostat by approximately two weeks.

CURRENT ESTIMATION PROCEDURE

The current estimation procedure will be described only briefly here. Although it has been used for several years for the processing of German retail statistics, it has not been altogether satisfactory in practice.

The procedure assumes a similar trend in the turnover and number of employees of an enterprise for which values have to be estimated as in sectoral rivals which supplied data on time.

The - extremely complicated - mathematical formula used will not be presented here.

Against the background of fierce competition in markets which have reached capacity, this approach is no longer methodologically acceptable. There is no valid reason why all the

enterprises in a sector should always develop in the same way. On the contrary, many economic situations reveal that the enterprises within a branch do not develop in parallel (e.g. when a bulk supplier takes business from a competitor by appropriate advertising or other means). In practice, therefore, the current procedure has often produced results requiring considerable subsequent correction (when the original notification data became available).

DRAFT NEW ESTIMATION PROCEDURE

Because of the unsatisfactory nature of the current estimation procedure, the search for new methods automatically excluded any based on parallel sectoral development. Moreover, among potential procedures, the focus was limited to those relying solely on available business data (i.e. from enterprises for which values had to be estimated), with no account being taken of extraneous information.

Subject to this limitation, the following estimation procedures will be examined:

A. „Naive“ estimates:

1. PM procedure:

Estimated value = preceding month's value.

2. PY procedure:

Estimated value = value of corresponding month of previous year.

B. „ Development estimates “
(Estimates which take account of trends in enterprise turnover and number of employees in preceding months); the example shows an estimate for the reporting month April 2001:

3. PR1 procedure:

This procedure assumes the continuation of the turnover trend of the entire preceding year in the reporting month.

$$\frac{April\,2001}{April\,2000} = \frac{Total\,(\,April\;\;2000\;\;to\;March\;\;2001)}{Total\,(April\;\;1999\;\;to\;March\,2000)}$$

It follows that:

$$April\,2001 = \frac{Total\,(\,April\,2000\;\;to\;March\;\;2001)}{Total(April\,1999\,to\;March\,2000)} \bullet April\;\;2000$$

4. PR2 procedure:

This procedure assumes the continuation of the turnover trend of the preceding quarter (relative to the corresponding quarter of the preceding year) in the reporting month.

$$\frac{April\ 2001}{April\ 2000} = \frac{January\ 2001 + February\ 2001 + March\ 2001}{January\ 2000 + February\ 2000 + March\ 2000}$$

It follows that :

$$April\ 2001 = \frac{January\ 2001 + February\ 2001 + March\ 2001}{January\ 2000 + February\ 2000 + March\ 2000} \bullet April\ 2000$$

5. PR3 procedure:

This procedure assumes the continuation of the turnover trend of the preceding month (relative to the corresponding month of the preceding year) in the reporting month.

$$\frac{April\ 2001}{April\ 2000} = \frac{March\ 2001}{March\ 2000}$$

It follows that:

$$April\ 2001 = \frac{March\ 2001}{March\ 2000} \bullet April\ 2000$$

Estimation procedures should be selected on the following basis: the smaller the difference between the estimated value and the unestimated original value, the better the procedure.

This general principle was represented by the following symbols:

x_i^* = estimated value of enterprise i
x_i = true value of enterprise i
n = number of enterprises

Mean absolute error MAE:

$$MAE = \frac{\sum_{i=1}^{n} |x_i^* - x_i|}{n}$$

Root-mean-square error, RMSE

$$RMSE = \sqrt{\frac{\sum_{i=1}^{n} (x_i^* - x_i)^2}{n}}$$

MAE relative to average all-enterprise true values, AMAE

$$AMAE = \frac{MAE}{Average\ all-company\ \ true\ \text{values}}$$

A pilot project will be conducted to examine the values obtained for these symbols in the individual estimation procedures. The calculation will cover Bavarian retail undertakings over two reporting months and will focus separately on "turnover" and "employment". The symbols will make it possible to rank the individual estimation procedures.

Although the methodology for determining the optimum estimation procedure has already been established (March 2001), calculations have not yet been carried out so that the results of the exercise cannot be presented.

FURTHER ACTION

On the basis of a comparison of estimated (i.e. how would an unnotified value be calculated by computer?) and original values, the different estimation procedures will be ranked according to quality with the aid of the above-mentioned symbols. Although the use of reliable business data and reference to symbols for the establishment of such an order of priority is extremely expensive, it has the great advantage of providing a precise mathematical indication of quality.

The highest-ranked procedure will be selected for the future processing of Germany's monthly trade statistics.

More rapid transmission of trading results to Eurostat cannot be expected before the reporting month January 2002.

COMBINING METHODOLOGY, QUALITY AND PUNCTUALITY

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SUMMARY

The entry into force of Council Regulation 1165/98 of 19 May 1998 and the creation of the European Monetary Union (EMU) set a new challenge for the Member States.
Although the Member States are obliged to implement this Regulation by the set deadline, they cannot ignore the need to pay special attention to the requirements of the European Central Bank (ECB) with regard to short-term statistical indicators.

This text deals with the way in which the Regulation has been implemented in Portugal, the difficulties encountered in trying to keep to the deadlines and the methodological principles set out in it to ensure a high level of quality, as well as the future developments which may occur in this domain.

In Portugal, it has been possible to reduce the deadlines for making the information available by remaining within the additional period allowed by the Regulation for Member States representing less than 3% of the EU's total and at the same time adhering to and in some cases even keeping shortening the general deadline. The quality of the information which is made available has been ensured in that the coverage of replies is around 85 to 90% in the first issue, the subsequent revisions of information have been reduced and the internal consistency of indicators has been guaranteed.

The continuation of the process of shortening deadlines whilst taking into account the needs of the ECB and users in general is possible, but to achieve this it will be important to mitigate some of the requirements set out in the Regulation, notably as regards the level of detail and observation units, as well as the definition of the harmonised criteria for the statistical production of these types of indicators. On the other hand, the dissemination process which is to be applied may be reviewed.

FRAMEWORK

Although at the time of approval of the Regulation, the Member States already had a significant portion of the indicators listed in it available, these indicators did not have the level of detail or characteristics mentioned in it.

However, in some cases, indicators had to be created since they did not exist in the national statistical systems. Since the Regulation only came into force in May 1998 and in the knowledge that each of the indicators to be presented in the form of an index had to take as the base year the years ending in 0 or 5, 1995 had to be adopted as the base year. Now since the national statistical authorities did not have basic statistical information for the period between the start of 1995 and 1998, in Portugal it was decided to create these new indicators only for base year 2000=100 – a possibility allowed by the Regulation since the Member States are allowed a transitional period of five years after the entry into force of the Regulation. Nonetheless, and in view of the needs to make the new indicators available early, every effort was made to reduce the transitional period to four years.

Already existing indicators were supposed to follow the Regulation's provisions. However, since a statistical series already existed it was difficult to revise it in order to take into account the details of the Regulation. In this case, too, it was decided to carry out the methodological revision only for base 2000=100 in cases where the differences did not clash squarely with the Regulation.

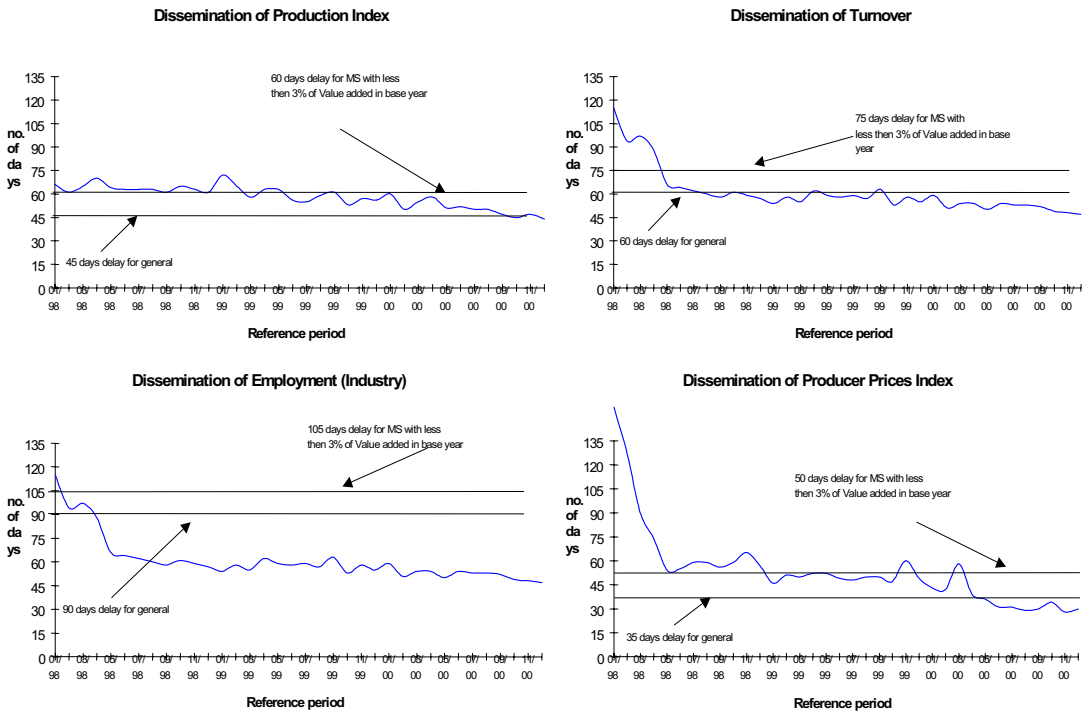
The demands of the ECB with regard to punctuality represented the main challenge for the national statistical authorities. With a transition period of 5 years, the Member States had the opportunity during that time to make the necessary adaptations in order to comply with the wording of the Regulation on deadlines. Nonetheless, the ECB, in order to administer European Monetary Policy, needs up-to-date statistical information and therefore requires the forwarding of most of the indicators before the deadline set in the Regulation itself. Thus an enormous effort had to be made to respond positively to the ECB's needs – Statistical Requirements of the European Central Bank in the field of General Economic Statistics, August 2000 - . This is the context in which some of the main objectives achieved by Portugal with regard to punctuality lie.

PUNCTUALITY

Being aware of the ECB's statistical information needs, Portugal has made efforts to provide the indicators proposed by the Regulation as early as possible and has introduced improvements to the statistical production process with fairly positive results. Our preoccupation with shortening deadlines is not limited to meeting the provisions of the Regulations, but also involves shortening these deadlines, and making a positive response to the ECB's legitimate needs and those of other important users with regard to the availability of short-term indicators. Thus, although able to take advantage of a further deadline for forwarding the different indicators to Eurostat by virtue of its weight within the EU of less than 3% of the total, Portugal has kept the period for making data available similar to the general one or is shortening it.

In this context, in February 2001 (data publication), we have the following deadlines for making some indicators available:

- Index of industrial production: **44 days;**
- Index for the volume of business in industry: **50 days;**
- Index for employment, remuneration and hours worked: **50 days;**
- Index for the prices of industrial production: **29 days;**
- Index for the volume of retail trade business: **74 days;**



It can be concluded from these graphs that for the four indicators, Portugal forwarded the data for the most recent periods even before the deadline set out in the Regulation. However, in the case of the Volume of Trade in the Distributive Trade (not presented), information was made available within the deadline allowed the Member States which have less weight within the EU, but there are prospects for it being shortened.

The shortening of deadlines has been achieved gradually, and it has been made possible by the introduction of minor changes to the process of producing indicators, namely:

- the creation of a group of statistical units which are subjected to an intensive campaign of persuasion to reply within the deadline;
- the establishment of personalised contacts with the statistical units;
- advanced analysis of the results (as and when the replies arrive);
- the simplification of the collecting process.

Despite the improvements already established, it is planned for the already started process of shortening deadlines for making data available to continue. To achieve this, it is planned to change the collecting process by starting to use, as early as in 2001, e-mail and the internet, which will facilitate replying and establishing contact with the statistical units.

QUALITY

The approach we have followed in shortening deadlines was generally based on the idea that shortening deadlines cannot be achieved at the cost of the quality of the information to be provided. In actual fact, in Portugal an effort has been made to shorten deadlines whilst maintaining the existing level of quality.

COVERAGE

With regard to coverage, we set the ambitious objective of meeting the deadlines set out by the Regulation whilst maintaining representativeness. This objective was achieved in that currently the response rate (coverage), for the first forwarding of each indicator, is about 85 to 90% and, for the second data transfer, the coverage is generally above 95%.

Being aware that it will not be possible to continue the initiated process of reducing deadlines for the availability of statistical information without reducing the rate of coverage, we believe it is important to discuss adopting a minimum limit which should be maintained in order to guarantee the quality of the different indicators.

Reducing the coverage rate and consequently increasing the share of estimated information can cause problems regarding the quality of indicators at both national and European level. For example, if we opt to accept a coverage of 70% of the weight of the Member States for a specific indicator and each of the Member States presents a coverage of 70%, the indicator in question will be published with a coverage at EU level of 49%. In other words, 51% of the information to be made available will be estimated. It is certain that this apparently pessimistic scenario does not correspond to reality since the method used for estimating results have proved fairly satisfactory. Nonetheless, it is a risk which will have to be taken into account and discussed by everybody.

Consequently, it is felt that it is relevant to discuss among the Member States, and users in general, the criteria regarding coverage since it is an important factor influencing the quality of the indicators to be produced. It should be emphasised that the proposed analysis will have to be carried out for each indicator since some appear to be more stable than others. In other words, the coverage rate can vary at a rate which is inversely proportionate to the indicator's stability. For example, the number of persons employed presents greater stability when compared with the volume of trade, which means a lower coverage rate will be acceptable.

REVISIONS

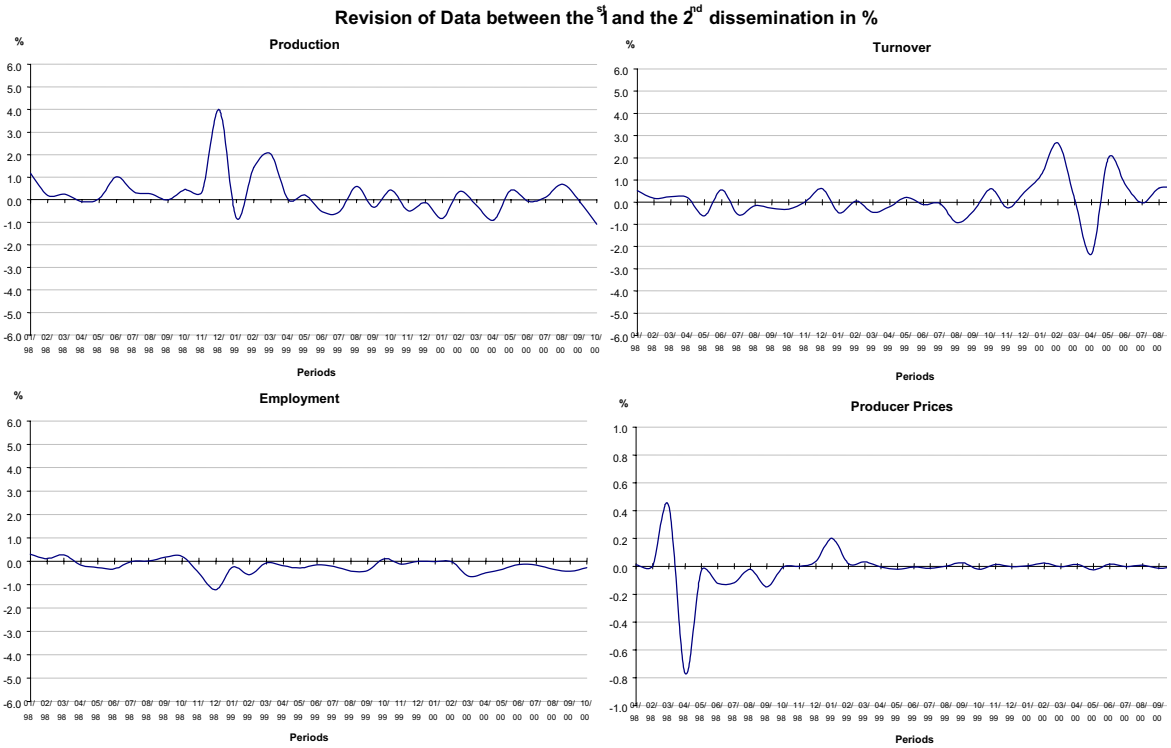
When the shortening of deadlines is considered, due attention should be given to the question of revising results. In effect, when less time is given to the replies of the observed units and less time is available for analysing results, we may be confronted with significant variations in the information published.

In the specific case of Portugal, the revision of the general index of the first transfer of data for the purposes of the second transfer has led to the presentation of not very high values in the different indicators - the Index of the Prices of Industrial Production even registers variations of less than 0.5%, except in one case.

It is to be hoped that there will be major revisions with the shortening of deadlines, together with the reduction in the coverage rate and shortening of the time available for analysing results. However, we feel that in this matter, too, the implications of such revisions will have to be studied in detail, namely by the main users: “Is it preferable to obtain statistical information later but with the possibility of its being revised or to obtain information later with a higher degree of reliability?”; “What is the acceptable limit for revisions of data?”.

In this case, the possible definition of acceptance limits for data revision will have to depend on the indicators - for example, for the production prices, no consideration should be given to major revisions.

CONSISTENCY



Throughout the process of shortening deadlines which has been pursued by Portugal, there have been worries about maintaining internal consistency for the different indicators as well as the coherence of the replies of the statistical units surveyed.
In effect, comparisons of replies are regularly made at statistical unit level and if differences are detected, explanations are requested – the comparative analysis cannot be limited to the indicators covered by the Regulation but consideration is also given to other statistical operations such as external trade statistics.

Consistency between indicators has also been ensured, and for this purpose, methodological differences between the indicators and characteristics of each sector of activities have been taken into account. For example, in the textile and clothing industries, orders for the autumn/winter collection are placed at the beginning of the year (an increase in new orders is recorded), the production associated with this collection is started in summer (when an increase in production for stocks is recorded), sales of the products are started at the end of summer and in early autumn. In this small example, which with appropriate adaptation can be applied to other activities, it can be seen that the information collected from the statistical units is consistent in spite of the fact that the comparison of the different indicators may lead to inconsistency of information if badly interpreted.

If deadlines continue to be shortened, it is likely that situations will crop up where inconsistencies may occur. However, if the rate of analysis is maintained, the statistical units will also begin to notice that the consistency of replies will need to be maintained.

ANALYSIS OF RESULTS

In order to ensure the quality of information to be made available a major effort needs to be made on analysing results. Such analyses are intended to reduce any errors caused by incorrect replies by the statistical units.

Currently, two periods for the analysis of results have been defined. The first is about 25 days after the reference period (for the Industrial Production Index), with a response rate of about 30 to 40%, when the replies already received are verified. Such an analysis involves comparing each reply with the previous period, with the same period of the previous year, as well as analysing the entire series.

The second analysis is carried out a few days (three to five days normally) before the results are forwarded, with the same type of comparisons as before.

Generally it can be said that this new process for analysing results has led to the securing of very positive results since it makes it possible to verify and monitor at an early stage the information which is to be forwarded.

The continuation of the already initiated process for shortening deadlines will result in the shortening of the time available for analysing results, but it is felt that the early verification which has already been started will allow this problem to be sorted out in some way.

METHODOLOGY

In the process for shortening deadlines and monitoring results at an early stage there are some methodological restrictions which need to be taken into account and for which some compromises can be established.

STATISTICAL UNIT

Council Regulation nº 1165/98 states that for Annex A on industry, the observation unit should be the kind-of-activity unit (KAU) only in the case of companies with few persons (the Regulation does not specify what is meant by few persons), use may be made of the local unit (establishment) or enterprise for this purpose.

For shortening deadlines, the use of an observation unit other than the KAU may largely facilitate the INE's tasks. In effect, for some indicators the use of the enterprise as the observation unit allows good quality replies to be obtained more quickly.

The case of the Volume of Business Index would appear to be one of these situations.

It is clear that the information obtained from kind-of-activity units is more complete and allows the situation of each activity to be identified more easily. However, it is also true that many enterprises only perform one activity. It is all the more beneficial when such an analysis is to be made at the division level of NACE Rev. 1. On the other hand, from the point of view of the accounting of enterprises, it is much easier to provide accounting elements at enterprise level than KAU level.

Consequently, when trying to shorten deadlines without having substantial effects on accuracy, use of the enterprise as the observation unit could be permitted and enormous gains in reduced deadlines could be achieved; it should be noted that at times enterprises have problems of forwarding information at KAU level.

LEVEL OF DETAIL

Regulation nº 1165/98 establishes too fine a level of detail compared with the main objective of indicators.

We agree that some level of detail is required in order to identify the specific situation of different economic activities. Nonetheless, the fact that the Regulation specifies that Member States must provide detailed or non-detailed statistical information by the same deadline is certainly a factor which limits the quality of information and the possibilities of further shortening deadlines.

We have no doubts about the need to have information available at division, group or even class level, but will it be necessary to have this information available in such a short space of time?

We feel that the adoption of a pragmatic approach to this question could make it possible for Member States to have the information on these indicators available on a phased basis. First, the indicators could be made available at a more global level (General Index, Section of NACE Rev. 1 and MIGS). Later, the same indicators could be forwarded at a more broken down level. In this way, it would be possible to limit cases requiring major revision and guarantee better quality of the information forwarded.

The simplification of the level of detail will make the forwarding of aggregated data more feasible by the deadline set out in the Regulation (or even before) and afterwards, the revised data can be made available with the required level of detail.

On the other hand, for the first transfer of data, Eurostat could opt for the dissemination of information of EU15, EU12, etc, and require information at Member State level only at the second stage.

CONCLUSION

The shortening of deadlines for making data available is possible and may be continued. However, it cannot be achieved at the cost of quality of statistical information.

To continue the process which has already started and respond to the needs of users, especially the European Central Bank, it will be necessary to rethink the process of disseminating information and perform a critical analysis of the current Regulation.

In order to make it possible to shorten deadlines for forwarding statistical information on short-term indicators, all parties: the Member States, Eurostat and users, need to be involved.

WHY US BUSINESS INDICATORS ARE FASTER AVAILABLE THEN THOSE FROM THE EU – SOME REFLECTIONS AND A COMPARISON OF PRACTICES

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The views expressed are purely those of the writer and may not in any circumstances be regarded as stating an official position of the European Commission.

SUMMARY

US business cycle indicators are much faster available than the same indicators from the EU. Why? This paper explores general structural differences in the organisation of the production of these figures between the US and the EU, turns after this to some selected indicators, and looks at data sources and the timetable of data collection. A brief summary and some information about data revisions are provided for each examined indicator.

INTRODUCTION

When Alan Greenspan gave a speech on the 13th of February 2001, he knew already the retail sales data for the reference month of January 2001. At the same day Willem Duisenberg, knew the Euro-zone retail sales figure for reference month November 2000 only.

The US publishes its indicators much faster then the EU. Why? Answers to this question will be found in this paper.

To be fair, much progress has been achieved in the EU during the last two and a half years. The average delay in the publication of industrial production data came down from over 80 days after the reference month (February 1998 was even published 100 days after the reference month) to about 50 days now. The timeliness for the producer price index has improved from 45 days to about 35 days and two years ago there was no available Euro-zone aggregate for retail trade turnover. Still much remains to be done.

How much? An idea could come by looking at the US as they produce economic data in a speedy way. So how do the US americans manage to produce economic data so fast? And what are their differences to the EU practices?

GENERAL OBSERVATIONS

Before looking at the differences, it is worth mentioning a commonly shared structure in both the US and the EU.

In one way or another, the US and the EU have both a decentralised statistical structure. In the US several government agencies, not only one, collect various business cycle indicators and publishes them. For example, the Bureau of Labour Statistics collects data for the consumer price index, treats the data and releases the figures. In the EU, each Member State collects statistics for each economic indicator and transmits those figures to Eurostat, which aggregates the data, treats them and publishes the EU and Euro-zone figures. So you could say that both, the EU and the US, have a decentralised system, but organised in a different way.

These different structures do not necessarily imply that one system is faster or better than the other system. A US system, would it be inefficient at the federal level, would be worse than an efficient EU style system. The functioning of the federal level is crucial in the US, and the important element in the EU are the Member States. It is therefore not unavoidable that the US system is better, or faster than the EU system.

Looking at the real world, however, we discover that the US system produces most of the business cycle indicators faster than the EU system. Given the same state of the rule of law, the will to abide to a certain work ethic and similar basic assumptions, even only a few theoretical reflections show that the US system has some fundamental underlying strong points.

Starting with the obvious one. The US has a federal sample for the whole economy, while each of the EU Member States runs its own survey. In the EU, the overall aggregate is not determined by the total number of respondents, but by the aggregates of individual Member States. This implies that more respondents are needed in the EU than in the US to get the aggregate result. To use a picture: say you need 8000 enterprises in a survey to get the industrial production figure for the US. To get a result for Germany alone, you might need 5000 enterprises. Add to that 4000 enterprises for France and another 3000 for Italy and Spain, and you see that you need much more respondents to get 80% of the Euro-zone information than to get 100% of the information needed for the US figure. This is one structural advantage of the US system.

In this context it might be worth wondering if the current EU system fulfills the requirement of subsidiarity, as some ask themselves if the statistics could not be better compiled at the European level, with a European survey, and not at the Member State level. This question could be posed when we speak about burden on business, as the number of businesses needed for an EU figure should currently - from a theoretical point of view - be much higher than if the survey would be organised in a European way.

Nevertheless, the US has at least another structural advantage. The Office of Management and Budget (OMB), an executive Office of the US President, has the authority to issue and to enforce standards and guidelines concerning the timely release of statistical data [1]. Currently the OMB demands from government agencies that they issue their releases within 22 working days after the reference period. The agencies are obliged to follow this request. In the EU, on the other hand, Eurostat has no such authority, as legal acts have to be – to present the general case - approved by the qualified majority of the Member States [2]. If Eurostat thinks that a modification of an existing Regulation is necessary, it has to convince the majority of the Member States first. And this can be difficult. In this respect, the OMB is much stronger than Eurostat.

An agency, commited to issue guidelines and create and enforce the necessary requriements for fast statistics can overcome the possible problem of free rider and prisoner’s dilemma as well. Look at the EU. Even if all EU Member States would independently from each other come to the conclusion that faster statistics are important, a small Member State could opt to take a free ride and wait for the others to act, as its contribution is to small to make a difference and therefore not essential. Larger Member States might know that their figures are indispensable. However, they face a kind of prisoner’s dilemma. If one of these larger Member States would really insert the necessary resources in its system in order to speed up the data delivery, it could never know, let alone be sure, that the other larger States would do the same. But if the others do not act in the same way, the efforts of any Member State would be in vein.

However, with a legal requirement and a strong law-enforcing agency, each Member State would know that everybody had to do the necessary thing. If everybody knew that everybody else would have to do the effort, each Member State would start to make the required changes and the result would be faster statistics for the EU/Euro-zone. Therefore, in this context, a strong central law-enforcing agency is an asset and the US has it to a higher degree than the EU. This is another structural advantage of the US system.

Turning now from general reflections to specific ones and thereby to business cycle indicators to look for concrete answers. The following examples will examine the cases of industrial production, the producer price index and the index of retail sales. These three indicators are chosen because they are compiled and published in a news release each month in the unit of Eurostat where the author is working since May 1998. Their legal base is the short-term statistics Regulation from 1998, which is currently in the process of being implemented.

The indicators will be treated in turn, starting with industrial production. Next are the producer price index and the index of retail sales. As the purpose of this short paper is to examine the timing and organisation of selected short-term business statistics between the US and the EU, the following comparison will treat only a few, key issues. It will look to the source of the data, the timetable of data collection and eventually, if available, the coverage for the first estimates and subsequent revisions. Each section will conclude with a brief summary and a table showing a snapshot of revisions for each indicator. This table is introduced to put a spotlight on user needs, as users are often not interested in underlying methodological details but see only the actual figure and the revisions for the previous month. Therefore, this table a kind of quality indicator, although it goes without saying that there are numerous others and a high or a low level of revisions does not, in a technical sense, prove anything about quality.

INDUSTRIAL PRODUCTION INDEX (IPI)

The index of industrial production is currently published from Eurostat about 50 days after the reference month, while the US releases its indicator about 15 days after the reference month. Why?

CONCEPT AND TIMETABLE OF DATA COLLECTION

IPI IN THE US…

The production index is published in the US by the Federal Reserve. It uses three main sources for the index. For two of them, hours worked and physical output, information is relatively quickly available. These two sources give information about the industrial output before the reference month is over. The three sources are:

- Production-hours worked by workers (collected by the Bureau of Labor Statistics on the bases of a survey which covers a pay period in the middle of the month)
- Physical measures of output (often collected weekly. This is based on both private and government surveys; typically physical output units for representative products; weights are used to combine the data when one needs more than one product to represent the industry. Includes in the first estimate provisional series totaling nearly 13 percent of index that are derived from weekly data and for which the actual data may lag several months.)

- Electric power use becomes only available for the first revision (from the Federal Reserve District banks using data from electric utilities and enterprises that generate their own electric power)

A first estimate is published with about 48% of the coverage available. In successive release months, data coverage increases to 85%, 96% and 97% [3].

Data collection for the industrial production index in the US

Type of data	1st release month	2nd release month	3rd release month	4th release month
Physical product	20%	31%	42%	43%
Production-worker hours	28%	28%	28%	28%
Electric power use	0%	26%	26%	26%
Federal Reserve estimates	53%	15%	4%	3%

…AND THE IPI IN THE EU

The EU/Euro-zone index published by Eurostat is based on the council regulation for short-term statistics. Member States have to transmit working days adjusted data not later than 45 days after the reference month to Eurostat. "Small" Member States have up to 15 days more to transmit the index. Member States are encouraged to transmit seasonally adjusted figures. If they do not, Eurostat makes the seasonal adjustment itself.

When looking at the timetable of data collection for the EU Member States in STS-Sources [4], all available information points to a practice that questionnaires are sent out shortly before, at or just after, the reference month is over.

With how much coverage do EU Member States publish their first estimation of the Industrial Production index? (Available data for the year 2000)

	1st estimate	2nd estimate	3rd estimate	4th estimate
Belgium	75%	90%	98%	None
Denmark	95%	100%		
Spain	95%***			
France**	80%			
Greece	92%	96%		
Ireland	90%			
Italy	91%	96%		
Netherlands	80%***	n.a.		Reaches 96% after some periods
Austria	96%	100%		
Finland	99.9%			
UK	82%	90%	92%	93%

Responses to Eurostat from Member States to a question posed to them in the year 2000; **minimum, ***answer based on STS-sources

The responses from those Member States who replied to this question from Eurostat shows the difference to the US. Each Member State waits to get at least 70% of the source data, and in most cases, Member States collect much more information for the first release. Denmark,

Greece, Ireland, Italy, Austria and Finland publish their first estimate with more than 90% of data available, while France and UK publish with at least 80%.

You would expect that those Member States who wait to get more data coverage for their first release publish their index later than the others. However, this is not necessarily the case. Some Member States publish their first estimate with the same amount of coverage as others, but not necessarily at the same date. Keeping in mind the above table, this can be seen by looking at the table below.

Publication dates of EU Member States (for reference Month of November 2000)

First arriving Member States (Luxembourg has transmitted an econometric estimate at the 4th of January)	Publication data/arrival date* (*whichever was earlier, except for embargo data**, where the publication data was taken - source STS Calendar)
DE	8th of January
BE,DK,ES,UK	12th of January
NL,FI,PT	15th of January
IT	17th of January
FR**	19th of January
EU/Euro-zone	19th of January

Eurostat waits for Member State coverage of at least 60% before publishing the EU/Euro-zone index. If timelines allows, Eurostat tries to get more coverage.

COMPARISON AND REVISIONS OF THE IPI FOR THE US AND THE EU

The US index is compiled by one institution, the Federal Reserve, which uses data from other sources. Eurostat publishes the EU index, by relying on information coming from the 15 EU Member States.

At the end of the reference month, the Federal Reserve has already information about this month, while EU Member States are about or have just send out their questionnaires.

The US publishes its first estimate with only about 48% of the data coverage available, while most EU Member States wait to get at least 80%, or much more.

What about revisions? In the US, the average revision for the total production index, without regard to the sign, between the first and the fourth estimates was 0.28 percentage during the 1987-1997 period. The average revision to the percentage change in the growth rate has been, without regard to sign, from the first to the fourth estimate 0.21 percentage points during the same period. In about 83 percent, the direction of change in output indicated by the first estimate for a given month is the same as that shown by the fourth estimate.

And in the EU? A comparison over such a long period does not exist and it would be very complicated to accomplish. After all, EU Member States rebase their figures every five years and this is not the case for the US. Therefore a comparison of indices between now and the same index value some time ago is not very useful.

The following table tries to compare the revisions in another way. It compares the first growth rates published for a reference month, either in the Federal Reserve publication for the US, or in the equivalent Eurostat news release, with the growth rates published for the same reference month, but two-month later.

Revisions for industrial production

	Jan 2000	Feb 2000	Mar 2000	Apr 2000	May 2000	June 2000	Jul 2000	Aug 2000	Sep 2000	Average revisions, not looking at the sign
US	0.0	0.1	0.4	0.1	0.2	0.1	0.6	0.2	0.1	**0.20**
Euro -zone	0.1	0.3	0.2	0.2	0.2	0.1	0.0	0.2	0.0	**0.14**
EU	0.1	0.3	0.3	0.4	0.1	0.0	0.2	0.1	0.1	**0.18**
BE	0.4	0.6	0.1	0.9	0.1	0.1	0.4	1.0	2.1	**0.63**
DK	0.9	0.0	0.6	0.2	0.6	0.5	:	0.3	0.6	**0.46**
DE	0.5	0.1	0.1	0.8	0.7	0.0	0.1	0.1	0.0	**0.27**
ES	1.0	1.3	0.1	0.0	0.0	:	0.1	0.1	0.1	**0.34**
FR	:	0.1	0.3	0.3	0.1	0.2	:	0.0	0.2	**0.17**
GR	:	:	:	:	:	:	0.1	:	:	**0.10**
IE	:	:	:	:	:	:	:	:	:	
IT	0.1	0.9	0.0	0.3	0.5	0.1	0.0	0.1	0.1	**0.23**
LU*	:	:	7.7	:	5.2	2.9	6.1	1.0	1.9	**4.13**
NL	1.1	0.5	0.3	0.7	1.4	0.4	0.7	0.5	0.5	**0.68**
AT	:	:	:	:	:	:	:	:	:	**0.00**
PT	:	0.1	:	:	0.4	0.1	0.0	1.0	0.6	**0.37**
FI	0.1	0.0	0.8	0.1	0.3	0.2	0.1	0.2	0.3	**0.23**
SE	:	:	:	:	:	:	:	:	0.0	**0.00**
UK	0.2	0.0	0.3	0.0	0.2	0.1	0.6	0.1	0.0	**0.17**

: = Member States, which did not provide data at the time of the first publication from Eurostat for the referred reference month. Example: For Member State X the first rate for March 2000 has been 0.4%. In the publication for the reverence month of May, the March 2000 rate had been revised to 0.7%. Then the figure for these Member State in the column for March would be 0.3. *=Luxembourg has send a first estimation based on a mathematical procedure. On the right side of the table, you see the average of these revisions. As it is important to measure the revision, the sign of the rate is not taken into account. It is obvious that this comparison is only a snapshot and can never represent the full picture. The utilized growth rate is the seasonally adjusted month on month figure. Seasonally adjusted Member States figures are adjusted by Member States, if they provided the figure, otherwise Eurostat has adjusted the figure. The period chosen was taken because Eurostat has published for the first time a news release with seasonally adjusted figures for industrial production for the reference month of January 2000. Extraordinary circumstances, like rebasements etc., could have happened for some series during the observation period.

This snapshot comparison shows that the US (0.20) has a slightly higher revision rate than the Euro-zone (0.14) in the observation period. However, the differences are far from dramatic. Especially the EU figure (0.18) is fairly close to the one from the US. The revision rates from a number of Member States are larger, sometimes much larger, than the US rate. For example the revision rate of Germany (0.27), Spain (0.34) and Italy (0.23) is higher than the US rate. France and UK (both 0.17) have a slightly lower rate than the US, but not in a significant way.

PRODUCER PRICE INDEX (PPI)

CONCEPT AND TIMETABLE OF DATA COLLECTION

The producer price index is published by Eurostat about 35 days after the reference month, while the corresponding US index is out about 15 days after the reference month.

THE PPI IN THE US…

In the US the index is compiled by the Bureau of Labour Statistics. The primary source for compiling the sample for the price information is the Unemployment Insurance System, because most employers are legally required to participate. Additional information from publicly available lists is used to refine the frame of establishments [5].

Most prices refer in the US to the Tuesday of the week containing the 13th. However, for some products there are exceptions: like for prices for some refined petroleum products were an average of prices from the first 10 working days of the month are taken or prices received by oil refineries on the tenth working day. Prices for natural gas to pipelines, liquefied petroleum gas, some industrial chemicals, compact discs and audio tapes are based on data for the calendar month as a whole and therefore lag 1 month behind the other indices [6].

…AND THE PPI IN THE EU

The index published by Eurostat is compiled by collecting data from Member States. They have to transmit data not later than 35 days after the reference month, except for “small” Member States, which have 15 days more to deliver the data. Data are gross and therefore not adjusted. The index is based on the regulation for short-term statistics from 1998.

The available information in STS-Sources reveals that some Member States send here questionnaires to enterprises already during the reference month. But the common definition decided in a meeting at the end of the year 2000 asks Member States to provide data representing an average of the whole reference month.

COMPARISON AND REVISIONS OF THE PPI FOR THE US AND THE EU

The Bureau of Labour statistics processes data for the PPI on information available from the Unemployment Insurance System. In the EU, the data collection takes place in the Member States, they compile the index and transmit it to Eurostat, which published EU and Euro-zone aggregates.

US data refer normally to a day during the month, while the EU Member States give information based on the average of the whole month.

And what about the revisions? In the US, all unadjusted Producer Price Indices are routinely subject to revision only once, 4 months after the first publication, to reflect late reports and corrections by company respondents. Once revised, indices are considered final. The EU does not have a common revision policy. Therefore, Member States are free to choose their own method.

The following gives a comparison of the revisions for US, the Euro-zone, EU and the other Member State figures. It compares the first growth rate published for a reference month, with the growth rate published for the same reference month, but four month later.

Revisions for the producer price index

	Nov 1999	Dec 1999	Jan 2000	Feb 2000	Mar 2000	Apr 2000	May 2000	Jun 2000	Jul 2000	Aug 2000	Average revisions, not looking at the sign
US	0.1	0.2	0.1	0.1	0.3	0.1	0.1	0.3	0.1	0.2	**0.16**
Euro -zone	0.1	0.1	0.1	0.0	0.1	0.2	0.1	0.0	0.0	0.1	**0.08**
EU	0.1	0.1	0.1	0.0	0.1	0.1	0.1	0.0	0.1	0.0	**0.07**
BE	:	:	:	:	:	:	:	:	:	:	**:**
DK	:	:	:	:	:	:	:	:	:	:	**:**
DE	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.00**
ES	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.00**
FR	0.1	0.0	0.3	0.3	0.7	0.6	0.7	0.0	:	0.1	**0.31**
GR	:	:	:	:	:	:	:	:	:	:	**:**
IE	:	:	:	0.1	0.0	0.0	0.0	0.0	0.0	0.0	**0.01**
IT	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	**0.01**
LU*	:	:	:	:	0.4	1.0	:	:	:	:	**0.70**
NL	0.1	0.2	0.1	0.0	0.0	0.1	0.0	0.0	0.5	0.0	**0.10**
AT	:	:	:	:	:	:	:	:	:	:	**:**
PT	:	:	:	:	:	:	:	:	0.0	0.1	**0.05**
FI	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.00**
SE	:	0.0	:	0.0	0.0	0.0	0.0	0.0	0.0	0.0	**0.00**
UK	0.3	0.0	0.1	0.2	0.1	0.2	0.1	0.1	0.0	0.0	**0.11**

: = Member State did not provide data at the time of the first publication from Eurostat of the reference month; the principle is the same like the one used for the table on industrial production above, except that the comparison is based here on four month later. *=Luxembourg has send a first estimation based on a mathematical procedure. The month on month rates are calculated on the bases of unadjusted rates for the Euro-zone, the EU and its Member States, but seasonally adjusted rates are taken for the US, as they publish these rates. The comparison with the same reference month 4 month later is used to take the information about US revisions into account. The time period chosen is longer then those for industrial production as Eurostat publishes a relevant rate since the summer 1999. Extraordinary circumstances, like rebasements etc., could have happened for some series during the observation period.

The Table shows that for the producer price index the revisions are clearly bigger in the US (0.16) than in either the Euro-zone (0.08) or in the EU (0.07). US revisions are higher than those from most available Member States. Ireland and Italy have a revision rate in the observation period of 0.01 each, while Germany, Spain, Finland and Sweden have no revisions at all. Member States that have higher revisions than the US were France (0.31) and Luxembourg (0.7).

THE RETAIL TRADE SALES INDEX (RT)

Eurostat publishes the index of retail trade about 60 days after the reference month. The US publishes this index about 15 days after the reference month.

CONCEPT AND TIMETABLE OF DATA COLLECTION

THE RT INDEX IN THE US…

In the US, Retail sales should measure the nominal sales values from companies with one or more establishments that sell merchandise and related services to final consumers. Therefore, the index is not adjusted for price effects. The survey is conduced by the US Census Bureau with a mail-out/mail-back survey [7].

Each month the Census Bureau in the US issues three sets of estimates for the retail sales index: an advance, a preliminary and a final index. The total sample for retail trade is about 13300 retail businesses with paid employees. Each month, the advance retail trade figure is published after 9 working days with a sample of about 4100 selected enterprises. A form for this advanced survey is mailed to enterprises 5 working days before the end of the reporting month and responses are due 3 working days after the reporting month. About 6 weeks after the close of the reference month preliminary figures for the current month and final figures for the previous month are released. For example, the advance monthly retail sales figure for the reference month December 2000 was published on the 12th of January 2001. It contained advance estimates for December 2000, preliminary estimates for November 2000 and final estimates for October 2000.

The response to the monthly survey is not mandatory. The response rates for the monthly surveys are usually around 80% for retail sales. The coverage rates for the three respective estimations could not be found.

… AND RT IN THE EU

Eurostat publishes a volume indicator, a deflated index. It covers retail sales, except the sales of motor vehicles, motorcycles and excludes repair of personal and household goods as well. The index is based on the regulation on short-term statistics from June 1998. Questionnaires in most Member States are send during or after the reference month. From the available information STS-Sources, it is not clear if any Member State has already information about the reference month during the reference month.

In the EU, data series for retail trade are transmitted from Member States to Eurostat. The data are used by Eurostat to calculate EU and Euro-zone figures. The Regulation on short-term statistics asks Member States to transmit working day adjusted figures. Member States are invited to transmit seasonally adjusted figures as well. If seasonally adjusted figures are not transmitted, Eurostat makes the adjustment itself. Aggregate data should be transmitted from Member States not later than two months after the reference month. “Small” Member States have up to three month to transmit the information.

COMPARISON AND REVISIONS OF THE RT INDEX FOR THE US AND THE EU

The US index is compiled by the US bureau of census, while in the EU, data are collected by EU Member States and they transmit their indices to Eurostat, which publishes the aggregate EU and Euro-zone information.

The US advance index is based on a small subsample of the total information available, which allows for fast publication of a first information for the reference month. EU Member States send their questionnaire out during or just after the relevant reference month. What about the revisions here?

The following gives a comparison of the revisions for US, the Euro-zone, EU and the other Member State figures. It compares the first growth rate published for a reference month, with the growth rate published for the same reference month two month later.

Revisions for Retail Trade

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Average revisions, not looking at the sign
US	0.1	0.3	0.0	0.3	0.4	0.1	0.1	0.2	0.1	**0.19**
Euro -zone	0.2	0.3	0.1	0.5	0.4	0.3	0.1	0.1	0.0	**0.22**
EU	0.1	0.1	0.0	0.2	0.5	0.4	0.0	0.0	0.1	**0.16**
BE	:	:	:	0.2	:	0.9	0.2	:	0.3	**0.40**
DK	:	:	:	:	:	0.3	:	0.2	:	**0.25**
DE	1.1	1.0	1.1	0.0	0.4	0.4	0.0	0.2	0.2	**0.49**
ES	2.7	0.2	0.6	0.2	0.2	0.5	0.1	0.1	0.1	**0.52**
FR	:	:	:	:	:	:	:	:	:	**:**
GR	:	:	:	:	:	:	:	:	:	**:**
IE	:	:	1.0	1.0	0.5	0.1	0.0	0.4	0.0	**0.43**
IT	0.1	0.0	0.1	0.2	0.1	0.2	:	0.0	0.0	**0.08**
LU	:	:	:	:	:	:	:	:	:	**:**
NL	0.4	0.1	0.2	0.3	0.3	0.0	0.3	0.3	0.0	**0.21**
AT	0.0	0.1	:	:	:	:	:	:	:	**0.05**
PT	:	:	:	:	:	:	:	:	:	**:**
FI	1.1	0.2	0.0	0.2	:	0.4	1.2	0.4	0.1	**0.45**
SE	0.1	0.1	0.0	0.0	0.1	0.0	0.0	0.4	0.1	**0.09**
UK	0.0	0.1	0.0	0.1	0.0	0.0	0.1	0.2	0.1	**0.07**

: = Member State did not provide data at the time of the first publication from Eurostat of the referred to reference month. The same explanatory text as in the table of industrial production applies here.

The figures show that the average revision for the US figures (0.19) is slightly higher than the corresponding EU figure (0.16), but slightly lower than the Euro-zone figure (0.22). All available information from Member States indicates that the US revisions are quite low on average. Spain and Germany have a figure of 0.52 and 0.49 respectively, much higher than the US figure. Italy (0.08), Sweden (0.09) and UK (0.07) have a lower revision figure than in the US.

CONCLUSION

In terms of providing timely indicators, the US has advantages compared with the EU system, some of them general and some specific.

The US has federal surveys for its business cycle indicators, which helps to limit the number of enterprises needed for the survey. This while the EU data collection is based on Member

States, which have to compile their indices and can only then transmit their collected indices to Eurostat, which makes the Euro-zone and EU aggregate publications.
The US has a central authority with the power to issue and enforce common standards for business statistics. The powers of Eurostat are much more limited. Missing this strong central agency, even Member States who would be ready to compile their figures faster, can act as free riders or fall into the prisoners dilemma which may hinder them to implement the necessary steps.

Looking at selected indicators it becomes evident that the US agencies found a way to publish a first release, with incomplete information, by relying on their own estimates for the first publication. Available information from EU Member States suggests that they wait for the bulk of data before giving a first estimate. Revisions do not seem to be significantly higher for US figures than for EU or Euro-zone data.

If the EU wants to improve the timeliness of their publications, many options are possible. However, I name only two: The first breaks with the established system and goes a new way. This would imply a switch to a European survey. The second option stays in the established system and tries to improve it. Here I see one option which seems to me the least resource intensive, namely to find a way for Member States to publish and transmit figures to Eurostat much faster than they are doing now. This could be tried at least for a first estimation of the main aggregates.

The first option looks not realistic. To set up European surveys for these kind of indicators would either raise the need of additional resources, or imply a shift of some no-longer needed resources from Member States to Eurostat. To get more resources or to get an agreement to this shift of resources is highly unlikely.

The second option looks more promising. It might be possible for Member States to provide aggregate figures much faster than now and to give a full set of detailed data later. In order to avoid free riding or any kind of prisoner dilemma, this effort should be formalised in a legal way as well.

If this option would be chosen, one day Willem Duisenberg might be able to look at the retail trade figure for the Euro-zone, and might have the same reference month for the EU and the Euro-zone available as his colleague Alan Greenspan has for the US.

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[3] Federal Reserve Bulletin March 2000, Industrial Production and Capacity Utilization: Recent Developments and the 1999 Revision, table on page 193
[4] document based on information from EU Member States collected by Eurostat
[5] Bureau of Labor Statistics, Handbook of Methods, Chapter 14. Producer Prices, Data Sources and Collection Methods, available on the Internet
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THE USE OF QUALITATIVE SURVEYS FOR THE CONSTRUCTION OF A NEW ORDERS INDEX

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SUMMARY

The Finnish experience shows that using qualitative surveys in the construction of a new orders index is a viable and in some cases even a preferable solution to quantitative surveys.

1. BACKGROUND

The accession of Finland in the European Union at the beginning of 1995 brought with it a host of requirements in the field of statistics. In Finland, where structural policies traditionally had dominated economic policy at the expense of cyclical policies, quite a few short-term indicators were lacking.

At the time of accession Eurostat was preparing a new framework regulation on short-term statistics (STS). The first draft of a framework regulation covering all activities was dated July 27, 1994. So we made a decision to adapt to the requirements of the regulation under preparation rather than to the directives that were to be superseded by the new regulation.

The project with the aim to adapt of Finnish short term statistics to Community requirements was chartered in April 17, 1996. After the preliminary analysis stage, a sub-project for designing and developing a survey on new orders in industry was initiated September 1996. There was also a sub-project on new orders in construction that followed a different path, but we will no describe that in this paper.

After the testing of the survey questionnaire and the definition of the frame population and the selection of units to be surveyed, the project on new orders in industry reached the stage of a pilot survey in March 1997. 475 units (mostly kind-of-activity units) from the relevant divisions of industry were surveyed. The analysis of the results of the pilot survey raised questions about the validity and reliability of the results. Raising the reliability would involve many years of badgering businesses in reporting correctly. And that would not ensure the validity of the results! Taking into account the response burden from a new survey, we had to look at an alternative way of producing the indicators on new orders.

At that time quite a few methodological papers, which described the merits of using qualitative surveys for predicting future production, were around (more about this in chapter 2). During the meetings of the Council Working Party between September 1997 and February 1998, the Commission proposal for a regulation on short term statistics was changed in a way which allowed for an alternative leading indicator based on business opinion surveys. The STS regulation entered into force in June 1998.

In Finland we stopped the development of a survey of new orders in industry and instead a project for developing an alternative leading indicator for industry on the basis of business opinion survey data collected by The Confederation of Finnish Industry and Employers was initiated on August 28, 1998. Transmissions of the new alternative leading indicator to

Eurostat started in February 1999. It is of interest to notice the shortness of the ramp-up time, which was made possible by the fact that raw data for the indicator was already in existence.

At first Finland was able to transmit only the indicator A130 (total). The construction of separate leading indicators for domestic and non-domestic markets was adjourned pending some changes in the barometer survey. When it was obvious that the changes in the barometer survey would not materialise, the project was resumed in December 1999 on the basis of available data. This time the development span was even shorter. Transmission of indicators A131 and A132 to Eurostat started in February 2000.

2. METHODOLOGICAL BACKGROUND

A key paper, which certainly must have influenced the decision to allow for an alternative leading indicator in the STS regulation, was a paper by Eurostat itself called Estimated Leading Indicator (EOIX) (May 1998, Eurostat/D3/EBT/98/11 EN).

Another paper of great interest was an unofficial paper by Henk Hoek called Do orders predict production?, dated October 14, 1997. Hoek investigated whether data on new orders have predictive power for industrial production and took into consideration both quantitative and qualitative data on new orders. The interesting part was the conclusions. Though the conclusions were 'weak' ('both kinds of data may have predictive power'), the interesting part was that there was no strong evidence in favour of quantitative new orders.

We also studied the ISTI paper A fresh look at business survey data written by Berthold Feldman and Björn Fisher (October 1997, preliminary version 5.4).

Later on we studied a Bank of Italy paper Energy consumption, survey data and the prediction of industrial production in Italy: A comparison and combination of different models by Marchetti and Parigi. This paper referred to another paper by Gerli and Petrucci, which described an accumulation of order expectations model. This model would be the basis for the redesigned leading indicator for division 32 of NACE Rev. 1.

Another study of importance was Short-term forecasting of industrial production with business survey data: experience from Finland's great depression 1990 – 1993 by Kauppi, Lassila and Teräsvirta (International Journal of Forecasting, Vol. 12, Issue 3, 1 September 1996). This widely cited study on the performance of qualitative indicators during the extremely severe downturn in the Finnish economy in the early 1990s, came to the conclusion that opinion survey results are good leading indicators of business trends.

3. METHODOLOGICAL DECISIONS IN TRANSFORMING QUALITATIVE DATA INTO A QUANTITATIVE INDICATOR

Methodologically the Finnish alternative leading indicator relies on a regression model, which uses qualitative data from a business barometer survey to predict the future value of a quantitative production index.

The regression model is basically of the form $Y_i = a + BX_i + e_i$

That still leaves still a lot of decisions to be made. First, what should be 'predicted', what is to be the variable Y. On the basis of some unofficial communication from Eurostat, we decided that our indicator for period t should predict the average of the production index for t+1 and t+2.

A further question. What then is Y exactly, an index? No, we are not yet at the stage of forming an index. The variable Y measures the percentage change in production compared to the same month in the previous year. The index series is then formed by chaining the annual changes from the base year onward, which in this case is 1995 = 100.

Second question, what qualitative data should be used? The business barometer survey of The Confederation of Finnish Industry and Employers (TT) has been harmonised with the Commission approved joint harmonised EU industry survey [22]. The monthly survey contains eight questions in all. It consists of the six questions, which in harmonised recommendation are defined as monthly and of two questions, which have been designed by the TT itself. Four alternatives can be associated to each question – positive, unchanged, negative and the balance of positive and negative answers.

The eight questions are:

1. Production trends in recent past: up, unchanged, down?
2. Order books: above normal, normal, below normal?
3. Export order books: above normal, normal, below normal?
4. Stocks of finished products: above normal, normal, below normal?
5. Production expectations for the months ahead: up, unchanged, down?
6. Selling price expectations for the months ahead: up, unchanged, down?
7. Relation of production capacity to demand: more than sufficient, sufficient, not sufficient?
8. General business outlook: up, unchanged, down?

For ease of notation we use the words plus and minus as general terms. On the basis of the plus and minus answers the balance (saldo) can be calculated. The saldo is widely used in the publication of barometer data.

When we are considering new orders, the questions 2 and 3 might seem to be of most interest. Nothing should however be taken for granted.

By using diagnostic tools we decided that the dependency (or similarity) between the production time series and the corresponding barometer time series for 1993 – May 1998 were best for questions 1, 2, 3 and 4. In the diagnosis things like correlation and time lags were studied.

On the basis of further study we found out that the variables which would, as leading indicators, explain the changes in the production indicator best as follows:

- Order books minus
- Export order books minus
- Stocks of finished products plus

Notice that no saldo variable is among the ‘best’ variables.

The best results for the leading indicator (for the total including both the domestic and non-domestic markets) was achieved by choosing two explaining variables, order books minus and stock of finished products plus. At the level of section D of NACE (Manufacturing) the basic formula

[22] The joint harmonised EU programme of business and consumer surveys, European Economy, Reports and Studies No 6, 1997 (European Commission, Directorate-General for Economic and Financial Affairs)

$$Y_i = a + BX_i + e_I$$

became

$$Y_T = 14{,}78 - 0{,}165 \text{orderbooksminus}_T - 0{,}331 \text{stockoffinishedgoodsplus}_T + e_i$$

The maximum annual growth rate this formula allows for all of manufacturing is 14,78 percent.

Individual divisions of NACE have of course their own individual values for the constant a and also individual coefficients for orderbooksminus and stockoffinishedgoodsplus.

This general formula did not work for division 32 of NACE Rev. 1. The methodology report (see below) describes the situation as follows:

The indicator for the branch 32 of NACE Rev. 1, which is included in the category 'Electronics industry', could not be formulated with the kind of model that was introduced in the equation (2). The reason for this difficulty is an exceptionally long and powerful growth of this branch. Business survey answers are answers to thricotomous opinion questions and the interpretation of these answers becomes somewhat complicated since the normal state during the period of estimation has been a very high growth. In this kind of situation, a reported decrease or an increase in, for example, stock of orders, can have several interpretations. Therefore the history of answers needs to be somehow included in the model. As the values of the balance between positive and negative answers are cumulated monthly starting from the year 1995, this information seems to reflect well the changes in production and turnover.

For NACE division 32 the method described by Gerli and Petrucci, which takes into account the accumulation of answers, was used.

4. METHODOLOGICAL QUESTIONS FOR INDICATORS FOR DOMESTIC AND NON-DOMESTIC MARKETS

The next questions related to the construction of separate leading indicators for the domestic and the non-domestic markets defined in the STS Regulation.

The index of industrial production does not distinguish between production for the domestic and the non-domestic markets. On the other hand the turnover indicator does exactly this. So instead of using the production index as Y, we used domestic and non-domestic turnover for Y.

The best explaining variables for the indicator for domestic, were order books minus and production trends plus. For non-domestic, the best variables were export order books minus and production trends plus.

Using the proper weights was of course central to the reliability of these indicators. For the indicator of domestic markets the weights of domestic sales were used and for the indicator of non-domestic markets the export weights were used. So in spite of the fact, that we did not have the question 'Domestic order books' in our use, appropriate weights made the construction of the indicator possible.

5. SOME REMARKS ON THE DESCRIPTION OF THE SYSTEM

The system which Statistics Finland uses is described in detail in the attached paper The Methodological Description of the Leading Indicator (Statistics Finland, Business Trends, Jan Nokkala, April 30, 2000). This paper will not repeat the details of the attached paper.

Instead we will have a look at some interesting details.

One of these is interesting details is the process in which a system relying on 'private' data came into being.

When the methodological questions had been resolved, the main questions centred on access to the business barometer data. Statistics Finland entered negotiations with the Confederation of Finnish Industry and Employers (TT).

The question was first introduced to the Working Party of Statistics Finland and Business, a forum, which meets regularly. Taking into account the worry about the response burden in general and the threat of a new obligatory survey of new orders looming, first reactions were positive.

The general stance remained positive. Questions relating to confidentiality and compensation of the direct cost of transmitting the barometer data were solved. An agreement between TT and Statistics Finland was signed in June 1999.

The question on confidentiality was resolved as follows. Statistics Finland does not receive the data at the level of individual businesses. Instead the TT aggregates the answers with appropriate weights to the 4-digit level of NACE. Based on our studies of the matter, we do not think that this has led to any lowering of the quality of our results.

Compensation was a minor matter. The cost is only a fraction of the costs a direct survey would cause.

A third question was how the results, that is the alternative leading indicator, would be made public. To put it one way, the TT was worried that Statistics Finland would 'steal the thunder' from the TT announcements of barometer results, in particular the news value of the so-called confidence indicator. This confidence indicator is a composite number[23] of key barometer questions and purports to predict future trends. As a matter of fact, the track record of the confidence indicator is rather good. The agreement was that, for now, Statistics Finland would transmit the new index only to Eurostat and flag the indicators confidential. Their primary use will be in the construction of the EU-15 and EU-12 indicators.

Statistics Finland however looks favourably at the notion of extending confidentiality limits to include the European Central Bank.

6. SO HOW DID THE INDICATOR PERFORM?

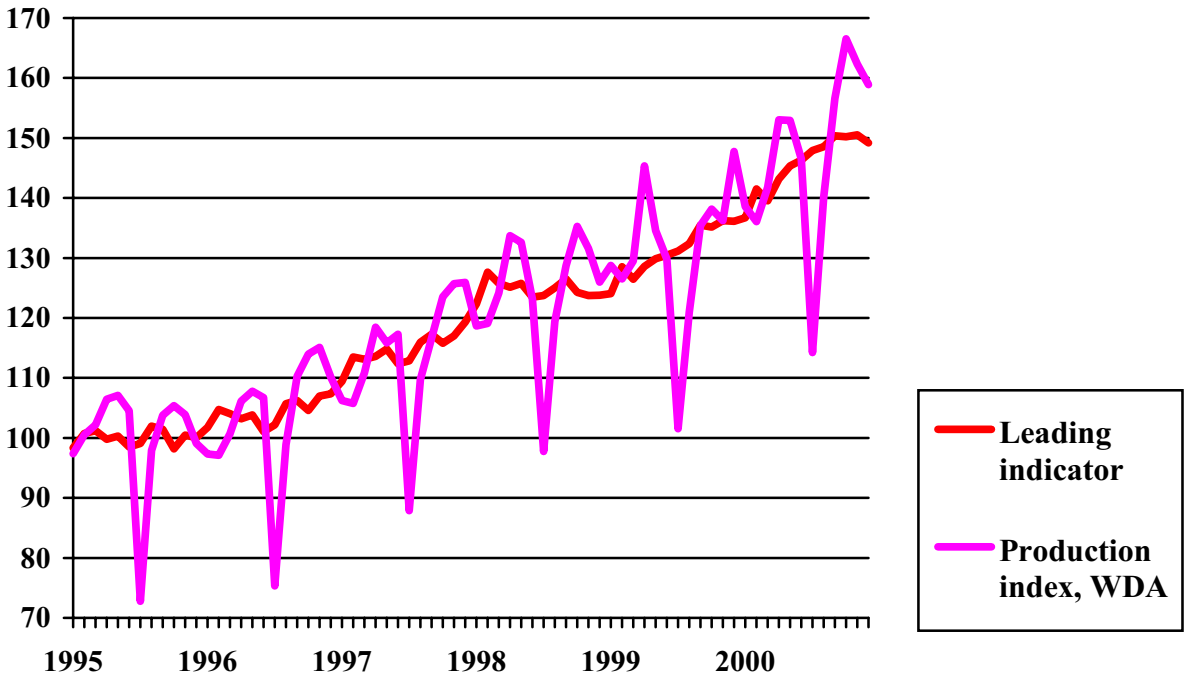
We built a model, which was based on historical data. This will of course, on average, 'predict' past events quite well. But how did it perform after it was put into production? Let us look at the year 2000. The year 2000 turned out to be a year in which industrial production in Finland grew unexpectedly fast. Year on year growth reached 12.3 percent, the highest growth rate since 1994. A difficult test to pass for the new indicator!

[23] A *saldo* number.

Well, maybe luck played a part, but the new indicator did, especially on the annual level, perform extremely well. The value of the leading index for manufacturing (Section D of NACE) for the year 2000 was 145.8 while the value of the production index was 147.4. The growth rate of the leading indicator was 11.1 percent, that of the production index was 12.3 percent.

The development of the two indicators over a longer period can be seen in figure 1.

Figure 1. Section D of NACE Rev. 1 (1995 = 100)



In the last months of year 2000, year-on-year growth rates for manufacturing were in the 16 to 21 percent range. We noted earlier, that the leading indicator cannot grow faster than 14.78 percent. The year-on-year growth rate of the leading indicator reached its peak at around 13 percent in July.

On Division level the results are not uniformly as good. Two Divisions of NACE, where the results are not that good, are Division 18 (Manufacturing of wearing apparel) and 32 (Manufacturing of radio, television and communication equipment and apparatus).

In the clothing industry the leading index and the production index have been diverging, the leading indicator growing and the production indicator slowly declining. The most likely explanation for this is the transfer of production into other countries. The demand created by rising order books is satisfied by production from the non-domestic sphere. In that case one could say that the leading indicator is reliable, but not valid (it indicates demand, not future production).

The telecommunications equipment industry is quite a different case. Let us remember that Division 32 was methodologically treated as a special case. It is made special by the extraordinary fast growth rate. Production has been growing at an annual compound rate of 36

percent over 1995 – 2000. During the same time the leading indicator has been growing at an annual rate of 'only' 26 percent.

7. CONCLUSIONS

So based on relatively short experience, what conclusions can we make. Let us divide the conclusions into advantages and disadvantages.

Advantages:

The response burden of business is a current topic in all or at least in most Member States. There are strong political pressures to limit the growth or even to reduce the response burden of business. It is a major advantage of this method that existing survey data can be used and duplicate surveys can be avoided.

It is inexpensive. Low response burden means that these statistics will not cause costs to business. Another advantage is that it will not cause major costs in the NSI. In view of the budgetary pressures prevailing in most Member States this is also a consideration.

As we have seen in the case of Finland, the ramp-up time to production of statistics is short.

Timeliness is another major consideration. Business barometer data arrive at Statistics Finland about 7 days after the end of the reference period. The indicators are transmitted to Eurostat on the 22nd or in case it is a non-working day before that. According to data on delays for March 2001 this is the shortest delay among Member States.

If there is need for it, a leading indicator can be constructed by this method for all activity branches, not just those where orders play a major role.

Disadvantages:

Based on hard evidence, it is rather difficult to find disadvantages. There is a psychological problem however. Many people feel, that barometer numbers are just opinions, while survey data on new orders are hard facts.

The real question is however the question on validity: What should these indicators represent? The draft Commission regulation on definitions of STS variables states:

It is the objective of the new orders received index to show the development of demand for products and services as an indication of future production. It is also suitable to indicate whether the demand originates from the domestic or non-domestic market.

The new indicator gives indication of future production; there is no doubt about that. The indicator depends on data about order books, stock of finished goods and production trends. In view of the nature of the data, the results can easily be interpreted as indicators of demand.

The indicators also show whether demand originates from the domestic or non-domestic markets. Our conclusion would be that the indicators are valid. Instead the validity of new orders surveys van be questioned. The pilot survey in Finland raised doubts about validity of results for some branches. Seasonal new orders in the clothing industry, stochastic new orders in shipbuilding and so on are not necessarily valid indicators of future production.

But are they as reliable as a survey on new orders? Let us first keep in mind the study by Henk Hoek. The study showed no evidence to support the conclusion that the survey results did its job better that barometer results.

Summary conclusion:

The opinion of Statistics Finland is that the alternative leading indicator is a valid indicator of future production and shows whether demand originates from the domestic or non-domestic market. Based on short experience, its reliability also seems good. There is no evidence to support the view that the validity or reliability of survey data on new orders would be of better quality. On the contrary, the pilot study showed that in its initial phase at least, the survey on new orders would have low validity as an indicator of future production and also have low reliability in the sense that the reported numbers really would correspond to the questions on the questionnaire.

Taking into account the advantages in respect to response burden, timeliness and cost, these methods can be recommended to all Member States, which have no history of new orders surveys. It will come as no surprise that Statistics Finland advocates that the ‘exception’ in the STS regulation should be made permanent. One might even go as far as to say that the new orders indicators should be replaced by the concept of leading indicators.

REVISION ANALYSIS FOR SELECTED EURO AREA AND EU COUNTRY SHORT-TERM INDICATORS

H. Ahnert, ECB

SUMMARY

This paper compares revisions of euro area data and revisions of data for the EU Member States for four key series of short-term statistics (industrial production, industrial producer prices, retail trade and production in construction) and draws a connection to the timeliness of the release of first results in the Member States. The analysis draws on data as received by the ECB from Eurostat and provided to ECB and ESCB end-users since early 1999. The results are based on a continuous comparison of subsequent databank vintages and derived summary measures of revisions.

Most data for EU Member States show a revision pattern which is a combination of the revision of the latest values, plus revisions in intervals or continuous revisions of long series. The size of revisions was lowest for industrial producer prices, significant for industrial production and high or very high for retail trade and construction data. Though lower revisions were generally observed in the year 2000 than in 1999 data, it should be taken into consideration that some revisions of data for the year 2000 are not yet available. All euro area national data contributed to the total size of the revision of the euro area results. Revisions, and in particular the balance of revisions over a longer time period for the euro area were, however, often smaller than for individual euro area countries, because revisions of different countries cancelled out. Over the complete time period since 1999, the average revision of industrial production, retail trade and production in construction had a positive sign, i.e. first estimates were systematically lower than current estimates.

A general correlation between the timeliness of the data releases and the revisions is – in a comparison between countries – not evident. With some interesting nuances in detail, it can be concluded that a similar performance in timeliness was achieved with a very different level of revisions, or that similar revisions were observed at greatly varying degrees of timeliness.

1. INTRODUCTION

The timeliness of euro area general economic statistics is – besides the non-availability of many required harmonised variables – one of the key issues in the present discussion on euro area macroeconomic statistics. The release of data by Eurostat for the euro area as a whole is not only later than releases in many euro area countries, but also later than corresponding releases of major countries outside the euro area (e.g. the United Kingdom, the United States). Acknowledging this situation, the Action Plan on EMU Statistical Requirements put emphasis on the timeliness of economic statistics; for example by requesting improvements for short-term statistics (respect of regulation requirements) and for quarterly national accounts (first publication after 70 days). However, the EMU Action Plan as well as the European Central Bank, in its publication on statistical requirements for general economic statistics in August 2000[24], acknowledge the potential trade-off between timeliness and reliability and underline

[24] The report entitled "Statistical Requirements of the European Central Bank in the field of general economic statistics", dated August 2000 (http://www.ecb.int).

that improved timeliness of euro area data is only of benefit when it does not cause significantly higher revisions of preliminary data. Timeliness and reliability of statistical data are regarded by the ECB as integral parts of the quality of the data.

Eurostat's publication dates for short-term statistics (STS) depend on the timetables in the Member States, which vary considerably. Generally, Eurostat produces a first estimate when available national data cover at least 60% of the euro area (or EU). Revisions of euro area results may be mainly triggered by more countries reporting data for a certain period and national data being revised for various reasons.

This paper attempts to add some empirical results to the discussion on timeliness and reliability. It is focused on the analysis of revisions to short-term indicators for the euro area and EU countries. It describes the patterns and the amount of revisions for four key indicators. It starts with a short description of the revision checking procedures for incoming short-term statistics (STS) data from Eurostat in the ECB's General Economic and Financial Statistics Division. The following section identifies cumulated amounts of revisions from January 1999 onwards. Finally, the observed revisions are considered in relation to the timeliness of the data. The conclusions are set out in Section 5.

2. THE TREATMENT OF REVISIONS TO STS DATA IN THE ECB

The ECB has been receiving STS from Eurostat on a daily basis since January 1999 (previously these data were received on a weekly basis). The time series are stored in an ECB internal databank which is accessible to all economists. The complete set of data is also transmitted to all EU national central banks (NCBs) at the same time as the ECB internal databank is updated. The ECB database on STS contains 8,800 series covering the euro area, the 15 EU Member States and the related aggregates, plus the United States and Japan. In order to monitor changes in the data, systematic checking procedures have been implemented which produce detailed daily reports on revisions.

All existing series are compared with the new revised data and the percentage change is calculated for each observation. A set of thresholds has been agreed which determine the maximum acceptable revision in percentage points for various indicators. These thresholds are used as an automated filtering mechanism to highlight possible problems within a large bulk of data. Naturally, the plausible size of revisions varies between indicators and also depends on the level of detail of the series and the size of the reporting country. Especially low thresholds have been set for key indicators for the euro area. Where the percentage revision of an observation falls beyond the respective threshold for the series, it is automatically filtered into a temporary database where it is held until it has been manually checked. A report is produced showing the original series, the updated series, the percentage revision, the annual percentage change in the original series, the annual percentage change in the updated series and the absolute difference between the two.

The following example was produced on 5 January 2001 and shows high revisions to a construction series (for France) which has a revision threshold of 5%.

STS.M.FR.W.PROD.CC1000.4.000 Eurostat code: VAL.FR.PROD.B4600.M.W.SER
Industrial Production Index, All buildings THRESHOLD = 5

Date	*Value in STS*	*Value in update*	*Revision*	*YTYPCT (STS)*	*YTYPCT (UPD)*	*Diff. in YTYPCT*
Jan.1999	79.48	105.22	32.38	-5.33	4.98	10.31
Feb.1999	88.58	93.38	5.41	-9.83	-6.57	3.26
Mar.1999	97.43	115.68	18.73	-3.79	4.89	8.67
Apr.1999	92.53	107.98	16.70	-2.67	2.12	4.79
May.1999	90.34	112.83	24.89	-2.14	5.25	7.39
Jun.1999	103.94	115.34	10.97	-0.62	4.55	5.17

Such high revisions (up to 32%, shown in the 4th column) lead to changes in the data from an annual percentage change of -5% in January 1999 (shown in the 5th column) to +5% in the revised series (shown in the 6th column). In such a case, the series is withheld from the ECB database pending further clarification from Eurostat or other sources. In the event that the data cannot be confirmed, the series is added temporarily to a list of series with "known issues" and is henceforth blocked from all future updates. Once the issue has been rectified, the series is removed from the list and the databank is updated.[25]
These procedures were implemented in June 2000 in an attempt to highlight problems within a large amount of data transmitted on a frequent basis which are impossible to check manually. Experience since the implementation of these checking procedures underpins the need for extensive data quality checking, because high revisions – also owing to mistakes in databanks or data transmission – are observed.

3. REVISION ANALYSIS FOR THE EURO AREA AND EU COUNTRIES

3.1 Explanation of the analysis

"Vintages" of STS databases are regularly archived by the ECB. From these database archives, the following analysis of revision ("revision history") has been compiled. Four key indicators have been chosen:

1. **Industrial production** (excl. construction)	2. **Industrial producer prices** (excl. construction)
3. **Retail sales** (total; constant prices)	4. **Production in construction**

For all indicators, the level series (index: 1995 = 100) for all EU Member States and the euro area aggregate were selected. Where applicable, the series are working day adjusted. The analysis of revisions covers the reporting periods from January 1999 to September 2000; the last weekly vintage of the ECB database used dates up to end-December 2000. From weekly vintages of ECB databases the series in question were compared and absolute revisions identified.[26] Table 1 shows an example of the underlying data for the revision analysis.

[25] In practice, however, it is often very difficult to verify the data, because information is needed for a broad range of indicators from the original data producer in 15 EU national statistical institutions (NSIs) or Eurostat.

[26] Absolute revisions rather than relative revision or revisions of growth rates were calculated. Test calculations showed that the differences are limited as most level data concerned are indices varying around 100; in addition, most revisions observed referred to revisions of the latest value, quarter or year (i.e. the revisions changed the annual growth rates as well) of the same, unchanged index basis of 1995 = 100. Weekly vintages of the database originate in general from backups taken every Monday. Due to the limitation of a weekly frequency, infra-weekly revisions which cancel out are not reflected.

The first aim was to identify revision patterns. For each indicator, a synoptic table has been produced, attempting to categorise various data revision practices applied in the individual Member States.

Four categories of revision patterns have been identified:

1. Non-regular and minor revisions	**2. Continuous revision of the latest value(s)**
3. Revision at intervals over longer time spans	**4. Continuous revisions over longer time spans**

In a second step, the size of revisions has been calculated.

Four – closely related – summary measures for revisions have been calculated:

1. Sum of absolute revisions (SAR): Sums the revisions regardless of the sign of the revision. The sums are compiled from the first release to the last available estimate separately for each reporting period. It is a simple measure of the total amount of revisions (or the volatility of the first estimate).
2. Average of sum of absolute revisions (ASAR): Calculates a long-term average from all SAR values observed (i.e. from January 1999 to September 2000).
3. Balance of revisions (BoR): This sums the revisions taking account of their sign. The resulting balance of revisions is equal to the latest available value for each reporting period minus the first estimate. This measure indicates the net effect of subsequent revisions.
4. Average of balance of revisions (ABoR): Calculates a long-term average from all BoR values observed (see No. 2).

For the interpretation of the results, it is important to bear in mind the limitations of the analysis. First, any results reflect data and changes to data as they were loaded into the ECB databank. The observed revisions result not only from revisions of national data by national institutes, but also reflect revisions made by Eurostat, mistakes in transmission or loading of the data, etc. Moreover, in cases where the ECB did not receive the first published figures or did not receive revisions to first or previous estimates, the analysis is incomplete. It is difficult or even impossible for the ECB as the end-user to clearly distinguish the possible reasons for revisions of data. Though, on the one hand, these caveats make it difficult to draw clear conclusions from the analysis, it is, on the other hand, a very realistic analysis from a user's point of view, because it reflects the data that have actually been available to the ECB rather than the data that should have been available.

3.2 Industrial production (excluding construction)

Revision pattern (see Table 2, Chart 1)

Data for industrial production are available for all EU countries; monthly observations from January 1999 to September 2000 are considered. Non-regular and minor revisions are seen for GR and IT; the most common pattern is the revision of the latest published value(s); this can be identified in 10 Member States. Revision of the time series in certain intervals were seen in 9 Member States; these revisions might be caused by available results from quarterly and/or annual surveys. However, it has been considered that the sample period of less than two years may, in some cases, be too short to clearly identify regular revision intervals. Continuous revisions over longer time spans took place in 5 Member States. For most Member States, a combination of different revision patterns can be identified; for example, in addition to the revisions of the last value(s), a regular annual revision may take place, incorporating detailed results from annual surveys.

For the euro area aggregate the combination of all the heterogeneous revision policies leads to continuous revisions of the complete time series in the observation period. Although some revisions are minor in absolute terms, the time series becomes rather volatile. Chart 1 illustrates the revisions to the published value for January 1999. The initially released value of 106.02 has been revised over time to stand at 105.25 by end-2000. Remarkably, revisions to the euro area aggregate, though concentrated in the first three months after first release, still occur a long time after the end of the reference month; in April 2000, some 15 months after the reference period, the aggregate figure was revised downwards by almost half an index point. Since then, no significant revisions have been made to the value for January 1999.

Revision size (see Tables 3 and 4)

The next considerations relate to the size of revisions which appeared in single observations over time. The different vintages of the database gave information on: (a) the amount of revisions which took place over time; and, (b) the direction of these revisions. On average from 1999 to 2000, monthly euro area industrial production data available in the ECB databank was revised 2.2 index points in absolute terms after its first appearance (ASAR, Table 3). Data above the euro area average are seen for BE, FR, LU and SE. However, the average balance of revisions (ABoR) is significantly smaller, as upward and downward revisions in individual countries outweigh each other in the aggregate. On average over the sample period, euro area data have been revised upwards by +0.4 index point. The average balance of revisions varies significantly between countries, from +1.4 index point in BE to -0.6 index point in NL. The majority of Member States report upward revisions, with the exception of ES, LU and NL.

Table 4 details the revisions to single monthly observations from January 1999 to September 2000. For the euro area it is interesting to note that the amount and balance of revisions from March 1999 to December 1999 are significantly higher than for the year 2000 data. A major reason for this was high upward revisions of data for DE and, to a lesser extent, for BE, FR and AT. For DE it is known that the change in the index compilation caused substantial revisions in the year of introduction. Since then, estimated advance corrections are made to first releases, which reduces the amount of revisions required at a later stage.[27] Revisions in 2000 for Germany and the euro area aggregate are lower. However, as some revisions for the year 2000 may not yet have been published (for example, due to annual survey results becoming available only in 2001) it is too early to draw a definitive conclusion on this.

Some particular developments are worth mentioning. Single reporting months are sometimes significantly revised. Revision balances of up to around 5 index points for individual months were observed in BE, DE, ES and FR. Revisions of 10 points or more were observed for LU and IE (only in 1999). For NL, the balance of revisions is generally not high, but almost all months have been revised downward after the first release.

3.3 Industrial producer prices (total excluding construction)

Revision pattern (see Table 2, Chart 2)

Data for industrial producer prices are available for all EU countries except Austria. The same range of monthly observations has been considered (January 1999 to September 2000). The revision patterns are, however, very different from the ones in industrial production data. Non-regular and minor revisions were observed in the available data for 10 out of 14 Member States; 5 Member States carried out revisions to the latest value(s), while revisions in intervals were observed for France (main change in July 2000[28]) and Luxembourg. As a consequence,

[27] For example, first results for the fourth quarter of 2000 were corrected upwards in advance by 1.2 percentage points in order to reduce later expected revisions.

[28] Due to a different treatment of specific taxes, the change led to substantial revisions.

though most countries do not revise the results, euro area results have been revised continuously.
Chart 2 plots the revisions to the January 1999 value for the euro area: the main change in July 2000 came from the revision of data by France.

Revision size (see Tables 3 and 5)
The euro area aggregate was revised downwards by 0.4 point; the absolute sum of revisions to euro area aggregates has been 0.8 index point on average since January 1999 (see Table 3). Although less pronounced in size than industrial production, the sum of all national revisions in producer prices caused ongoing revisions to the euro area aggregate (see Table 5). Most of the revisions in the aggregate can be explained by the high revision of data for France after the introduction of the new national index in July 2000. Since then, revisions of the euro area aggregate have been negligible. Most Member States have not revised producer price data or revise these data only in exceptional circumstances.
Further, particular revisions can be observed for BE and NL, for which revisions to first producer price results are higher than in other Member States. High revisions for results in the year 2000 are reported for LU (including also one likely mistake in data transmission for July 2000).

3.4. Retail sales (total, constant prices)
Revision pattern (see Table 2, Chart 3)

Continuous revisions over longer time spans of available data for retail trade are observed for all EU Member States with the exception of SE and, to a lesser extent, BE and DK. The sample period for FR and PT data is very short (data for FR have been discontinued since December 1999, while data for PT were received for the first time in August 2000). As most Member States appear to continuously revise retail trade data, it is difficult to separate these revisions from possible additional revisions at intervals or revisions of latest values. However, as a consequence of the frequent revisions of Member State data, revisions of euro area data are continuous and ongoing. Chart 3 shows the revisions of data for January 1999, for which changes could be observed up to the end of the sample period.

Revision size (see Tables 3 and 6)

On average since January 1999, euro area retail trade data have been revised upwards by only 0.2 point (see Table 3). However, this low long-term average is a result of continuously high revisions of individual months and very high sums of absolute revisions (5.6 points), in particular in the first three quarters of 1999 (see Table 6). The high sums of absolute revisions indicate high volatility of the first estimates.
Substantial revisions of first estimates are reported for many Member States, at least for some intervals during the sample period. Regular revisions of first estimates of a considerable magnitude are observed for DE, GR, ES, LU, NL and FI. Reasons for extreme revisions of some periods for GR, IE and IT are unknown, but may be due to mistakes in the data transmission. Small revisions of data are reported for the three Member States outside the euro area.

3.5. Production in construction
Revision pattern (see Table 2, Chart 4)

Construction data are available only for 10 EU Member States, but not for GR, IE, PT, SE and UK (the latter due to a mistake in the ECB databank). Data for ES, IT and FI are quarterly. The majority of available national data report revisions at regular intervals.

Continuous revisions (or at least frequent ones) are observed for ES and FR. The euro area aggregate is revised continuously with certain "peaks" in intervals.
Chart 4 illustrates the revision of data for January 1999 since its first release. More than for any other indicator analysed, the first estimate is subject to continuous and high revisions. Starting with a first release of 86.8, the euro area aggregate stood at 84.7 in early January 2001 only to be revised up to 87.8 in spring 2000; later, in summer 2000, further revisions declined the value to stand at 84.4; by January 2001 it stood at 85.5.
Revision size (see Tables 3 and 7)
In general, the amount of revisions in construction data is much higher than in the other selected indicators (see Table 3). For the euro area, data were revised, on average, by 12 index points (in absolute terms), for FR, the level of revisions was 18.8 points, for NL it stood at 10.6 points. As expected, the balance of the revisions is smaller (1.5 points for the euro area), but it reaches up to 9 index points in individual months; for some Member States the average balances of revisions are still very high (DK, BE, FR and AT) and even higher for individual observation periods. The amount of revisions to euro area data was very high throughout the whole of 1999 (around 16.5 index points), owing to revisions in particular for data for BE, FR, NL and AT. Since the beginning of 2000, the amount of revisions has declined significantly; however, further revisions might be outstanding and introduced later this year.

4. TIMELINESS AND REVISIONS TO DATA

This section draws a comparison between the revisions as reported in Section 3 and the timeliness of the first release of economic data. In the context of the EMU Action Plan, reference to the trade-off between timeliness and reliability was made.[29] Whilst it is impossible, from a user's point of view, to assess the potential loss of accuracy due to improved timeliness for individual national indicators, this section draws a cross-country comparison between EU Member States in order to identify possible correlation between the release schedule and the observed amount of revisions across countries.
The timeliness of the four indicators varied significantly across EU countries for all four selected indicators (see Table 8). Industrial production was released first in Germany, after 36 days, and last in Austria, after 88 days – a difference of 52 days. 10 EU countries published August 2000 data after between 36 and 49 days and the data for the three "best performing" countries were available after 40 days. The STS regulation requirement is 45 days (60 days for small countries).
Timeliness for industrial producer prices was, in general, better: 12 days for the UK and 19 for BE. After 32 days, industrial producer price data were released in 10 EU countries. GR, IE, LU and DK released data thereafter; no data are available for AT. The STS regulation requirement is 35 days (50 days for small countries).
Results for the retail trade are available at a lower level of timeliness. With the outperforming release for the UK after 14 days, the majority of EU countries published between 41 and 57 days after the reference month. Later releases are reported in AT (67 days), GR (75 days), PT (82 days) and LU (105 days); no August 2000 data for FR are available. The STS regulation requires 60 days (90 days for small countries).

[29] The Statistical Programme Committee (SPC) concluded as follows on the draft EMU Action Plan (14 September 2000): "The SPC stressed the importance of the quality of the statistical outputs and underlined the statement in the draft action plan that: 'a timely publication of the aggregations must not compromise minimum quality standards, so as to minimise subsequent revisions and keep public confidence in the data'. Recognising that, in most cases, there is a trade-off between timeliness requirements and reliability the SPC considered that final decisions regarding the action plan should take into consideration a technical assessment of these trade-offs. Eurostat was requested to launch and co-ordinate relevant studies and analyses."

Timeliness for construction data (some of which are monthly, while some are quarterly) varied between 36 days (DE) and 204 days (IT). Two months after the end of the reference period, data were released in BE (49), NL (57), FR (59), DK (60) and LU (60). The STS regulation requires 60 days (75 days for small countries).

Charts 5 to 8 combine the performance on timeliness with the average sum of absolute revisions.

Euro area data for industrial production were released after 54 days and, on average, subsequently revised by 2.2 index points. At approximately the same level of revisions, much more timely data were available for DE, UK, DK, NL and UK (ordered by release date). Later than these and with a higher level of revisions were the data for BE and FR; later, but with a lower level of revisions were data for IT, PT and FI. ES data became available after the euro area total and much later than the Member States mentioned before, but the revision level has not differed. Extreme values are reported for three smaller countries (LU (timely, but very high revisions), IE and AT (very late release, but with a low level of revisions). With the exception of these three Member States, no correlation between the timeliness of national data and the release can be observed.

A similar picture, but at a lower level of revisions, is reported for industrial producer prices. Though there is a wide span of first release dates (between 12 and 49 days), timeliness seems to have only a small impact on the amount of revisions: early releases (UK, BE, FI, DE, SE, ES, NL, IT and PT) have almost the same amount of subsequent revisions as late releases (GR, DK and IE). The exceptional cases of FR (revisions due to new index) and LU are evident.

For retail trade, the euro area data and most country data are released between 40 and 60 days after the month-end. There is no apparent link to the size of revisions, which differs significantly between countries like SE and DK on the one hand and DE, ES and NL on the other despite the fact that their performance is the same in terms of timeliness. Very low levels of revisions combined with a very high degree of timeliness can be observed for the UK, while high revisions with low timeliness are reported for GR and LU.

Construction production data (which are not available for GR, IE, PT, SE or UK) confirm the result of the three previous indicators. There are significant differences in timeliness as well as in the sum of the absolute revisions, but a correlation between these two cannot be confirmed. However, as for several countries – with the exception of Germany – and for the euro area aggregate timeliness is lower and furthermore revisions are much higher than for other indicators, this indicator generally performs worse compared with the three other key STS indicators.

CONCLUSIONS AND OUTLOOK

This paper compares revisions of euro area data and revisions of data for the EU Member States for four key series of short-term statistics and draws a connection to the release timetable in the Member States. The analysis is limited to the “total” (aggregate) series, i.e. the possibly higher revisions at the detailed index level are not considered. The analysis refers to changes in levels but the differences in results from an analysis of percentage changes or changes in growth rates are not high for the comparison period. The analysis draws on data as received by the ECB from Eurostat and provided to ECB and ESCB end-users since early 1999. The results are based on a continuous comparison of subsequent databank vintages and derived summary measures of revisions.

The procedure chosen has some limitations, which are to be taken into account in the interpretation of the results. It reports revisions as observed by the ECB, and these might be different from the revisions carried out by the national data producer. The calculation captures actual revisions to national data, but also revisions made by Eurostat, mistakes in data transmission and, for euro area aggregates, revisions due to the replacement of ARIMA forecasts by actual national data. The analysis can report revisions to first releases only, if first releases were transmitted to the ECB; experience shows that this has not always happened, in particular in the early days of the comparison period. Moreover, high revisions generally point to a low degree of accuracy of the initial data, but low levels of revisions do not necessarily indicate that the quality of the data is higher. The results are therefore to be interpreted with some caution.

The revision analysis carried out for industrial production, industrial producer prices, retail sales and production in construction leads to the following conclusions:

- Most data for EU Member States show a revision pattern which is a combination of the revision of the latest values, plus revisions in intervals or continuous revisions of long series. The only exception to this is industrial producer prices, which were revised only by few Member States. As a result, the euro area aggregates were revised continuously over long time spans. For euro area industrial production and retail sales most revisions were carried out in the first 3 to 5 months after release, but significant revisions still occurred after about one year. Continuous revisions over more than one year were observed for production in construction data.
- The size of revisions was lowest for industrial producer prices, but significant for industrial production and high or very high for retail trade and construction data. Though lower revisions were generally observed in the year 2000 than in 1999 data, it should be taken into consideration that some revisions of data for the year 2000 are not yet available. It seems therefore to be too early to conclude that revisions for the year 2000 will be lower. However, some of the 1999 revisions can only be explained by mistakes in data transmission and it will be possible to avoid these through better data quality checking procedures.
- All euro area national data contributed to the total size of the revision of the euro area results. Taking into account their weight in the euro area results, revisions for data of DE, ES, FR and NL contributed significantly to the revisions in the euro area aggregates.
- Revisions, and in particular the balance of revisions over a longer time period for the euro area were, however, often smaller than for individual euro area countries, because revisions of different countries cancelled out. This effect was particularly evident for industrial production data. Euro area results were often more stable than country data.
- The sign of subsequent revisions to one observation value was often different, with the result that the total of the upward and downward revision to first data is often much higher than the balance of all cumulated revisions. This effect could be observed for all indicators except industrial producer prices. For euro area data, this is particularly evident for retail trade and construction production, for which many significant upward and downward revisions for observations were seen. Over the complete time period since 1999, the average revision of industrial production, retail trade and production in construction had a positive sign, i.e. first estimates were systematically lower than current estimates.
- Finally, a general correlation between the timeliness of the data releases and the revisions is – in a comparison between countries – not evident. With some interesting nuances in detail, it can be concluded that a similar performance in timeliness was achieved with a very different level of revisions, or that similar revisions were observed at greatly varying degrees of timeliness.

The results indicate that further work and discussion is important, in particular, in the following fields:

Revision pattern and policy: First, due to the unsynchronised revision policy in the Member States, euro area aggregates change continuously. This is a disadvantage for the analysis. It could only be avoided if national revisions were not considered in the compilation of euro area aggregates, or if national producers were able to better synchronise their revision policy. The preferred solution would obviously be the latter option.

High revision in retail trade and construction data: Second, for these indicators the results indicate that high revisions significantly reduce the usefulness of the data for economic analysis. In particular, first estimates for retail trade and construction production were often subject to very high revisions and, at the same time, were released late. The first estimates of these data cannot be regarded as a reliable indicator for the euro area or for several Member States. Improvements in the timeliness and reliability of these data are desirable.

Timeliness across Member States: Third, more detailed study should be undertaken on why some individual Member States achieve good timeliness and limited revisions at the same time. The group of Member States concerned has a different composition for each indicator, but one striking example appears to be the United Kingdom, which generally released very timely data with a relatively low level of revisions.

Data checks and transmission: Finally, the analysis underlined the importance of thorough data checks and quality control procedures for national and euro area data, as there were various extremely high revisions observed which can only be explained by data transmission mistakes.

Table 1		Revisions in industrial production for the euro area																				
		(balance of revisions; index points)																				
		Reporting period																				
		#####	#####	#####	#####	mai-99	#####	####	#####	#####	oct-99	#####	#####	#####	#####	#####	#####	mai-00	#####	####	#####	#####
Databank vintages	Jan.1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Feb.1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Mar.1999	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Apr.1999	-0,19	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	May.1999	-0,42	-0,09	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Jun.1999	0,04	-0,02	0,07	0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Jul.1999	0,13	-0,09	0,22	0,13	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Aug.1999	0,05	0,04	0,19	-0,1	-0,01	0,03	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Sep.1999	0,04	0,02	0,02	0,03	-0,02	0,14	0,51	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Oct.1999	0,19	0,19	0,01	-0,01	-0,06	0,02	0,04	0,41	-	-	-	-	-	-	-	-	-	-	-	-	-
	Nov.1999	-0,04	0,09	0,35	0,53	0,64	0,64	0,1	0,06	0,75	-	-	-	-	-	-	-	-	-	-	-	-
	Dec.1999	0,03	0,01	-0,03	-0,05	-0,01	-0,03	0,71	0,68	0,81	-	-	-	-	-	-	-	-	-	-	-	-
	Jan.2000	0	0	0	0	0	-0,01	0,02	-0,01	0,12	-0,05	0,4	-	-	-	-	-	-	-	-	-	-
	Feb.2000	0,05	0,03	0,05	0,07	0,07	0,07	0	-0,01	-0,03	0,7	1,21	0,89	-	-	-	-	-	-	-	-	-
	Mar.2000	-0,06	0,04	0,16	0,18	0,15	0,18	0,21	0,27	0,3	0,06	0,06	-0,09	-0,31	-	-	-	-	-	-	-	-
	Apr.2000	-0,53	-0,04	0,37	0,05	-0,06	0,64	-0,1	-0,02	0,33	0,53	0,47	1,15	-0,77	-0,5	-	-	-	-	-	-	-
	May.2000	0,31	-0,46	-0,25	-0,11	-0,02	-0,14	0,17	0,03	-0,09	0,18	-0,06	0,16	0,07	-0,26	0	-	-	-	-	-	-
	Jun.2000	-0,26	-0,13	-0,22	-0,32	-0,23	-0,19	0,04	-1,15	-0,23	-0,23	-0,29	-0,5	-0,4	-0,2	0	-0,56	-	-	-	-	-
	Jul.2000	-0,02	-0,03	-0,03	-0,02	-0,03	0,02	0,15	0	0,03	0,04	0,16	0,12	0,04	0,07	0,01	-0,16	0,55	-	-	-	-
	Aug.2000	-0,06	0,06	-0,14	0	-0,1	-0,04	-0	0,03	-0,02	-0,03	0	0,05	0,12	0,26	-0,05	0,05	0,28	-1,15	-	-	-
	Sep.2000	0,02	-0,01	-0,03	0,01	0,09	0	-0	0,03	0,04	0,05	-0,11	0,2	-0,14	-0,1	-0,07	0,12	0,09	-0,09	-0,2	-	-
	Oct.2000	-0,01	0,02	-0,02	0,02	-0,01	-0,02	0,01	-0,01	0	-0,02	0,01	0	0,07	-0,08	-0,03	0,2	0,11	0,21	0,19	-0,05	-
	Nov.2000	-0,01	-0,05	-0,03	-0,09	-0,05	-0,06	-0	-0,04	-0,01	0	-0,04	-0,03	0,01	0,05	0,08	-0,02	-0,08	-0,15	0,1	0,24	0,52
	Dec.2000	-0,01	0	0,01	0,01	-0,01	0	0	0,01	-0,01	0,01	0,01	0	0	0,01	-0,01	0	0,02	0,07	-0,1	-0,07	0,09
Source: ECB calculations based on Eurostat data.																						

Table 2 Revision patterns in selected STS indicators

	Non-regular and minor revisions	Continuous revisions of the latest value(s)	Revisions at intervals over longer time spans	Continuous revisions over longer time spans
	Industrial production			
Euro area [1)]		✔	✔	✔
BE		✓	✓	
DE		✓	✓	
GR	✓	✓		
ES		✓		✓ (up to May 2000)
FR		✓	✓	✓
IE			✓ (?)	
IT	✓	✓		
LU		✓	✓	
NL			✓	✓
AT			✓	
PT		✓		
FI			✓	
DK				✓
SE		✓	✓	
UK		✓		✓
	Industrial producer prices			
Euro area [1)]		✔	✔	✔
BE	✓ (in 1999)	✓ (in 2000)		
DE	✓			
GR	✓			
ES	✓			
FR		✓	✓ (major revision in July 2000)	
IE	✓			
IT	✓			
LU		✓ (in 2000)	✓	
NL		✓		
AT	n.a.	n.a.	n.a.	n.a.
PT	✓			
FI	✓			
DK	✓			
SE	✓			
UK		✓		

Source: ECB.
1) Excluding Greece.

Table 2 Revision patterns in selected STS indicators (cont'd.)

	Non-regular and minor revisions	Continuous revisions of the latest value(s)	Revisions at intervals over longer time spans	Continuous revisions over longer time spans
	Retail trade			
Euro area [1]		✔		✔
BE		✓ (?)	✓	
DE		✓		✓
GR				✓
ES				✓
FR				✓ (series stops in Dec. 1999)
IE				✓
IT				✓
LU				✓
NL				✓
AT		✓		✓
PT		✓ (series starts in Jan. 2000)		
FI				✓
DK			✓	
SE	✓		✓	
UK				✓
	Production in construction			
Euro area [1]		✔	✔	✔
BE		✓	✓	
DE		✓	✓	
GR	n.a.	n.a.	n.a.	n.a.
ES				✓
FR				✓
IE	n.a.	n.a.	n.a.	n.a.
IT [2]				
LU	✓			
NL			✓	
AT			✓	
PT	n.a.	n.a.	n.a.	n.a.
FI [2]				
DK			✓	
SE	n.a.	n.a.	n.a.	n.a.
UK	n.a.	n.a.	n.a.	n.a.

Source: ECB.
1) Excluding Greece.
2) Series stops in 1999 Q4; no classification possible.

Table 3 **Sum of absolute revisions and balance of revisions**

(averages for the period from Jan./Q1 1999 to Sep./Q3 2000)

		Industrial production	Industrial producer prices	Retail trade	Production in construction
Euro area [1]	ASAR	*2,2*	*0,8*	*5,6*	*12,0*
	ABoR	*0,4*	*-0,4*	*0,2*	*1,5*
BE	ASAR	3,5	0,7	1,3	7,2
	ABoR	1,4	0,2	-0,2	2,4
DE	ASAR	2,0	0,0	3,9	1,9
	ABoR	1,2	0,0	1,0	1,0
GR	ASAR	0,9	0,2	52,3	-
	ABoR	0,1	0,2	3,8	-
ES	ASAR	1,9	0,0	3,5	2,4
	ABoR	-0,5	0,0	-0,2	0,5
FR	ASAR	2,7	2,8	1,2	18,8
	ABoR	0,6	-2,2	0,1	5,4
IE	ASAR	1,3	0,0	4,9	-
	ABoR	0,4	0,0	-3,8	-
IT	ASAR	0,3	0,0	4,2	1,1
	ABoR	0,2	0,0	-1,4	-0,2
LU	ASAR	6,3	3,7	5,9	0,5
	ABoR	-0,1	3,5	0,9	0,3
NL	ASAR	1,7	0,3	4,2	10,6
	ABoR	-0,6	0,1	0,1	0,6
AT	ASAR	0,7	-	1,0	7,2
	ABoR	0,5	-	0,0	5,3
PT	ASAR	1,4	0,0	0,1	-
	ABoR	0,5	0,0	0,0	-
FI	ASAR	0,9	0,0	2,5	4,2
	ABoR	0,7	0,0	-0,8	2,2
DK	ASAR	2,0	0,0	0,7	10,0
	ABoR	0,4	0,0	0,0	10,0
SE	ASAR	2,9	0,0	0,3	-
	ABoR	0,6	0,0	-0,2	-
UK	ASAR	2,2	0,2	0,6	-
	ABoR	0,8	-0,1	0,1	-

Source: *ECB calculations based on Eurostat data.*

Notes: *ASAR: average of the monthly sum of the absolute amounts of revisions.*
ABoR: average of the monthly sum of the balance of revisions,
I.e. taking into account the sign of the revision.

1) Excluding Greece.

CONTENTS

Table 4	**Sum of absolute and balance of revisions - Industrial production**																						
	(cumulated revisions after first availability in the ECB databank; index points; working day adjusted data)																						
		####	févr-99	####	avr-99	mai-99	juin-99	juil-99	####	####	oct-99	nov-99	déc-99	####	févr-00	####	avr-00	mai-00	juin-00	juil-00	####	####	**Average**	
		Industrial production																						
Euro area [1]	*SAR*	*3,5*	*2,5*	*2,4*	*2,0*	*1,9*	*2,6*	*2,7*	*3,4*	*3,0*	*2,5*	*3,2*	*3,7*	*2,3*	*1,9*	*1,1*	*1,4*	*1,2*	*1,9*	*1,1*	*0,4*	*0,8*	*2,2*	***Euro area*** [1]
	BoR	*-0,8*	*-0,4*	*0,7*	*0,3*	*0,3*	*1,3*	*1,8*	*0,3*	*2,0*	*1,2*	*1,8*	*2,0*	*-1,3*	*-0,8*	*-0,1*	*-0,4*	*1,0*	*-1,1*	*0,0*	*0,1*	*0,6*	*0,4*	
BE	SAR	1,4	1,6	4,2	2,0	2,2	4,2	1,2	1,9	3,0	1,3	6,0	6,3	4,8	2,8	2,6	3,4	5,2	3,2	4,7	5,2	5,5	3,5	**BE**
	BoR	-1,4	-1,0	3,8	-0,4	1,4	1,6	-1,2	0,3	1,8	1,3	4,6	5,7	1,0	0,8	1,8	0,6	1,4	2,8	-1,7	-0,2	5,5	1,4	
DE	SAR	3,2	2,9	2,2	2,2	1,9	2,5	3,1	2,5	4,7	2,5	2,6	2,1	1,1	1,0	1,8	1,9	1,4	0,8	0,0	0,0	1,1	2,0	**DE**
	BoR	-0,6	0,1	2,2	1,2	1,9	2,5	1,7	2,3	4,7	1,5	2,6	1,7	-1,1	0,8	1,6	-1,1	1,4	0,0	0,0	0,0	1,1	1,2	
GR	SAR	0,0	0,3	0,7	1,0	0,7	0,1	0,1	0,2	0,0	3,3	2,7	0,9	0,1	0,3	0,7	2,2	2,3	1,0	0,4	2,9	0,2	0,9	**GR**
	BoR	0,0	0,3	0,7	-1,0	0,7	0,1	-0,1	0,2	0,0	-3,3	-2,3	-0,9	-0,1	0,3	0,5	2,2	0,2	1,0	0,4	2,9	-0,2	0,1	
ES	SAR	3,1	7,0	3,4	1,9	1,0	1,5	3,3	0,5	2,1	2,8	2,4	1,9	1,4	6,1	0,3	0,2	0,4	0,7	0,2	0,2	0,2	1,9	**ES**
	BoR	2,8	-5,5	-3,1	-1,7	0,1	-1,0	2,1	0,2	0,3	1,6	-2,2	0,6	-0,3	-5,7	0,3	-0,2	0,0	0,5	-0,2	0,2	0,2	-0,5	
FR	SAR	5,6	2,7	4,0	2,5	2,6	5,9	1,8	1,4	2,6	3,8	3,2	7,2	4,5	2,5	1,8	1,2	0,4	1,6	0,2	0,3	0,3	2,7	**FR**
	BoR	-3,5	-0,6	1,8	-0,1	-0,6	3,5	-0,1	0,2	1,6	2,4	2,0	5,7	-1,8	1,9	0,5	-0,8	-0,2	0,2	0,2	0,2	-0,3	0,6	
IE	SAR	2,0	2,0	2,1	2,1	2,1	1,6	10,1	5,9	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,3	**IE**
	BoR	-2,0	-2,0	-2,1	-2,1	-2,1	1,6	10,1	5,9	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,4	
IT	SAR	0,4	0,7	0,1	0,0	0,0	0,3	0,0	0,3	0,2	0,1	0,7	0,5	0,4	0,4	1,1	0,0	0,9	0,5	0,4	0,0	0,0	0,3	**IT**
	BoR	-0,4	0,7	0,1	0,0	0,0	0,3	0,0	-0,3	0,2	-0,1	0,7	0,5	-0,4	0,4	0,9	0,0	0,9	-0,5	0,4	0,0	0,0	0,2	
LU	SAR	0,7	1,3	1,1	1,3	1,9	1,9	3,7	2,0	1,3	4,5	4,7	4,2	15,3	15,9	19,7	11,4	15,0	20,3	3,0	0,4	3,7	6,3	**LU**
	BoR	-0,7	-1,3	-1,1	-1,3	-1,7	-1,9	-3,7	-2,0	-0,9	-1,7	-1,5	-4,2	14,1	13,7	-7,9	9,4	-3,6	-0,9	-0,6	-0,2	-3,3	-0,1	
NL	SAR	1,7	1,6	2,5	2,5	3,1	2,3	2,7	2,6	1,7	1,3	1,2	2,4	1,6	1,1	0,9	1,1	2,4	0,9	0,9	0,8	0,6	1,7	**NL**
	BoR	0,3	-1,0	-0,7	-1,5	-2,1	-1,7	-1,9	-1,0	-1,1	-0,5	-0,2	-1,0	-0,6	0,1	-0,1	-0,1	1,6	-0,5	-0,1	0,6	-0,4	-0,6	
AT	SAR	1,3	0,9	0,7	1,7	2,0	1,1	0,1	0,3	1,1	0,7	0,7	3,1	0,8	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,7	**AT**
	BoR	0,7	0,5	0,7	1,1	2,0	1,1	-0,1	0,1	0,9	0,7	0,7	3,1	0,0	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,5	
PT	SAR	3,8	3,9	2,8	0,6	0,6	1,5	0,9	1,2	0,8	1,2	1,9	1,0	1,7	2,8	0,3	1,3	0,6	0,2	0,4	1,1	0,1	1,4	**PT**
	BoR	3,0	3,5	2,6	0,4	0,0	1,5	-0,5	1,2	-0,4	1,2	0,7	0,8	-0,9	-1,8	-0,3	-1,3	0,6	0,0	-0,2	1,1	-0,1	0,5	
FI	SAR	2,1	1,7	1,2	1,8	1,1	1,4	0,7	0,9	0,7	0,6	0,4	0,4	1,5	1,1	0,4	1,4	1,1	1,0	0,1	0,0	0,0	0,9	**FI**
	BoR	1,7	1,7	1,2	1,4	0,7	1,4	0,1	0,5	0,7	0,2	-0,4	-0,4	1,5	1,1	0,2	1,2	1,1	1,0	0,1	0,0	0,0	0,7	
DK	SAR	1,3	3,9	2,3	3,8	3,7	2,6	2,1	3,3	2,7	3,5	1,3	2,5	0,9	1,1	0,9	1,2	1,0	1,9	1,3	0,8	0,5	2,0	**DK**
	BoR	0,6	0,2	-1,3	-0,1	-0,4	-2,1	1,8	0,9	1,0	2,3	0,7	2,2	-0,6	0,2	0,8	-0,9	0,3	1,9	1,2	0,6	-0,1	0,4	
SE	SAR	5,5	2,1	3,6	3,2	0,8	1,5	8,6	4,3	3,1	2,1	0,9	4,7	2,3	2,0	4,6	2,9	1,6	1,9	1,2	2,8	1,8	2,9	**SE**
	BoR	-0,3	1,5	-0,4	-1,2	0,4	1,1	0,2	0,3	1,1	1,1	0,5	0,7	1,3	1,6	2,4	1,1	1,6	1,7	1,2	-2,6	-1,4	0,6	
UK	SAR	3,2	2,1	4,1	2,1	1,9	2,5	2,4	2,5	2,1	2,1	2,2	1,3	2,8	4,0	1,8	2,3	1,9	1,2	1,5	0,5	1,1	2,2	**UK**
	BoR	0,8	0,3	-1,2	0,4	0,1	0,5	1,3	1,5	1,7	-0,1	0,0	1,0	2,3	3,7	1,3	-0,6	-0,3	0,7	1,5	0,5	1,1	0,8	
Source:	*ECB calculations based on Eurostat data.*																							
Notes:	*SAR: Sum of the absolute amounts of revisions.*																							
	BoR: Sum of the balance of revisions, i.e. taking into account the sign of the revision.																							
1) Excluding Greece.																								

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Table 5	Sum of absolute revisions and balance of revisions - Industrial producer prices																						
	(cumulated revisions after first availability in the ECB databank; index points)																						
		####	févr-99	####	avr-99	mai-99	juin-99	juil-99	####	####	oct-99	nov-99	déc-99	####	févr-00	####	avr-00	mai-00	juin-00	juil-00	####	####	**Average**	
		Industrial producer prices																						
Euro area [1]	*SAR*	*0,3*	*0,3*	*0,3*	*0,4*	*0,5*	*0,4*	*0,8*	*0,8*	*1,0*	*1,0*	*1,2*	*1,2*	*1,3*	*1,7*	*1,6*	*1,4*	*2,0*	*0,1*	*0,4*	*0,3*	*0,1*	*0,8*	***Euro area*** [1]
	BoR	*0,2*	*0,2*	*0,1*	*0,0*	*0,0*	*0,0*	*0,0*	*-0,3*	*-0,4*	*-0,5*	*-0,7*	*-0,9*	*-1,0*	*-0,9*	*-1,3*	*-1,2*	*-1,1*	*0,1*	*0,1*	*-0,1*	*0,1*	*-0,4*	
BE	SAR	0,0	0,0	0,0	0,1	0,1	0,2	0,0	0,2	0,0	0,6	0,1	0,2	0,3	0,4	0,7	0,2	2,8	0,5	1,5	4,1	3,0	0,7	**BE**
	BoR	0,0	0,0	0,0	0,1	-0,1	0,2	0,0	-0,2	0,0	-0,6	0,1	0,2	0,3	0,4	0,7	0,2	0,1	0,5	-1,5	0,1	3,0	0,2	
DE	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**DE**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
GR	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	3,3	0,2	**GR**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	3,3	0,2	
ES	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**ES**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
FR	SAR	0,7	0,7	0,7	1,2	1,6	1,5	2,0	2,8	3,6	3,7	4,6	4,9	5,4	6,4	6,6	5,8	6,7	0,1	0,2	0,2	0,0	2,8	**FR**
	BoR	0,7	0,7	0,1	-0,5	-0,5	-0,6	-1,4	-1,8	-2,6	-2,8	-3,4	-4,7	-4,7	-5,0	-6,4	-5,6	-6,3	-0,1	-0,2	-0,2	0,0	-2,2	
IE	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**IE**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
IT	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,1	0,0	0,0	0,0	**IT**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,1	0,1	0,0	0,0	0,1	0,0	0,0	0,0	
LU	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	1,0	0,6	1,9	3,6	1,9	2,4	61,7	2,8	1,2	3,7	**LU**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,2	1,8	3,6	1,9	2,4	61,7	2,8	-1,2	3,5	
NL	SAR	0,2	0,4	0,0	0,1	0,0	0,0	0,5	0,4	0,2	0,2	0,3	0,2	0,4	0,1	0,2	0,5	0,4	0,4	0,9	0,9	0,0	0,3	**NL**
	BoR	0,2	0,2	0,0	-0,1	0,0	0,0	-0,1	0,0	0,2	0,0	-0,1	0,0	-0,2	0,1	0,2	0,1	0,2	0,2	0,7	0,7	0,0	0,1	
AT	SAR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**AT**
	BoR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
PT	SAR	0,2	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	**PT**
	BoR	0,2	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,1	0,0	0,0	0,0	0,0	0,0	0,1	0,0	0,0	
FI	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**FI**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
DK	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**DK**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
SE	SAR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	**SE**
	BoR	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	
UK	SAR	0,1	0,2	0,2	0,2	0,1	0,2	0,1	0,2	0,0	0,2	0,3	0,0	0,1	0,3	0,3	0,2	0,4	0,4	0,1	0,1	0,2	0,2	**UK**
	BoR	0,1	-0,2	-0,2	-0,2	-0,1	-0,2	0,0	0,1	0,0	-0,2	0,3	0,0	-0,1	-0,2	-0,1	-0,1	0,0	-0,4	-0,1	-0,1	0,2	-0,1	
Source:	*ECB calculations based on Eurostat data.*																							
Notes:	*SAR: Sum of the absolute amounts of revisions.*																							
	BoR: Sum of the balance of revisions, i.e. taking into account the sign of the revision.																							
1) Excluding Greece.																								

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Table 6	**Sum of absolute revisions and balance of revisions - Retail trade turnover**																							
	(cumulated revisions after first availability in the ECB databank; index points)																							
		####	févr-99	####	avr-99	mai-99	juin-99	juil-99	####	####	oct-99	nov-99	déc-99	####	####	févr-00	####	avr-00	mai-00	juin-00	juil-00	####	####	**Average**	
		Retail trade turnover																						
Euro area [1]	*SAR*	*7,5*	*26,9*	*11,8*	*7,9*	*10,3*	*8,8*	*8,4*	*3,0*	*2,3*	*4,0*	*3,0*	*5,1*	*4,5*	*5,7*	*2,2*	*2,4*	*1,8*	*1,0*	*0,7*	*0,3*	*0,0*	5,6	***Euro area*** [1]
	BoR	*-0,8*	*-1,2*	*-1,5*	*0,3*	*-1,1*	*1,3*	*-0,8*	*1,2*	*-0,1*	*1,5*	*1,6*	*-1,2*	*1,0*	*2,4*	*1,1*	*0,2*	*0,4*	*0,2*	*0,1*	*-0,1*	*0,0*	0,2	
BE	SAR	0,5	2,8	1,0	1,3	3,4	1,5	0,6	0,9	0,5	0,7	0,5	0,8	1,5	2,7	6,2	0,5	0,9	0,5	0,1	0,1	0,0	1,3	**BE**
	BoR	0,1	1,4	-0,6	0,9	-3,2	1,3	-0,4	-0,5	0,5	-0,3	0,3	0,0	-0,9	2,1	-4,8	0,3	-0,7	0,5	0,1	0,1	0,0	-0,2	
DE	SAR	6,1	24,9	7,8	9,3	4,1	3,8	3,7	1,8	2,0	2,3	1,3	1,8	2,8	3,1	2,4	0,9	1,6	0,8	0,3	0,0	0,6	3,9	**DE**
	BoR	-0,5	6,1	-0,6	4,8	2,0	0,9	0,2	0,2	-0,2	0,7	-0,1	0,8	2,0	2,9	2,2	0,7	1,4	-0,8	-0,3	0,0	-0,6	1,0	
GR	SAR	40,3	34,1	32,2	18,0	11,8	9,8	11,2	10,9	7,2	23,2	16,8	9,9	327,6	532,2	4,3	4,3	3,0	1,7	0,0	0,0	0,0	52,3	**GR**
	BoR	9,3	5,8	7,6	5,1	6,0	0,3	3,6	1,7	-1,5	9,8	5,6	2,6	11,9	12,6	1,5	-2,1	1,6	-1,7	0,0	0,0	0,0	3,8	
ES	SAR	4,1	15,3	10,4	6,5	4,7	1,9	3,1	3,6	2,8	1,6	2,8	1,6	6,9	2,0	0,4	3,8	0,8	0,9	0,6	0,1	0,0	3,5	**ES**
	BoR	-0,6	1,8	0,5	-0,2	0,4	0,2	-1,4	-2,1	-1,0	-0,6	1,3	0,6	-4,2	0,4	-0,2	0,7	0,0	-0,6	0,6	0,1	0,0	-0,2	
FR	SAR	0,6	9,4	1,6	2,2	2,2	1,8	0,8	0,6	0,3	3,9	0,9	0,0	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,0	**FR**
	BoR	-0,4	-6,3	0,0	0,7	1,7	1,3	0,3	-0,6	0,3	3,7	0,9	0,0	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,1	
IE	SAR	1,5	21,1	16,2	14,4	13,4	9,4	11,4	6,8	0,9	1,2	0,8	1,2	1,0	2,0	0,6	0,9	0,4	0,1	0,0	0,0	0,0	4,9	**IE**
	BoR	0,1	-16,3	-13,6	-13,1	-12,5	-8,7	-10,3	-5,6	0,0	0,0	-0,2	0,4	0,0	-0,5	0,0	0,6	0,2	0,1	0,0	0,0	0,0	-3,8	
IT	SAR	9,1	13,4	9,0	11,4	18,8	17,9	0,5	1,2	1,2	1,8	1,1	0,9	0,3	0,6	0,1	0,1	0,4	0,4	0,2	0,0	0,0	4,2	**IT**
	BoR	-6,8	-7,1	-8,2	-7,7	0,0	-0,3	0,4	-0,9	0,4	0,3	0,2	0,5	-0,3	0,5	-0,1	0,0	-0,4	0,4	-0,2	0,0	0,0	-1,4	
LU	SAR	17,6	7,7	12,4	5,5	9,9	10,8	9,2	7,1	4,2	9,9	8,7	6,3	3,5	4,1	2,3	1,9	1,9	1,7	0,0	0,0	0,0	5,9	**LU**
	BoR	-10,4	3,3	6,4	2,1	-5,5	7,2	-1,0	5,1	3,0	-3,1	7,3	3,5	0,7	-0,5	0,7	-0,3	-1,9	1,7	0,0	0,0	0,0	0,9	
NL	SAR	4,5	15,0	5,3	6,0	6,7	2,8	5,7	5,6	3,4	4,5	2,6	4,5	4,0	2,7	3,6	2,7	2,5	2,7	2,4	0,7	0,0	4,2	**NL**
	BoR	-0,2	8,0	-2,3	2,4	-0,7	1,0	0,3	-0,8	1,0	-1,7	1,0	-0,3	-0,7	1,1	-0,7	-0,5	-0,5	-0,3	-2,4	-0,7	0,0	0,1	
AT	SAR	1,4	4,9	2,1	1,6	1,1	0,7	0,8	0,8	1,1	1,2	0,6	1,3	0,6	1,3	0,6	0,2	0,2	0,1	0,1	0,0	0,0	1,0	**AT**
	BoR	0,0	0,3	-0,1	0,4	0,1	-0,2	0,3	-0,1	0,2	0,1	0,0	0,1	-0,2	-0,2	0,1	0,2	-0,2	0,1	-0,1	0,0	0,0	0,0	
PT	SAR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,0	0,1	0,2	0,6	0,5	0,3	0,0	0,0	0,2	**PT**
	BoR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	0,0	0,1	0,2	0,6	-0,5	0,3	0,0	0,0	0,1	
FI	SAR	1,9	5,1	6,8	1,5	3,2	1,6	2,5	1,7	1,0	1,9	6,3	3,9	2,7	2,0	5,0	0,4	1,0	1,1	1,4	1,0	0,0	2,5	**FI**
	BoR	1,0	-2,3	-4,0	0,2	-0,3	-1,2	1,3	0,5	0,2	-1,9	0,1	-0,1	-0,9	-1,0	-4,8	-0,2	-0,8	-0,9	-1,4	-1,0	0,0	-0,8	
DK	SAR	1,2	3,1	1,5	0,6	0,7	0,7	1,2	0,9	0,8	1,1	0,8	1,0	0,2	0,5	0,2	0,2	0,0	0,0	0,0	0,0	0,0	0,7	**DK**
	BoR	-0,2	1,9	-0,6	0,3	-0,2	0,1	-0,5	-0,7	0,5	-0,2	-0,1	-0,5	0,2	-0,5	0,2	0,2	0,0	0,0	0,0	0,0	0,0	0,0	
SE	SAR	1,1	0,9	1,2	0,1	0,3	0,7	0,4	0,8	0,7	0,5	0,4	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,3	**SE**
	BoR	0,1	-0,5	-1,0	-0,1	0,1	-0,7	-0,4	-0,8	-0,7	-0,5	-0,4	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	0,0	-0,2	
UK	SAR	0,8	1,8	0,6	0,7	0,6	0,2	0,5	0,5	0,7	1,0	0,7	0,9	0,5	0,5	0,2	0,4	0,3	0,1	0,3	0,3	0,1	0,6	**UK**
	BoR	0,1	0,8	0,2	0,3	-0,1	0,1	-0,1	-0,1	-0,3	0,1	0,2	-0,2	0,2	0,1	0,2	0,4	-0,1	-0,1	0,3	-0,3	-0,1	0,1	

Source: *ECB calculations based on Eurostat data.*

Notes: *SAR: Sum of the absolute amounts of revisions.*

BoR: Sum of the balance of revisions, i.e. taking into account the sign of the revision.

1) Excluding Greece.

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Table 7	Sum of absolute revisions and balance of revisions - Production in construction																							
	(cumulated revisions after first availability in the ECB databank; index points)																							
		#####	#####	#####	avr-99	mai-99	juin-99	juil-99	#####	#####	oct-99	nov-99	déc-99	#####	#####	#####	avr-00	mai-00	juin-00	juil-00	#####	#####	**Average**	
		Production in construction																						
Euro area [1]	*SAR*	*12,8*	*28,3*	*17,9*	*14,8*	*18,9*	*15,9*	*16,7*	*13,6*	*14,3*	*13,3*	*11,5*	*18,4*	*8,9*	*13,3*	*14,1*	*9,2*	*3,7*	*5,0*	*0,7*	*0,7*	*0,0*	*12,0*	***Euro area*** [1]
	BoR	*-1,2*	*-3,0*	*3,5*	*3,7*	*5,3*	*7,8*	*9,0*	*4,6*	*2,5*	*-0,5*	*2,8*	*4,2*	*-3,9*	*-7,0*	*-2,5*	*0,0*	*3,1*	*3,2*	*0,1*	*0,0*	*0,0*	*1,5*	
BE	SAR	7,8	6,1	8,0	8,6	9,5	11,7	7,5	10,1	11,9	3,1	3,9	3,4	10,7	10,7	6,0	6,8	8,7	8,8	7,7	0,8	0,0	7,2	**BE**
	BoR	0,8	0,2	0,1	-1,3	1,7	3,3	-2,9	2,7	3,7	3,1	3,9	3,4	5,1	0,7	5,2	6,0	3,9	7,8	1,9	0,8	0,0	2,4	
DE	SAR	0,2	0,7	5,2	3,6	3,6	4,2	4,0	3,6	4,9	2,8	0,9	1,2	0,1	1,4	0,7	0,3	1,2	0,6	0,2	0,5	0,0	1,9	**DE**
	BoR	0,2	0,5	0,6	3,0	3,0	3,0	3,6	3,2	2,5	2,8	0,9	1,2	0,1	-1,4	-0,7	-0,3	-1,2	0,6	-0,2	0,5	0,0	1,0	
GR	SAR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**GR**
	BoR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
ES	SAR	ND	ND	5,7	ND	ND	0,9	ND	ND	3,0	ND	ND	3,2	ND	ND	0,9	ND	ND	0,7	ND	ND	ND	2,4	**ES**
	BoR	ND	ND	1,8	ND	ND	-0,3	ND	ND	0,3	ND	ND	1,6	ND	ND	0,5	ND	ND	-0,7	ND	ND	ND	0,5	
FR	SAR	20,3	78,3	22,5	19,4	23,2	23,9	23,3	21,4	21,4	21,3	21,4	15,5	17,0	26,2	12,7	9,8	9,0	5,5	0,8	1,9	0,0	18,8	**FR**
	BoR	7,2	-2,6	9,3	9,4	11,8	10,4	13,8	13,1	8,5	11,6	10,5	9,2	7,5	-4,6	3,8	-6,0	3,2	-0,9	-0,8	-1,9	0,0	5,4	
IE	SAR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**IE**
	BoR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
IT	SAR	ND	ND	0,4	ND	ND	3,2	ND	ND	1,9	ND	ND	0,0	ND	ND	0,0	ND	ND	ND	ND	ND	ND	1,1	**IT**
	BoR	ND	ND	-0,4	ND	ND	1,2	ND	ND	-1,9	ND	ND	0,0	ND	ND	0,0	ND	ND	ND	ND	ND	ND	-0,2	
LU	SAR	0,0	0,0	0,0	0,0	0,4	0,0	0,0	0,0	0,0	0,1	0,3	0,0	5,4	0,8	0,8	0,2	1,1	0,6	0,0	ND	ND	0,5	**LU**
	BoR	0,0	0,0	0,0	0,0	0,4	0,0	0,0	0,0	0,0	-0,1	-0,3	0,0	5,4	0,6	-0,8	-0,2	0,9	0,6	0,0	ND	ND	0,3	
NL	SAR	18,1	45,0	13,8	7,7	9,4	10,9	9,4	8,7	10,4	12,5	7,7	6,8	8,9	17,2	4,9	0,0	0,0	0,0	ND	ND	ND	10,6	**NL**
	BoR	-14,5	40,9	-4,1	7,2	-8,8	10,5	-9,2	-8,3	2,0	-10,0	7,7	-5,6	-8,9	17,2	-4,9	0,0	0,0	0,0	ND	ND	ND	0,6	
AT	SAR	16,5	5,4	14,6	9,0	20,7	12,2	18,3	19,7	11,0	20,9	1,4	0,7	0,4	0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	7,2	**AT**
	BoR	7,2	-3,3	14,0	8,3	20,7	11,2	14,9	15,3	5,5	16,1	1,4	0,7	0,0	-0,1	0,0	0,0	0,0	0,0	0,0	0,0	0,0	5,3	
PT	SAR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**PT**
	BoR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
FI	SAR	ND	ND	11,9	ND	ND	3,5	ND	ND	1,5	ND	ND	0,0	ND	ND	ND	ND	ND	ND	ND	ND	ND	4,2	**FI**
	BoR	ND	ND	9,3	ND	ND	1,2	ND	ND	-1,5	ND	ND	0,0	ND	ND	ND	ND	ND	ND	ND	ND	ND	2,2	
DK	SAR	5,8	5,4	7,1	13,2	17,2	22,0	14,4	17,3	17,4	0,0	0,0	0,0	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,0	**DK**
	BoR	5,8	5,4	7,1	13,2	17,2	22,0	14,4	17,3	17,4	0,0	0,0	0,0	ND	ND	ND	ND	ND	ND	ND	ND	ND	10,0	
SE	SAR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**SE**
	BoR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	
UK	SAR	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	ND	**UK**

Table 8 Timeliness of EU national statistics *)

	BE	DE	GR	ES	FR	IE	IT	LU	NL	AT	PT	FI	DK	SE	UK
Industrial production	49	**36**	62	57	49	n.a.	45	**40**	42	88	49	43	41	60	**39**
Industrial producer prices	**19**	27	41	29	29	49	32	49	29	n.a.	32	**26**	41	27	**12**
Retail sales	57	**43**	75	47	n.a.	57	57	105	**41**	67	82	57	55	47	**14**
Production in construction	**49**	**36**	n.a.	105	59	n.a.	204	60	**57**	88	n.a.	88	60	n.a.	70

*) Number of days after the end of the reporting period. Data for the three earliest available countries in bold; values refer to the reporting period August 2000.

Source: EFC's 3rd progress report on the EMU Action Plan, January 2001.

Chart 1 Industrial production in the euro area; revisions to the January 1999 value

(index; 1995 = 100)

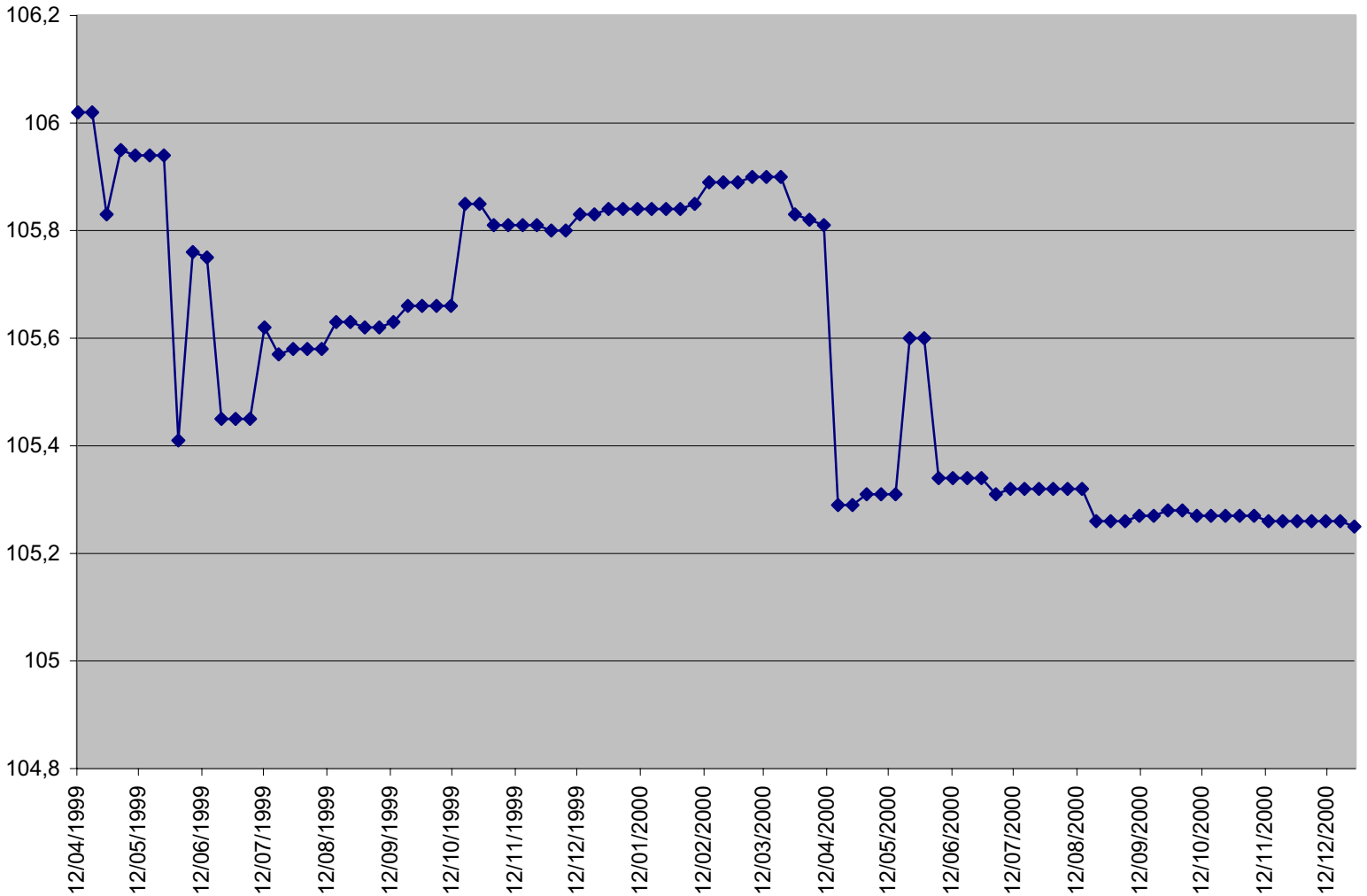


Chart 3 Retail trade turnover in the euro area; revisions to the January 1999 value

(index; 1995 = 100)

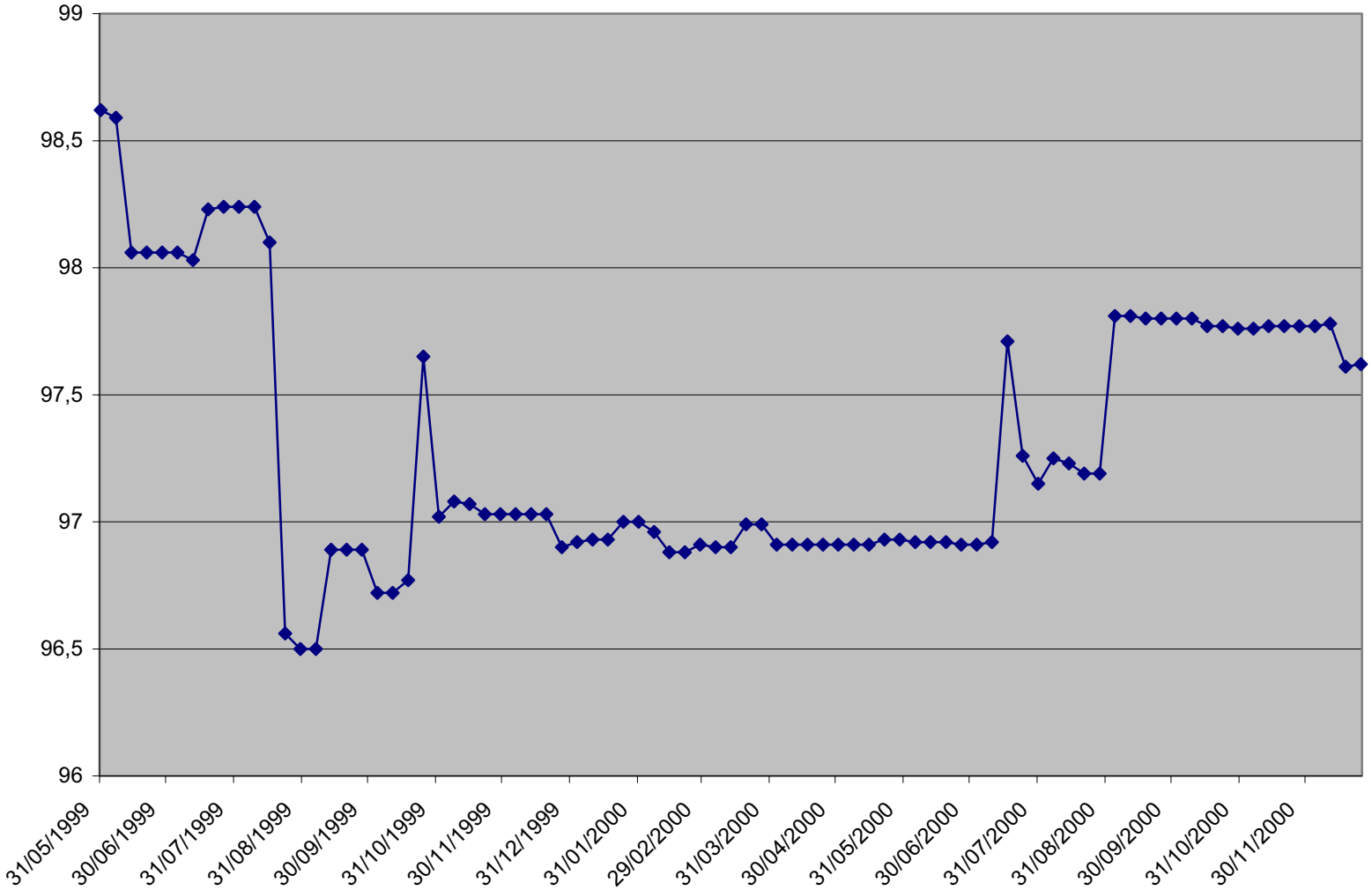


Chart 4 Production in construction in the euro area; revisions to the January 1999 value

(index; 1995 = 100)

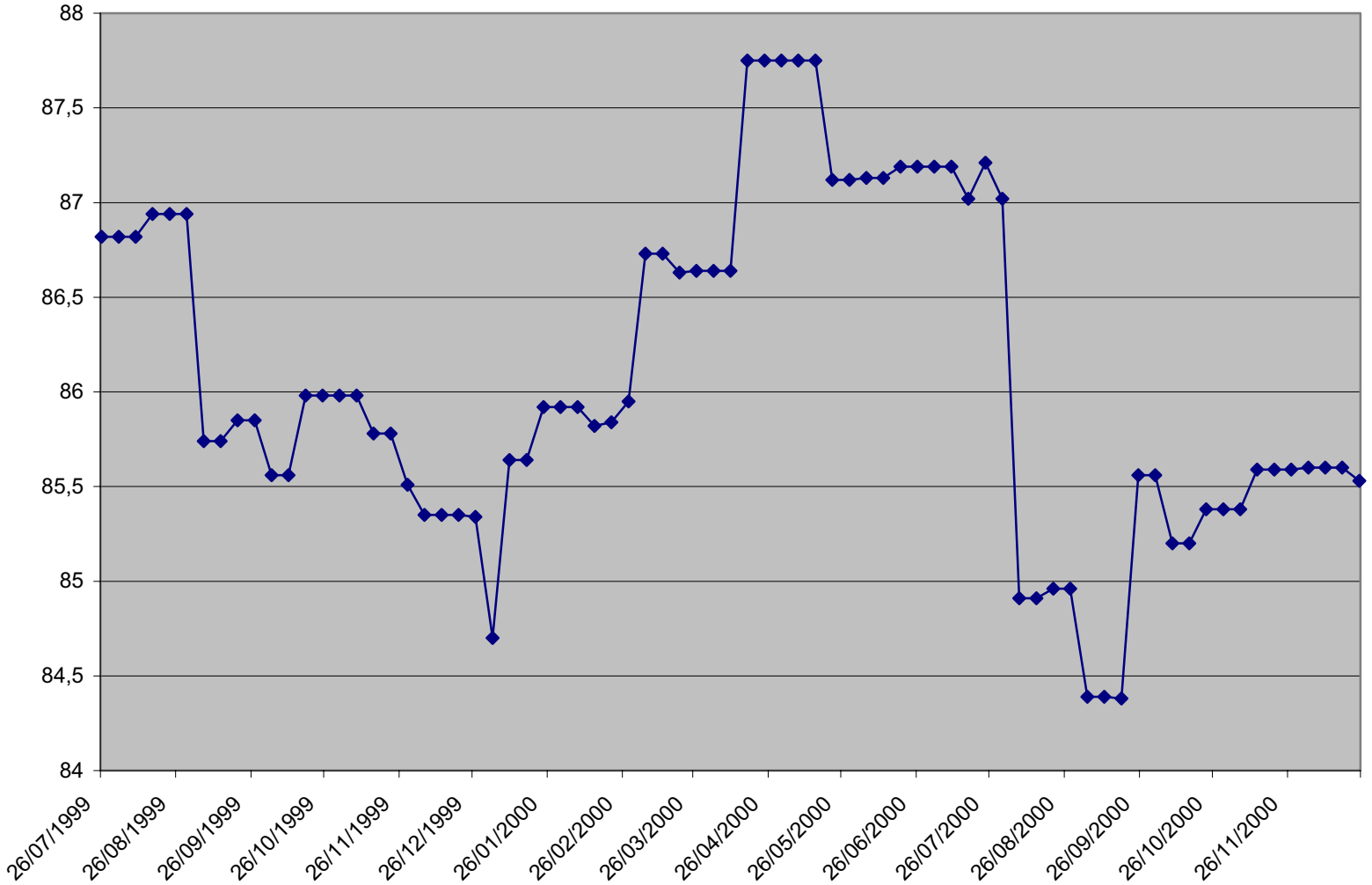
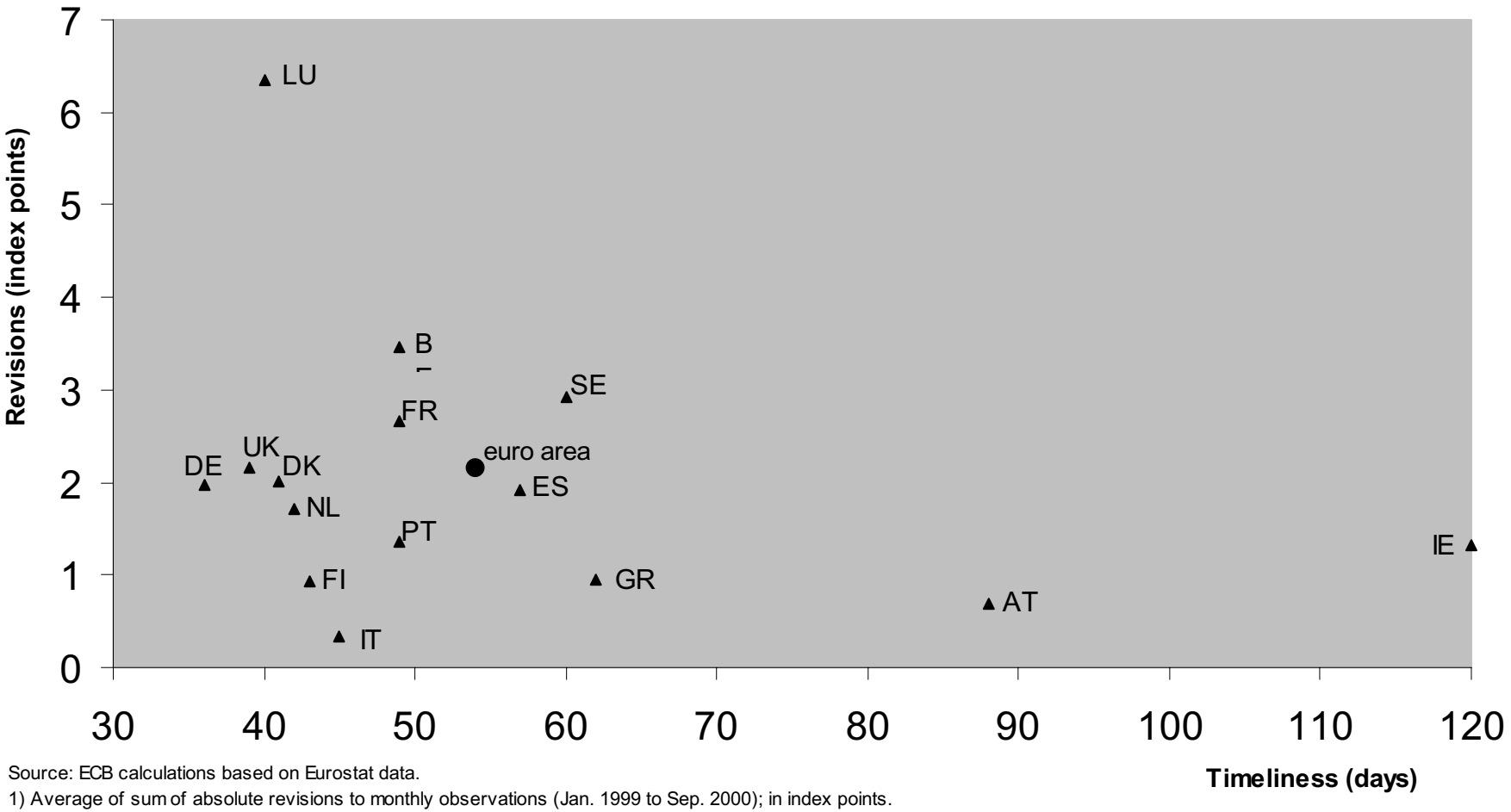
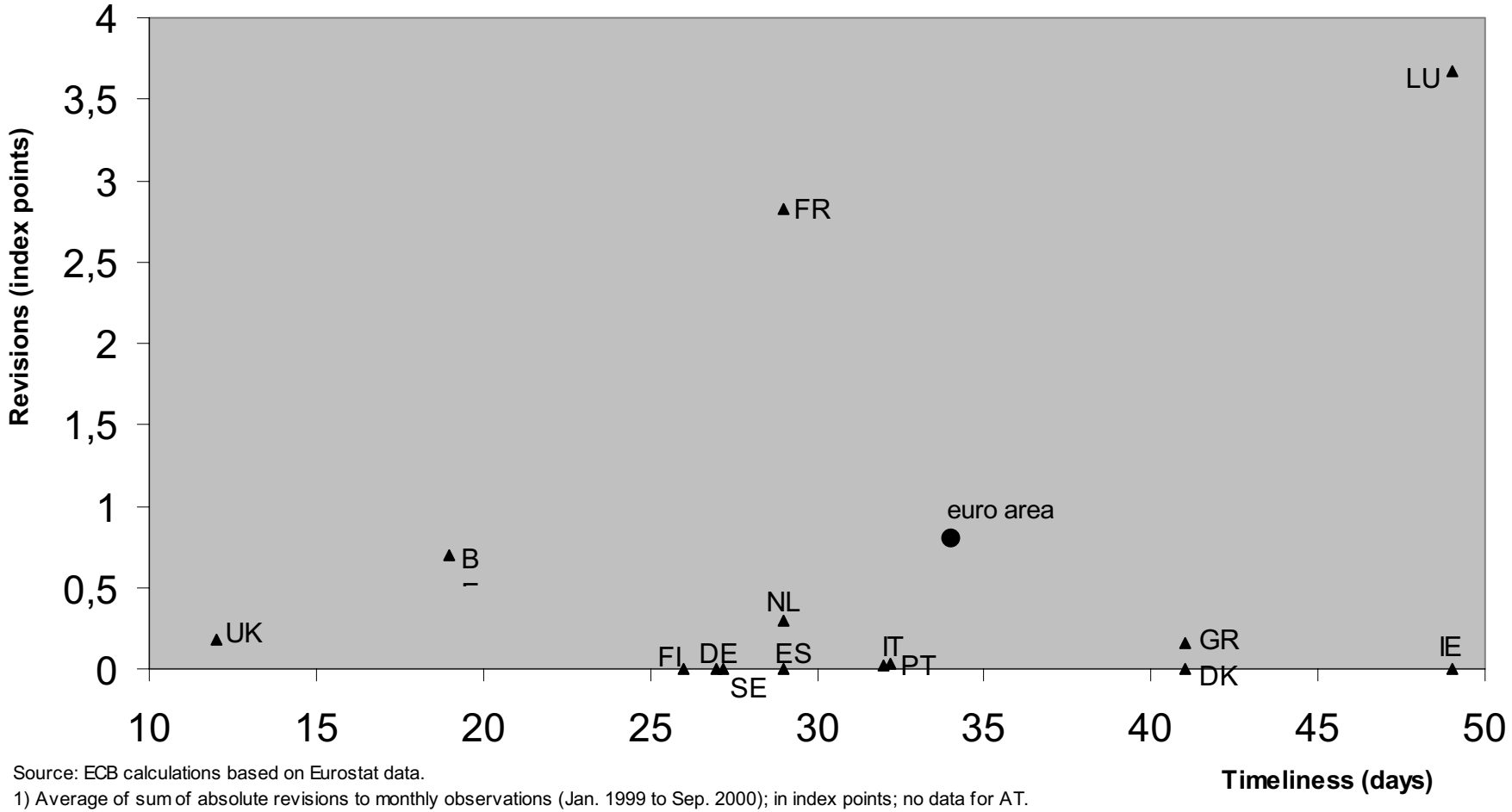


Chart 5 **Revisions[1] and timeliness[2] - Industrial production**



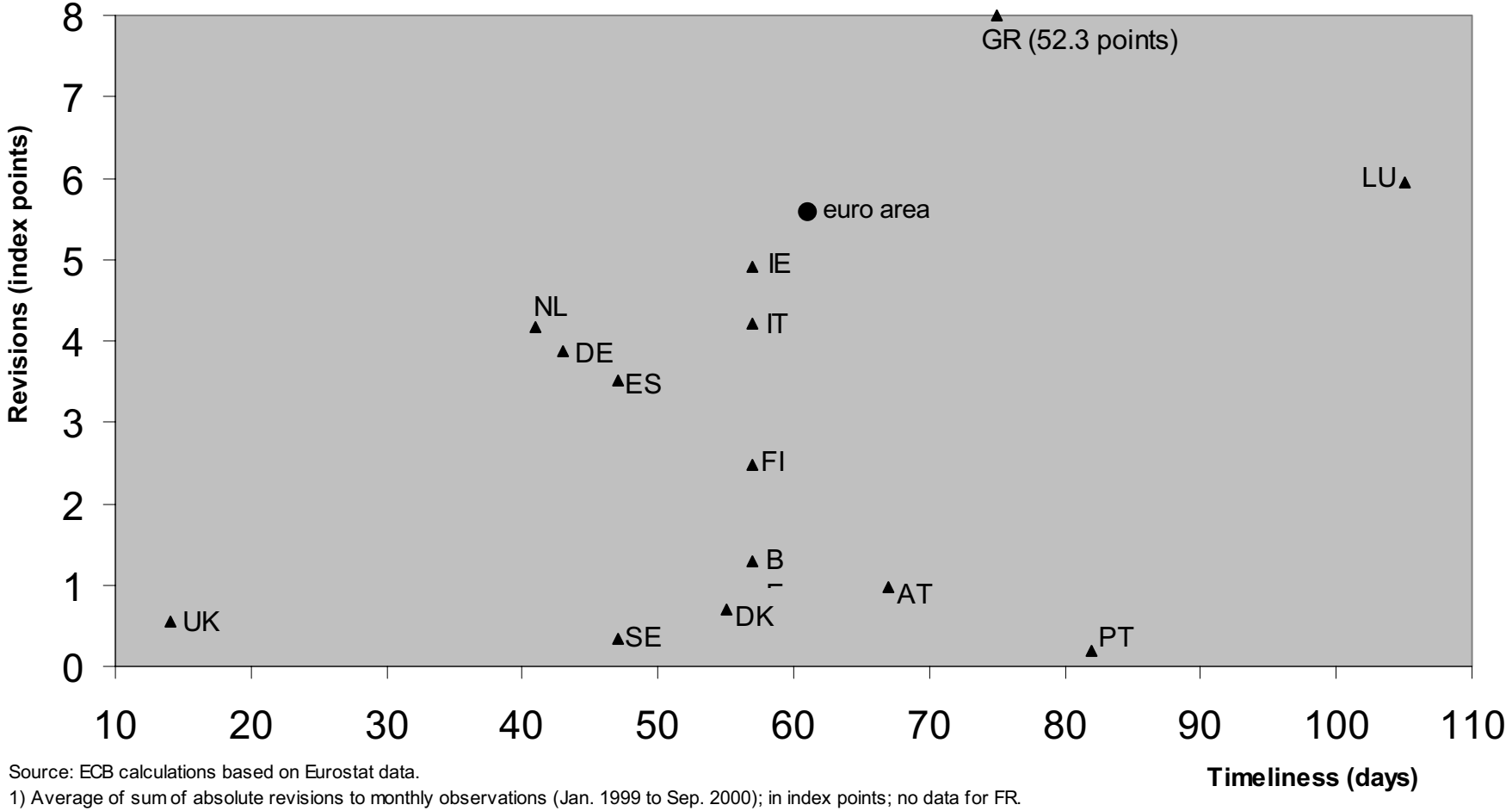
Source: ECB calculations based on Eurostat data.
1) Average of sum of absolute revisions to monthly observations (Jan. 1999 to Sep. 2000); in index points.
2) Publication delays for the Aug. 2000 observation; Ireland: July 2000; in calendar days.

Chart 6 **Revisions[1] and timeliness[2] - Industrial producer prices**



Source: ECB calculations based on Eurostat data.
1) Average of sum of absolute revisions to monthly observations (Jan. 1999 to Sep. 2000); in index points; no data for AT.
2) Publication delays for the Aug. 2000 observation; in calendar days.

Chart 7 **Revisions[1] and timeliness[2] - Retail trade turnover**

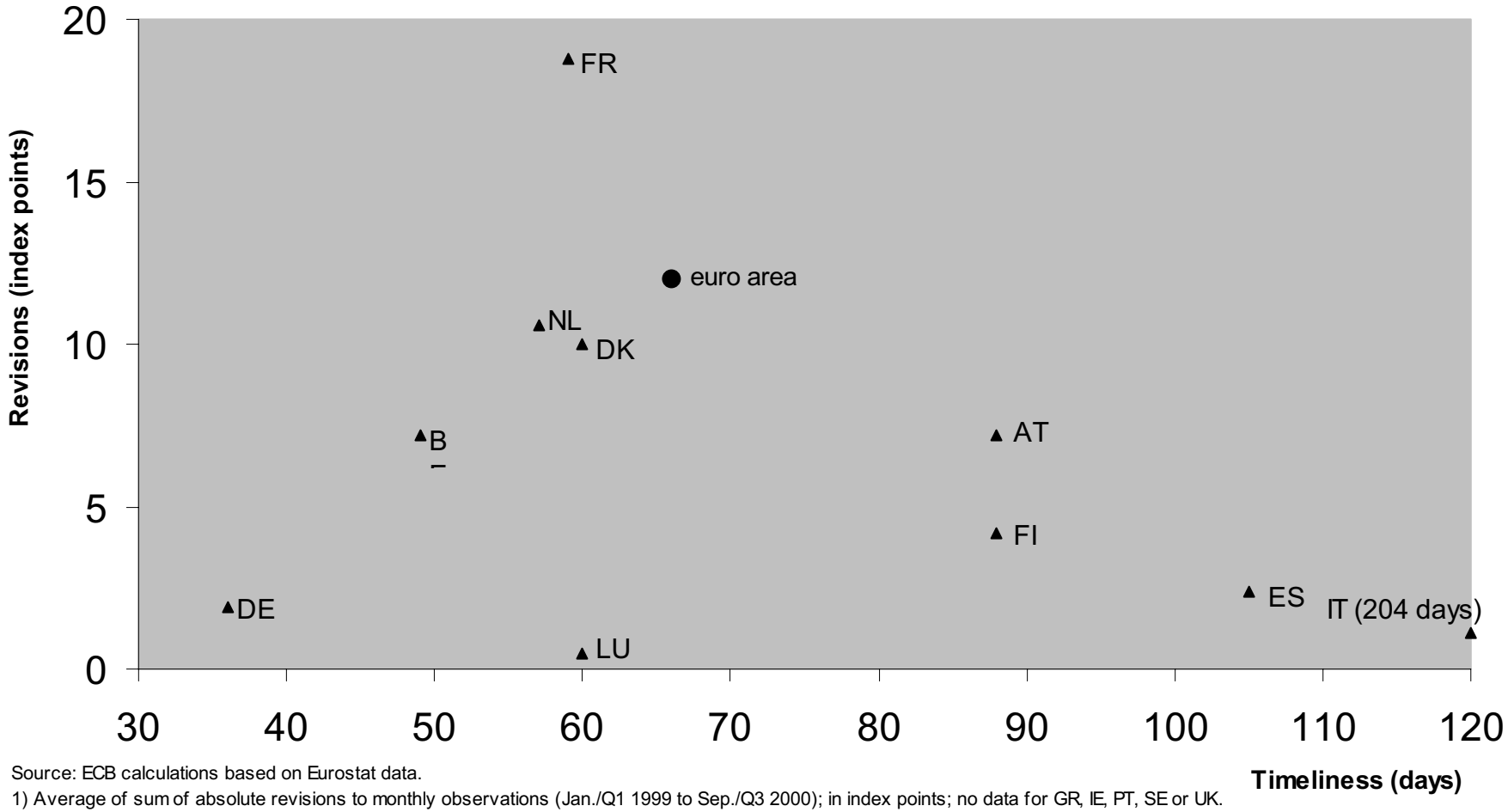


Source: ECB calculations based on Eurostat data.

1) Average of sum of absolute revisions to monthly observations (Jan. 1999 to Sep. 2000); in index points; no data for FR.

2) Publication delays for the Aug. 2000 observation; in calendar days.

Chart 8 **Revisions[1] and timeliness[2] - Production in construction**



Source: ECB calculations based on Eurostat data.

1) Average of sum of absolute revisions to monthly observations (Jan./Q1 1999 to Sep./Q3 2000); in index points; no data for GR, IE, PT, SE or UK.

2) Publication delays for the Aug. 2000/Q2 2000 2observation: in calendar days.

STUDY ON THE INDUSTRIAL PRODUCTION INDEX

Availability, transmission deadlines and ways of obtaining an early indicator

F. Donzel, Eurostat

INTRODUCTION

The following study is devoted entirely to the industrial production index (IPI). This index plays a key role in the production of statistics relating to the business cycle. In fact, in many countries the IPI is the first available quantitative indicator with which the level of industrial activity can be assessed. The same applies within the Eurostat framework. The industrial production index is therefore a matter of great interest to user organisations, foremost among which is the European Central Bank.

The industrial production index is covered by a European Regulation dating from May 1998 which is now being implemented. The Regulation lays down in particular that the national statistical offices are to submit their country's IPI to Eurostat no later than 45 days after the reference period. The Member States are required to provide adjusted working-day series but may also provide other details (unadjusted data, seasonally adjusted figures, trend cycles, etc.). The practice of Eurostat in the realm of industrial statistics is to focus particularly on the aggregate figures for industrial output excluding the construction industry, which correspond to the figures for activity categories C, D and E of the general industrial classification of economic activities within the European Communities (NACE). Consequently, the present study is devoted entirely to the adjusted working-day series of these aggregate figures.

Quality and speed of production are frequent subjects of discussion in connection with the industrial production index. The users' wish list may be summarised as follows: obtaining the IPI as quickly as possible is of paramount importance (gaining 24 hours can prove valuable), but the quality of the indicator, needless to say, must not be sacrificed for the sake of speed. Of particular importance in the European context is the requirement that the IPI take account of the data from each of the major countries. These two factors of quality and speed of production form an equation that is difficult to solve, the more so since, as we shall see, the time frames within which industrial production indices are produced vary significantly from one country to another.

At the time of writing, in other words for the reference period of December 2000, the IPI is published between day *t+47* and day *t+50*. In principle, the index is made public on the date of publication of the French index or on the following day, since France is the last of the large Member States to publish its IPI. The deadline prescribed by the Regulation, namely day *t+45*, should be achieved in the year 2001. The view we shall present here is that this aim is in the process of being achieved, and our interest will focus on ways in which we could obtain an early indicator. Even though we cannot ignore the time frame within which our overseas partner countries operate, and in particular the fact that the United States publishes its index on day *t+15*, we shall argue in this study from the same premises as the European Central Bank, which, in its recommendations of August 2000, expressed the need to have this indicator at is disposal before day *t+40*.

1. Notes on the methods used to obtain the IPI

- Eurostat collects the IPI in the form of adjusted working-day series. This is the only form that is used to obtain the European aggregate figures. This adjusted time series is obtained by means of a weighted average of the national working-day series. The seasonally adjusted IPIs and the trend cycles for Europe are obtained by eliminating seasonal effects from the European working-day series, never by adding together the submitted national figures. Thus the trend-cycle series and seasonally adjusted series produced by individual countries are directly published, but Eurostat does not use them to produce its European aggregate figures.

- Eurostat applies the subsidiarity principle in relation to the Member States. This means that Eurostat will always give priority to figures submitted directly by the Member States but may act on behalf of a Member State which has not submitted its figures. This principle also applies to series which the Regulation explicitly prescribes, such as adjusted working-day IPI series. If a country transmits only unadjusted series, Eurostat assumes responsibility for working-day adjustment of the data.

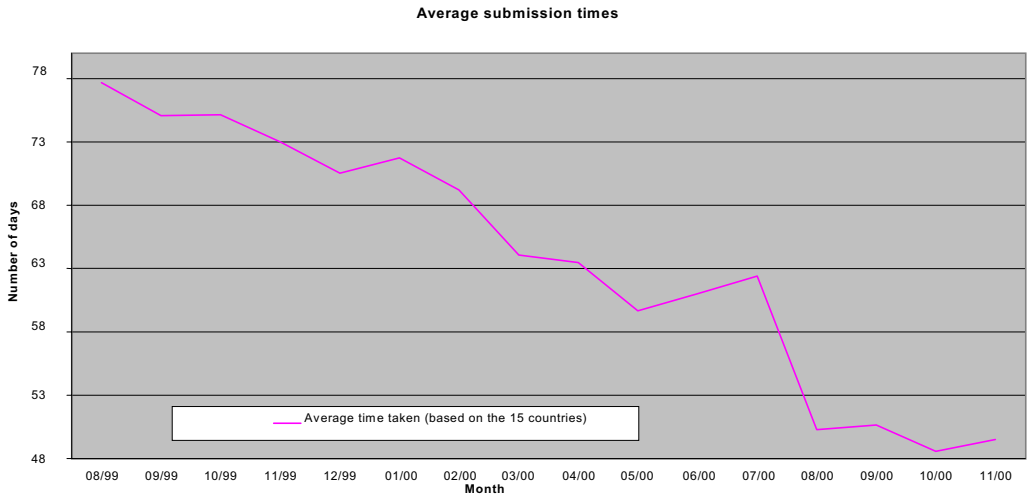
- As far as the length of the cumulative European series is concerned, the law of the highest common denominator is applied. The European series does not start until the date on which the shortest national time series begins. At the present time, Eurostat is exploring various ways of limiting the consequences of this systematic rule.

- The European aggregate for any given date is only calculated if Eurostat possesses figures covering at least 60% of the total weighting. This is the minimum weighting required for the calculation of the aggregate figure in the Eurostat database, but the published European IPI is naturally based on a far greater percentage of the total weighting. The latest monthly figure at the present time, for example, takes account of more than 90% of the total weighting, i.e. the statistics for all Member States except Austria, Greece, Ireland and Sweden.

- The fact that an aggregate figure is obtained from national adjusted working-day series may pose methodological difficulties if there are wide variations in the adjustment methods used by the national statistical offices.

2. Deadlines for transmission of the industrial production index

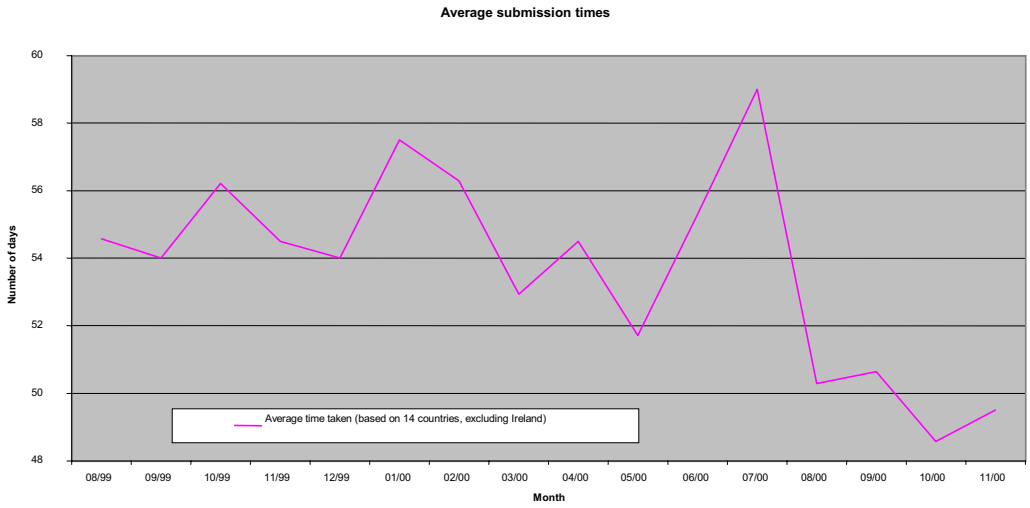
The following graph shows the average number of days taken to obtain the IPI. For each date, we calculate the average time lag for each of the 15 countries.



It is clear that the average time taken to obtain the industrial production index fell very significantly over the period from August 1999 to November 2000. It has to be said,

however, that the average remained above the 45 days laid down in the Regulation, even over the final few months.

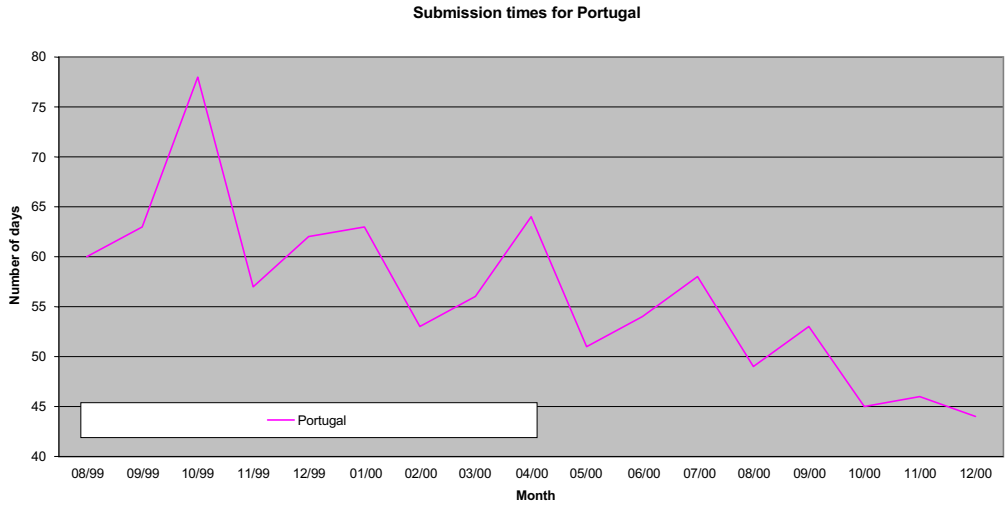
This average, however, has been influenced by a powerful structural effect. During the period under consideration, the time lag for Ireland plummeted from 400 days to 110 days but still remains far too long. The following graph shows the average for 14 countries and excludes Ireland.

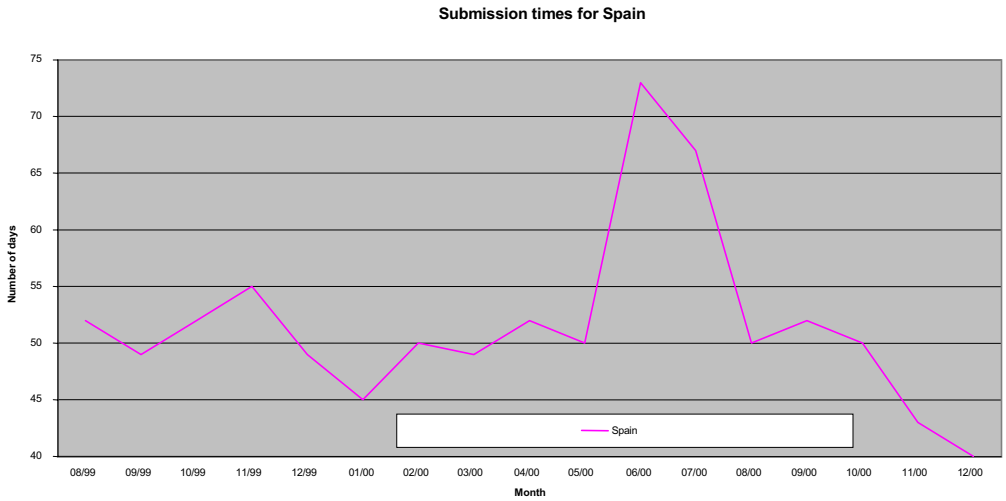


The drop remains significant, even without the effect produced by the Irish figures. It is noticeable that the average still exceeds the 45 days prescribed by the Regulation.

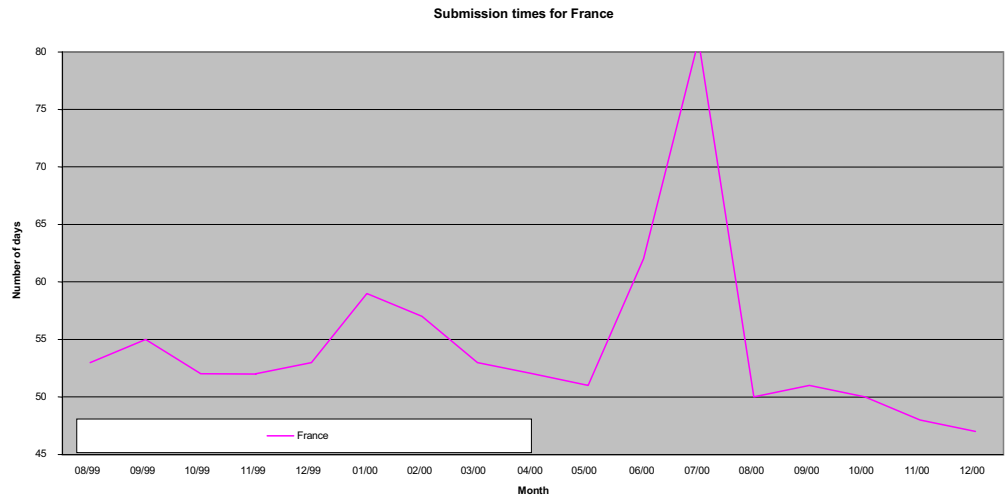
It is also observable that this average depends very much on the month under consideration. In July, for example, the average rose to almost 60 days.

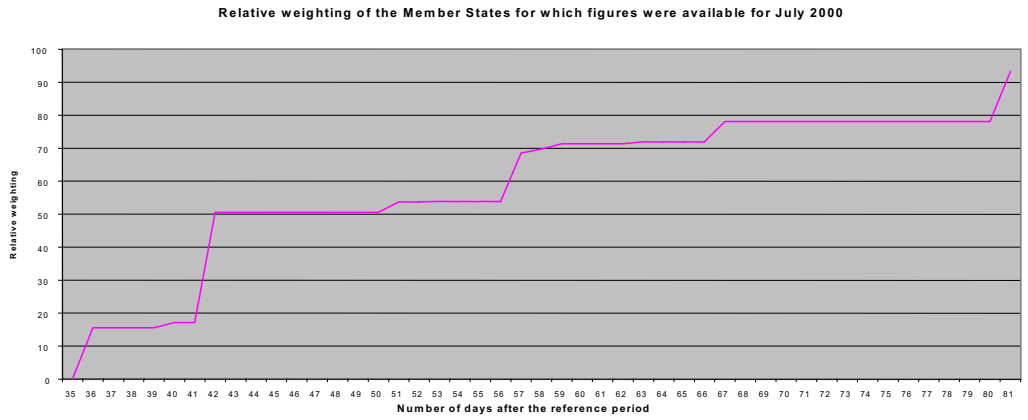
This reduction in the average time lag is reflected to a greater or lesser extent in the various national statistics. The case of Ireland was referred to above, although in that case the time lags are far in excess of the period laid down in the Regulation. Over the same period, some other countries have considerably reduced the amount of time taken to publish their indices and now comply with the *t+45* deadline. This is the case with Spain and Portugal and, to a lesser degree, with France (see following graphs).

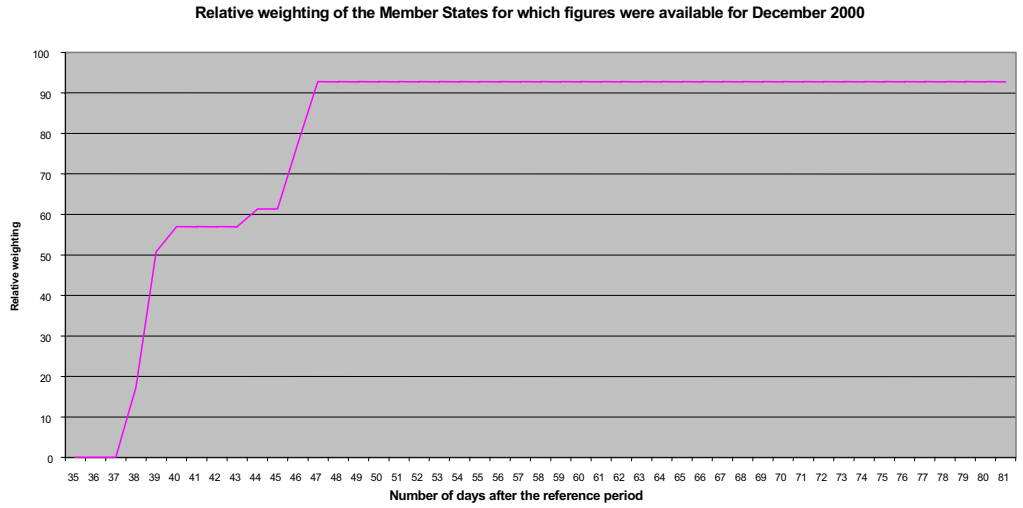




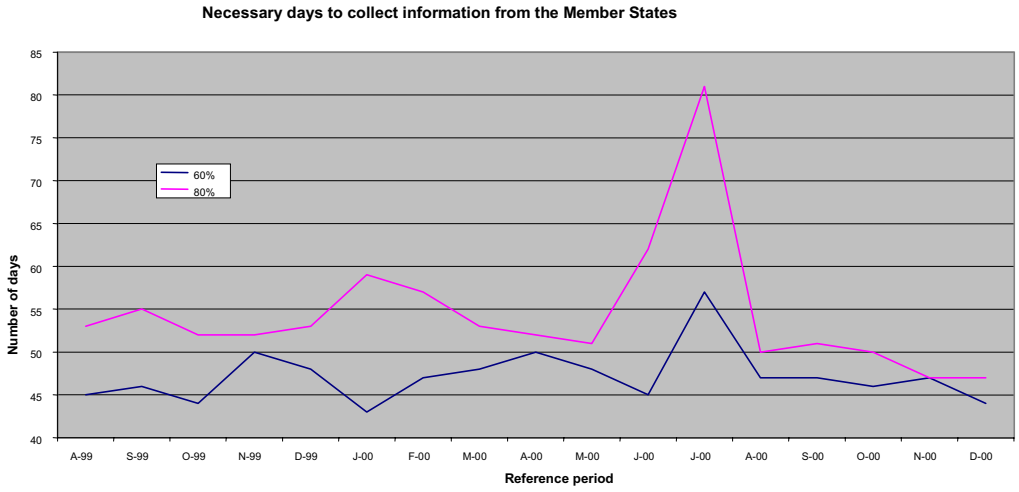
On the other hand, to the extent that the European aggregate for the IPI is obtained by means of a weighted average of the various national series, it is interesting to observe the way in which the cumulative weighted amount develops for each of the months. It is, in fact, conceivable that, even if some countries submit their data very late, their impact on the overall weighted amount will be minimal. The following two graphs show how this cumulative weighting developed in the months of July and December 2000. It emerges that it can develop in different ways from one month to another. In fact, more than 90% of the total weighted amount for December was available on day *t+47*, whereas the 60% mark was not reached for the July figures until 58 days after the reference period, and the 80% line was not crossed until day *t+80*. It is certainly true that the month of July is affected by holidays and is therefore somewhat exceptional, but even if we look at other periods, we must surely conclude that this cumulative weighting does not develop in accordance with a fixed rule.





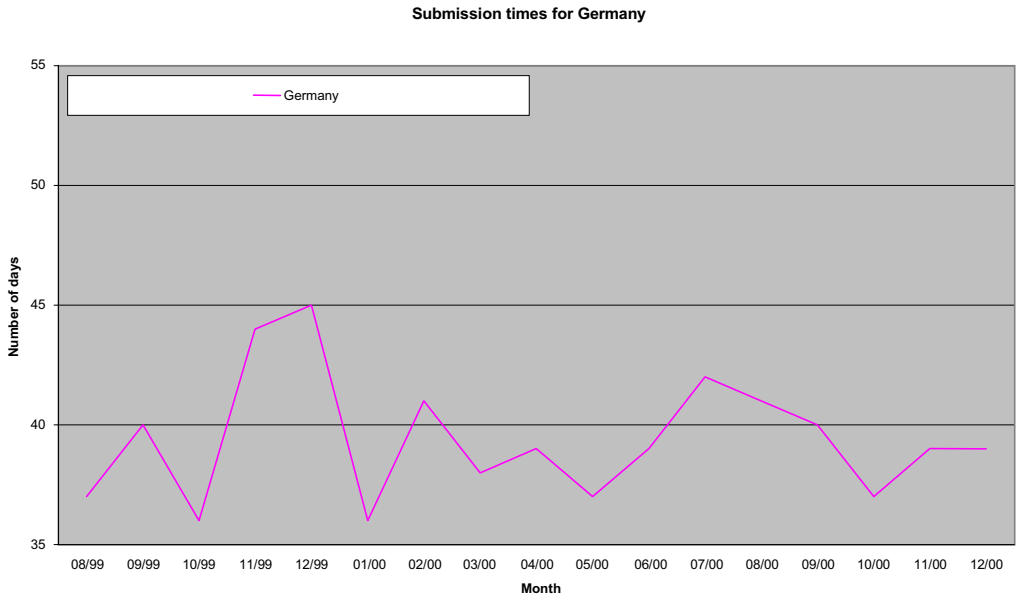


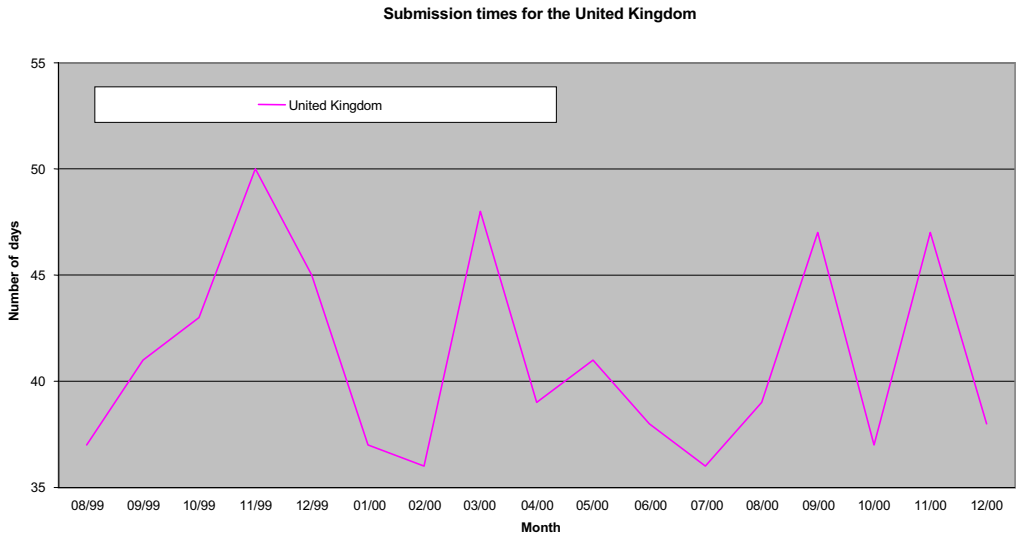
In order to obtain conclusive evidence that submission times fluctuate considerably from one month to another, we can try to determine the number of days required to obtain 60% or 80% of the total weighting for each reference period.



Once again, it is noticeable that the situation depends very much on the month under consideration. It is not a common occurrence (it happened four times during the period under review) for 60% of the information to be available by day *t+45*. However, the convergence of the two curves during recent months is an encouraging sign, because it means that the time taken to move from 60% to 80% is becoming shorter.

In recent times, Spain has become the sixth country, after Germany, the Netherlands, Denmark, the United Kingdom and Luxembourg, to provide information before day *t+40*. These countries account for a more than 50% of the total European weighting and would therefore be an attractive option as a basis for the possible creation of an early aggregate. Unfortunately, the consistency with which countries manage to produce their returns before day *t+40* can vary between countries, as is illustrated by the following graphs for Germany and the United Kingdom.





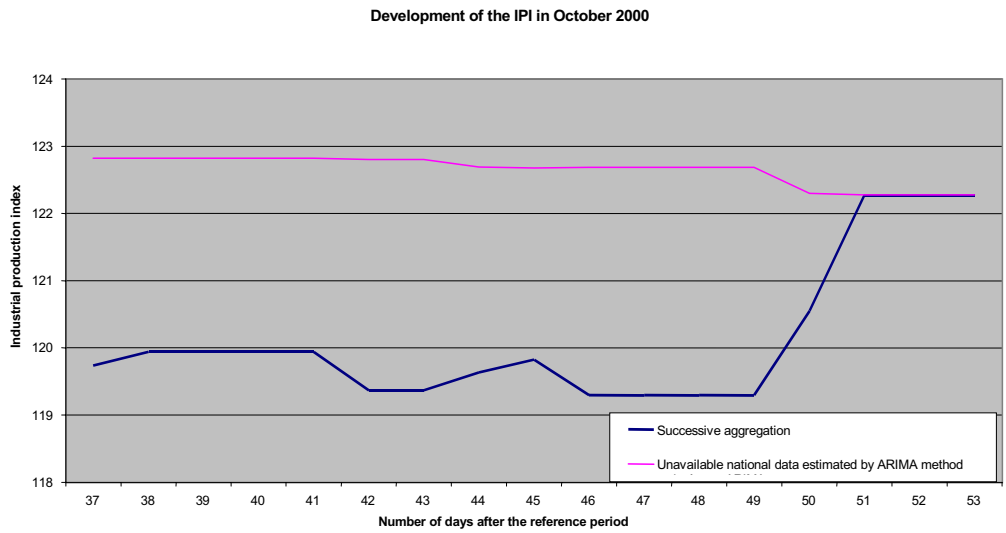
At this point a few preliminary conclusions may be drawn about submission times. The average time lag has decreased, thanks to certain Member States having significantly reduced their submission times. Consequently, the disparities between countries' submission times have narrowed. If we look at the weightings of the various countries, it emerges that 60% of the European figures are not consistently delivered by day *t+45*, although the situation is gradually improving. We do ultimately have six countries which can deliver data within 40 days, and these countries do account for more than 50% of the total weighting. However, since the European Regulation concerning short-term statistics stipulates 45 days, these countries are under no obligation to submit their figures systematically by day *t+40*. Perhaps Eurostat ought to be spell out more precisely the importance of obtaining data as early as possible in advance of the deadline prescribed in the Regulation.

3. Impact of the use of auto-regressive integrated moving average (ARIMA) models

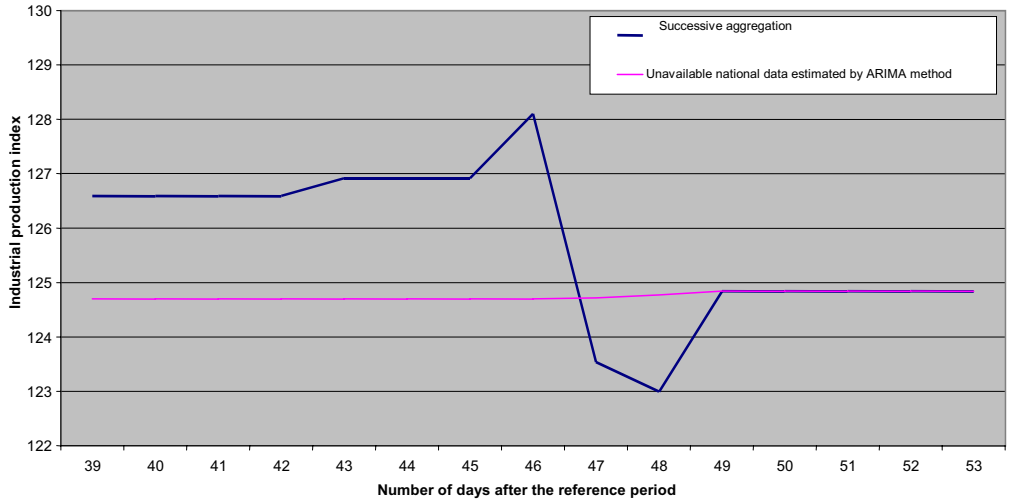
For any given reference period, the IPI is calculated as follows: the calculation of the aggregate values does not begin until data have been submitted by countries whose cumulative weighting amounts to 60% of the total. Data for the countries from which no information has yet been received are estimated with the aid of an ARIMA model. The statistics resulting from the use of this model are never published as national data but are used to assess the European aggregate figures.

There are good grounds for questioning the legitimacy of such an approach in so far as the missing information for country *A* at time *t* is perhaps more closely linked to the data submitted by other countries for time *t* than it is to the statistics that are available for country *A* up to time *t-1*. In other words, in view of the high degree of economic integration in Europe, the French IPI at any given time will be more closely related to the German IPI at that time than to the French IPI series up to and including the previous assessment period.

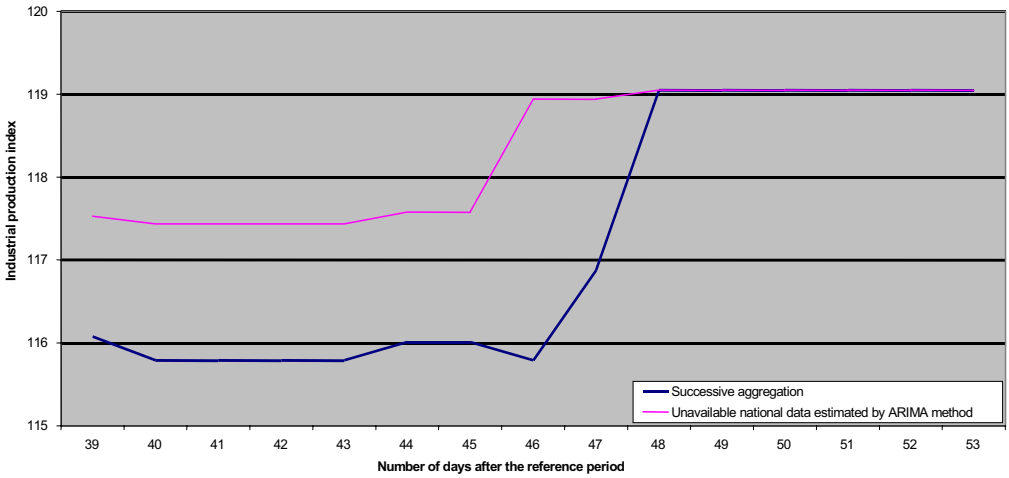
The following graphs show, for the months of October, November and December 2000 respectively, the difference between figures derived from successive aggregation and from ARIMA-based estimation of the missing national data. Successive aggregation is variable in terms of the number of countries, i.e. additional countries are included as their statistical data become available. The ARIMA figures are always based on 15 countries, because the missing figures for each measurement period are estimated.



Development of the IPI in November 2000



Development of the production index in December 2000



For the months of October and November, it is apparent that the aggregate figures derived from the use of the ARIMA model converge far more quickly than those obtained by means of successive aggregation. This is because the average is obtained from indices, and the levels of these indices vary quite widely from one country to another. The fact that we are currently quite far removed from the base year (1995) tends to reinforce these differences. Aggregation using the ARIMA method makes it possible to calculate a coherent growth rate at any time, because the calculation of the index is always based on the full complement of countries. It goes without saying, however, that the use of ARIMA-based methods has disadvantages too, in particular the inertia it generates. The identification of breakover points, a vital component in the treatment of short-term statistics, becomes a delicate operation when the ARIMA model is applied.

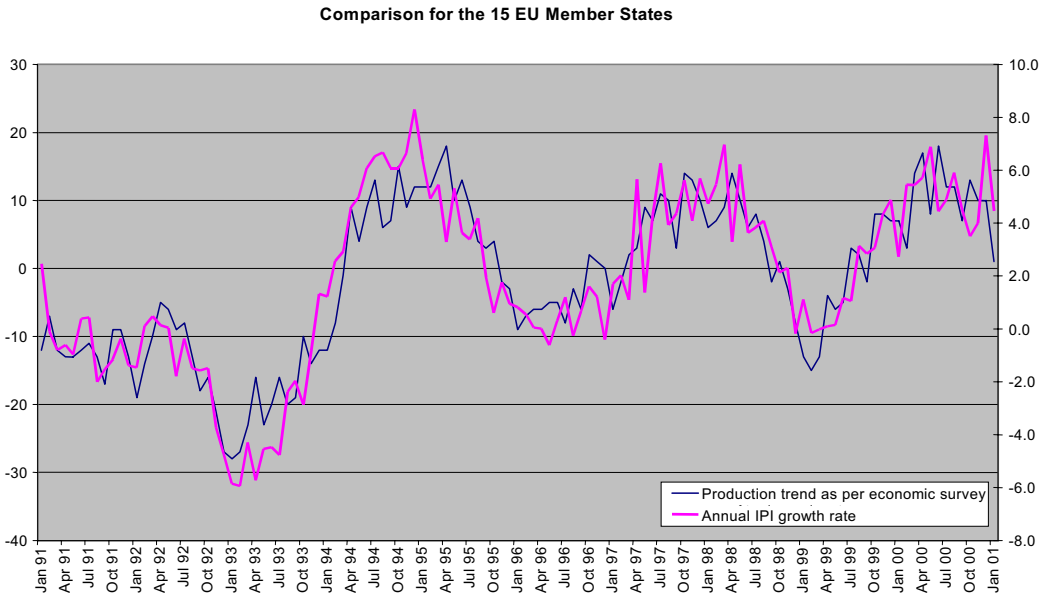
The example of the month of December also helps to put the benefit of the use of ARIMA models into perspective. At the *t+45* point, it is observable that the European aggregate

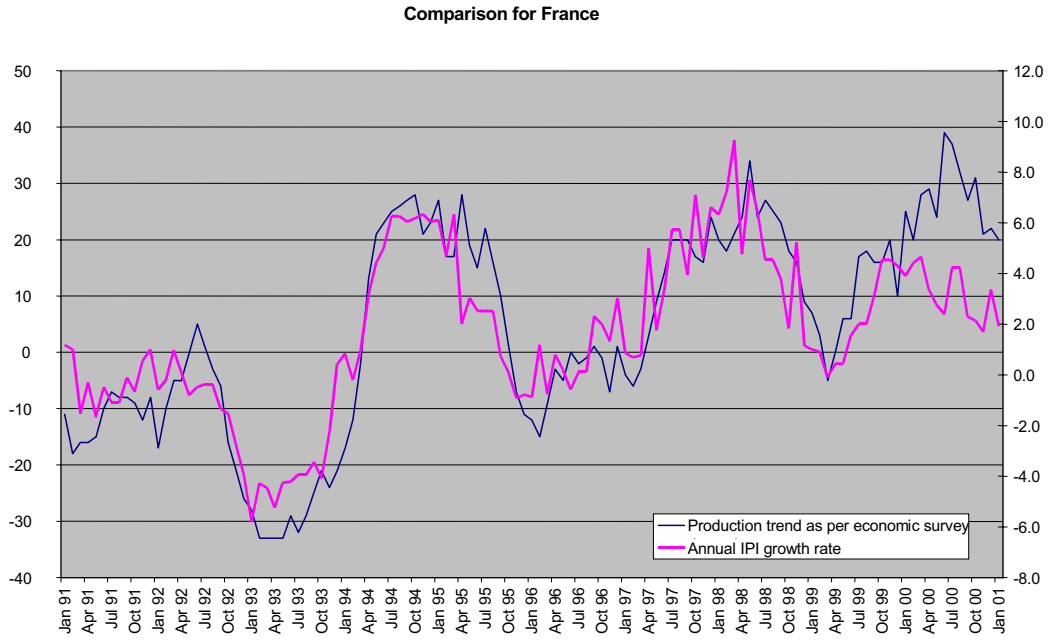
index suddenly rises by 1.5 index points. This leap is due to the inclusion of Italy, whose actual December figure turned out to be ten points higher than the forecast made with the aid of an ARIMA on the basis of the previous months' figures. This new factor, the huge difference between the predicted value and the actual value, completely legitimises the practice of collecting and publishing data on a monthly basis. It also illustrates the limitations of the use of ARIMA models, which are very unreliable predictors.

In conclusion, it may be said that, while the method involving the use of ARIMA models seems to produce quicker convergence in our illustrative examples than the method based on successive aggregation, it is no more than a means of cutting down on the succession of corrections and of improving the overall coherence of the statistical data. When it comes to creating early indicators, the ARIMA method does not enable us to take account of extraneous shocks. The only alternative is to use external series which are sufficiently linked to take such shocks into account.

4. Use of economic surveys to create early indicators

It seems fairly natural to have recourse to economic surveys. These are monthly surveys, the findings of which are available at the end of the reference period ($t+0$) for each of the countries. In most of the questions, respondents are asked to choose one of three qualitative categories. Heads of companies are asked, for example, to assess recent trends in the volume of business. The assessment categories are 'rising', 'stable' and 'falling'. On the basis of these responses, a quantitative series is constructed – a balance of opinion corresponding to the difference, after weighting and adjustment, between the percentage whose volume of business is rising and the percentage whose business is slackening. The trade cycles described by these series actually do match the trends reflected in the IPI figures for the respective countries. The following graphs provide a comparison between the annual growth rate of the IPI and the trends that have emerged from the economic surveys. The first graph compares the data for the 15 Member States of the European Union, and the second compares the equivalent data for France.





It is noticeable that the general trends correspond but that the monthly data sometimes differ somewhat. The two series are more closely matched for Europe as a whole than for France, where the most recent figures show a particularly wide divergence.

From the outset two types of method may be envisaged for the construction of an early indicator with the aid of economic surveys:

- produce an IPI prediction for each of the 15 Member States, then add these predictions together to obtain an aggregate prediction, or
- directly produce an aggregate IPI prediction for the EU as a whole.

In both cases, the indicator becomes available at a very early stage in the process ($t+0$).

Before examining these two options, we must define the underlying rules governing regression and the choice of an econometric equation.

Certain criteria are absolutely imperative:

- The model must possess a high degree of macroeconomic validity.
- The model must use a reasonable number of elucidatory variables (in view of the periods to which the estimates relate, five variables appear to be the maximum.
- Each of the variables that are used must be significant (in the sense of Student's test).
- The model must be stable (it must not show Chow's first-order structural break).

From the models that comply with these criteria, we shall select the equation with the highest quality of adjustment in terms of r^2 corrected and with the lowest number of second-order parametrical instabilities as defined in the Chow test.

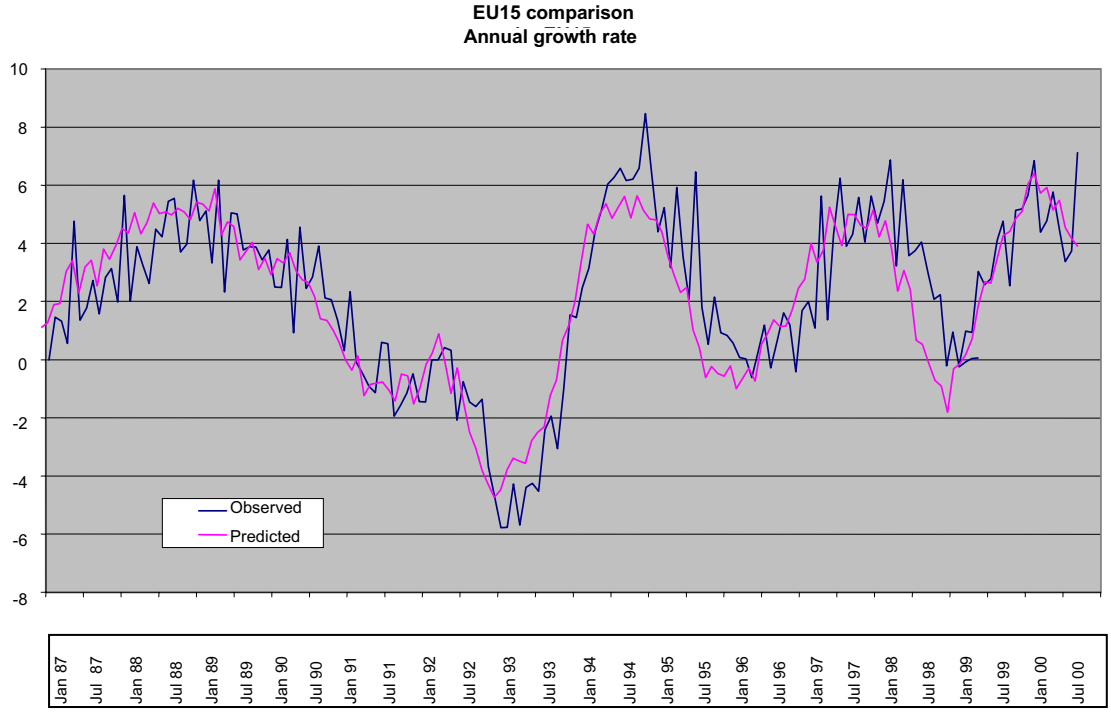
The method based on a forecast for each country turns out to be difficult to establish and to maintain. In fact, while such a method produces encouraging findings for certain countries (Finland in particular), it seems to be very tricky in some cases, such as that of Italy, to make a forecast. Such a system, however, cannot work unless there are 15 standardised forecasts, one for each of the Member States. It sometimes appears as if it would be possible to obtain an equation of satisfactory quality on a quarterly basis but not at monthly intervals. In fact, it is occasionally observable - and is very conspicuous in the case of France – that a time lag exists between the IPI series and the series emanating from the

economic survey, but it is not a systematic time lag. Moreover, such a system is difficult to maintain in the sense that the odds of at least one occurrence of Chow's structural break among the 15 equations are far from negligible. In the end, therefore, this system was not selected.

It is possible to try a direct forecast on the basis of the European aggregate, using only the economic surveys. The graph below presents the results of a forecast of this type. The questions in the economic survey require heads of companies to assess how business is faring. The balance of opinion that can be drawn up on the basis of their responses is therefore consistent with the IPI growth rate. In order to predict the annual IPI growth rate, we use five elucidatory variables here:

- the annual IPI growth rate as measured one month ago,
- the annual IPI growth rate as measured twelve months ago,
- the balance of opinion on past production levels,
- the balance of opinion on the state of companies' order books, and
- the balance of opinion on future production levels as measured one month ago.

All of these variables are European aggregates. The endogenous variable from the previous month is used because of the relative inertia of the annual IPI growth rate. Its inclusion lends greater stability to the model, even though it probably blunts the reactivity factor to some extent. The endogenous variable from 12 months ago is used to account for the fact that, although we are operating with an annual growth rate, the series is subject to seasonal fluctuations. The three variables derived from the economic surveys, namely past production levels, the present state of order books and predicted production levels, are clearly macroeconomically linked to the industrial production index.



To the extent that the endogenous variable, as measured one month ago, is used here, the model is not available until day *t+20*. It is difficult to refrain from the use of this variable, because of both the improved adjustment capability it offers and the stability it lends to the model.
It is clear that there is information to be found in the economic surveys. The quality of the adjustment is acceptable (r^2 corrected = 0.84). The usefulness of these variables is especially apparent when changeover points occur. To an extent, this model provides good qualitative information for each month, the predicted trends generally coinciding with the series of observed values. Nevertheless, in some cases the quantitative data are widely divergent. In December 2000, for instance, there was a gap of about three index points. Such a disparity prohibits the systematic use of the prediction as a provisional estimate of the actual IPI prior to its publication on day *t+50*. In such a case, an excessive amount of correction would be required.

At the same time, the previous observations concerning the method involving a predicted figure for each country remain valid to a certain extent with regard to this direct estimation too. The use of quarterly time series produces results which are far more convincing in statistical terms than those obtained from monthly series. But from an operational point of view, quarterly figures are clearly too infrequent. In addition, while there is still a possibility that the appearance of a structural break as defined by Chow will make the equation difficult to sustain, such an eventuality is obviously less likely to materialise in one general equation than in any one of 15 national equations. The most useful feature of this equation, at the end of the day, is the fact that it provides information on the current position of the EU within the trade cycle. On the other hand, in periods of growth it is not an accurate indicator of the rate of growth in a given month.

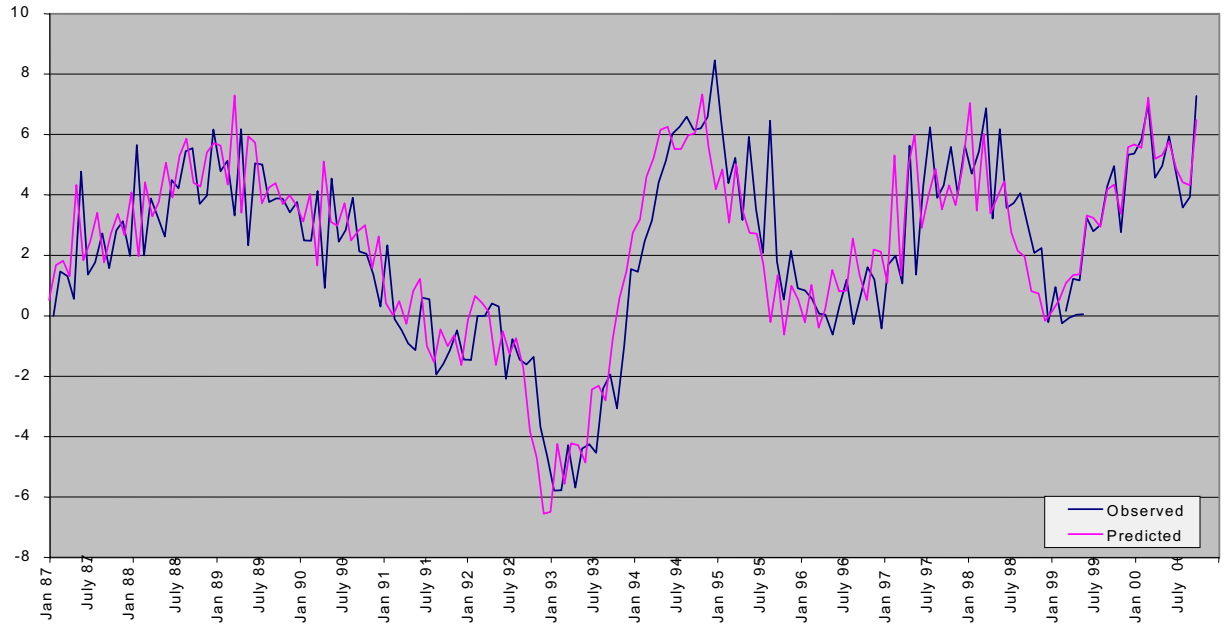
5. The creation of early indicators at *t+40*

By day *t+40*, we not only have the results of the economic survey (indeed, we even have the findings of the following month's survey); we also have statistical information for six countries. The data for Germany, the United Kingdom, the Netherlands, Denmark and Spain will normally be available, along with an estimate for Luxembourg. Assuming that these data can be provided systematically within this time frame, it is possible to produce an aggregate based on those six countries, which account for more than 50% of the total weighting. Because of this high percentage of the total weighting mass, this aggregate is a prime candidate for selection as an elucidatory variable. In fact, in all circumstances and whatever the other potential exogenous variables, this aggregate based on six countries possesses a high degree of elucidatory validity, as was only to be expected (it registers a very high score on Student's test). The next step was therefore to look among the variables resulting from the economic survey to find those that would improve the quality of the prediction. Here we see that the chosen model comprises three variables from the economic survey:

- production prospects as assessed in Italy (ITE),
- past production levels in France (FRA), and
- past production levels in the European Union as a whole (EUA).

It is interesting to note that France and Italy are the two 'major' EU Member States whose data are not available at *t+40*. The model therefore enables us, directly or indirectly, to use information from all the largest countries of the Union. The following graph shows the results of a forecast based on this equation.

Forecast using both economic surveys and data available on day *t+40*



$$AGR = 0.528 + 0.742*AGR40 + 0.010*ITE + 0.014*FRA + 0.040*EUA$$

r^2 corrected = 0.95

AGR = Annual IPI growth rate for the European Union as a whole
AGR40 = Annual IPI growth rate for the six countries whose data are available by day *t+40*
ITE, EUA and FRA: as defined above

It should be noted that the endogenous variables from one and twelve months ago are not used in this model. This is a direct consequence of the use of variable AGR40, which has similar characteristics to AGR.

This model produces far more accurate correction than the model based purely on the economic surveys. Unlike the latter model, the prediction made by this method allows us to identify real numerical values within a satisfactory margin of error. In December 2000, the forecast is still substantially below the observed value, but in this case too it is far more accurate than in the previous model, the divergence having been reduced to about 0.8 index points.

There remains an inherent inaccuracy in the use of the aggregated annual growth rates for the countries whose data are available by day *t+40* (AGR40). This lies in the fact that we use a given point in the AGR40 series, whereas the series should really be used dynamically. In particular, the AGR series might be significantly different if we used the information that was actually available for the six countries on day *t+40* (AGR40), since significant *post hoc* corrections might have been made.

Although the results of this prediction may be used for the purpose of quantitative assessment, it nevertheless appears difficult to present the results of this estimation as the provisional version of the figure that is due for publication on day *t+50*. In some cases, the necessary adjustments would be too great, sometimes exceeding one whole index point. On the other hand, it is very useful to analyse the series produced on day *t+40* 'independently'

of the published *t+50* series. An economic diagnosis could be based on the *t+40* series, but in view of the short time between the two publication dates, it would take great presentation skills to convince anyone that the calculation methods for these two series differ to any great extent.

6. Prospects for improving the quality of an early indicator published at *t+40*

It is clear that models based on factual information are more reliable. The use of economic surveys represents an improvement on ARIMA-based models, especially as regards the identification of breakover points, because the findings of surveys are factual in the sense that they are collected at first hand from heads of companies. At the same time, the use of the information that is available by day *t+40* on the six countries' IPI also serves to improve on the quality of the model based on economic surveys alone. In order to take another step on the way to a highly precise early indicator, we should have information for other countries (those whose data are not currently available by day *t+40*). One idea would have been to collect the series that the remaining nine countries had at their disposal on day *t+40*. Even if these values only covered a limited percentage of the respective national economies, they would at least constitute factual information. In this case, such data would have to be processed to eliminate the possibility of a systematic bias. Each of the Member States concerned was approached with a request for the submission of such information. The only favourable response came from Portugal. The other Member States declined, either because they do not have access to a data series prior to the publication of their national statistics and are therefore unable to provide the required information at *t+40* or because they do not wish, for strategic reasons, to release data based on an excessively small sample, not even for the purposes of a study. It is perhaps regrettable that the European statistical system is insufficiently harmonised in this respect, in so far as the definition of a sufficiently large sample varies considerably from one country to another.

Another possibility is to work with seasonally adjusted series. This would apply to both the series resulting from the economic surveys and the series of actual IPI data. By so doing, we might achieve better overall coherence than is achieved with the methodology described in the present study, which uses adjusted working-day series for the IPI and raw data from the economic surveys.

Lastly, we could try to harmonise nomenclature categories to a more refined level (the MIGS level, for example) and then aggregate the results. Such an approach would, however, pose difficulties – the same sort of difficulties involved in making separate predictions for each Member State.

CONCLUSION

This study represents a first piece of exploratory work relating to the reduction of the time taken to produce an industrial production index and to the creation of early indicators. The reduction of time lags in the presentation of national data series has accelerated recently and will culminate in the short term in the publication of a European aggregate on day *t+45*, the deadline prescribed by the European Regulation concerning short-term statistics. The exclusive use of economic surveys represents an improvement on econometric methods which take no account of any external information, especially as regards the identification of breakover points. However, the numerical values obtained by means of economic surveys may still differ quite widely from the actual data series that the surveys

are designed to predict. At *t+40*, it is possible to use a method which combines elements of both approaches in that it uses both the findings of economic surveys and the information from countries whose data are already available at that time. The results of this last-named method are encouraging. In the coming months, it will be a matter of observing how the usefulness of this equation can be maintained. To improve the quality of the adjustment still further, it would be useful if we were able to include factual information from the countries whose IPI is not available by day *t+40* but which possess some part of the requisite data at that stage.

SPANISH METHODS TO IMPROVE TIMELINESS IN THE INDUSTRIAL PRODUCTION INDICES

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SUMMARY

The Spanish methods to improve timeliness in the industrial production indices are presented in this paper. They fit into a more general program carried out for all the industrial statistics produced by the National Statistical Institute of Spain. The target of the program is to reduce publication dates without any loss of accuracy. The implementation of the program is a direct consequence of the TQM approach using to produce industrial statistics in Spain. A selective editing procedure based on time series modelling is a major methodological tool for reducing production times in the indices.

KEYWORDS: short- term indicator, TQM, selective data editing, ARIMA modelling

I. INTRODUCTION

The central idea of the approach presented in this paper comes from the fact that continuous surveys lead to a set of sequential observations collected over time.

Therefore, in these surveys, the appropriate theoretical framework for their study should not be limited to that of the static random variables but should rather be enlarged on random variables varying with time (i.e. the stochastic processes).

Indeed, if useful information on previous surveys is available, it should be used to the maximum in different phases of the statistical production process.

Certainly, the use of information of previous surveys is not new in statistical methodology and practice. Ratio and regression estimates or benchmarking techniques are only some examples. In data editing, the use of data from previous surveys is also of general application. One of the most frequent ratio edits use the data of the previous survey, and monthly, quarterly and annual rates are often used.

However, these methods are based on a partial use of the information of the previous surveys. It would be convenient to use, in an efficient way, the whole set of available information, that is, the whole past of the series. This means taking advantage of the whole structure of correlation (cross and auto-correlation). To achieve this, it is necessary to use models that have stochastic processes as a theoretical framework, such as time series analysis models.

In this paper, the use of very simple time series models is proposed: univariate ARIMA models (Box-Jenkins, 1970) and univariate ARIMA with Intervention Analysis models (Box - Tiao, 1975).

From a theoretical point of view, multivariate models (that picked up the correlation of all the variables) would be appropriate in surveys with more than one variable. However, the difficulty of their practical use suggests the desirability of a univariate environment.

ARIMA modelling (in addition to their common use in seasonal adjustment) may be used in statistical offices for data editing and imputation, the description of the data´s characteristics for analysis and quality control (Revilla et al., 1991), and linking series.

This paper is restricted to the use of ARIMA modelling for data editing.

The most useful information for data editing in short term indicators is the past data of the same population. For example, monthly and annual rates are often used. Editing based on monthly and annual rates can be improved using ARIMA modelling.

The basic idea of this approach is very simple: if the observed data are far from the ARIMA forecast, maybe the data have some kind of error.

ARIMA modelling method has the following advantages over the traditional monthly and annual rates:

1. Monthly and annual rates use just one value of previous data. On the contrary, the ARIMA forecast uses the whole of the previous data, in an optimal way. In fact, the ARIMA forecast is a linear function of the latter.

2. The ARIMA forecast enables us to use probabilistic data editing. This is very useful because it allows to take into account the different variability of the economic sectors, products, etc.

II. DESCRIPTION OF THE SELECTIVE EDITING PROCEDURE

The approach presented here is being used in the Spanish National Institute to elaborate the Industrial Production and Price Indices.

In this paper we concentrate on the Industrial Production Indices. Similar formulas are used for the Price Indices. It could also be implemented in other short-term indicators.

A monthly survey is carried out by mail in order to calculate the Industrial Production Indices. A panel sample of about 9000 enterprises is used. The response rate is about 95%.

One single variable, the production, in a particular physical unit (tons, litres, etc.) or in monetary value, is requested from each enterprise.

As a result of the survey, we have a microdata set $q_{i,j,t}$, that is, the production figure for the product i, reported by the enterprise j at month t.

From the microdata set, the index for product i is calculated as:

$$I_{i,t} = I_{i,t-1} \frac{\sum_j q_{i,j,t}}{\sum_j q_{i,j,t-1}}$$

Where j is the set of enterprises with valid values at both t and $t-1$.

And, from these product indices, Laspeyres aggregated indices are calculated at successive levels of breakdown of the economic activities classification (at the top of the aggregation is the total industry). The following formula is used:

$$I_t = \sum_i w_i I_{i,t}$$

where the base year weights w_i are based on the value added (for activities aggregation) or the value of the production (for products aggregation).

A traditional approach was used for data editing, carrying out the following steps:

1. Microediting, mainly using monthly and annual rates.
2. Indices computation.
3. Indices macroediting, using monthly an annual rates and subject matter judgement about the behaviour of each of the series.
4. And, again, microediting the individual data of the indices that are suspicious of error.

The former process was carried out in an iterative way until all the indices were considered valid.

The disadvantages of that approach were:

- A low "hit rate" (ratio of editing changes to the number of flags) was achieved.
- The same microdata were revised many times.
- Identical efforts were made to edit microdata with great and small impacts on macrodata.
- The editing criteria were often subjective.

We have tried to solve or to minimise these problems using a selective editing strategy, with the following targets: to improve the "hit rate", to integrate the editing phases, prioritising the efforts on errors with a great impact on the macrodata and to use objective criteria.

Following the selective editing philosophy, the procedure tries to solve two problems:

1. To define and to detect outliers in the macrodata (the indices).
2. To define and to detect the influential microdata.

In order to achieve the first target we have designed some tools, the “surprises”, that are functions of the ARIMA model forecast.

Since the number of time series to handle is very large and it is difficult and time consuming to build models for all of them we need an automatic procedure. We use an automatic method developed by Revilla, Rey and Espasa that fits into the Box-Jenkins iterative modelling strategy of identify, estimate and diagnostic checking.

Using this method, an ARIMA model has been constructed for each of the index series of products and activities.

A straightforward use of ARIMA models is not sufficient to capture calendar variations in the indices, because they are not exactly periodic. Regression models are used to handle calendar effects and other deterministic variations (for example, a strike). To specify the intervention variables we have found that some subject matter knowledge about the

behaviour of the indices is needed. Therefore, the overall models are a sum of ARIMA and regression models:

$$\ln I_{i,t} = \frac{\theta_i(B)\,\Theta_i(B^{12})}{\varphi_i(B)\,\Phi_i(B^{12})} a_{i,t} + \sum_h \frac{\alpha_{i,h}(B)}{\delta_{i,h}(B)} A_{i,h,t}$$

where:

- $\ln I_{i,t}$ is the neperian logarithm of the industrial production index for product (or activity) i.
- B is the backshift operator, $B^k(I_t) = I_{t-k}$.
- $\theta_i(B), \varphi_i(B), \Theta_i(B^{12}), \Phi_i(B^{12}), \alpha_{i,h}(B), \delta_{i,h}(B)$ are polynomials in the backshift operator.
- $a_{i,t}$ are white noise variables i. i. d. $N(0,\sigma)$.
- $A_{i,h,t}$ are intervention variables.

If we calculate the one-step ahead forecast $\ln \hat{I}_{i,t}$ for $\ln I_{i,t}$, the one-step ahead forecast error is:

$$e_{i,t} = \ln I_{i,t} - \ln \hat{I}_{i,t}$$

From these models (and, in particular, from the one-step ahead forecasted values) we can construct the following tools:

The ***Surprise (or simple surprise)*** $S_{i,t}$ for the index $I_{i,t}$ is the relative change between the observed and the forecasted data:

$$S_{i,t} = \frac{I_{i,t} - \hat{I}_{i,t}}{\hat{I}_{i,t}}$$

Since the one-step ahead forecast error $e_{i,t}$ is a $N(0,\sigma_i)$ white noise process and $\ln I_{i,t} - \ln \hat{I}_{i,t} \cong \left(I_{i,t} - \hat{I}_{i,t}\right) \big/ \hat{I}_{i,t}$, we have that $S_{i,t}$ is approximately $N(0,\sigma_i)$. Hence, a confidence interval (for example, a 95% interval) for the surprises can be constructed:

$$P\left[-1.96\sigma_i < S_{i,t} \le 1.96\sigma_i\right] = 0.95$$

and the outliers can be defined as the indices whose surprise is outside the interval.

The ***Standard surprise*** for the index $I_{i,t}$ is:

$$\frac{S_{i,t}}{\sigma_i} = \frac{I_{i,t} - \hat{I}_{i,t}}{\hat{I}_{i,t}} \frac{1}{\sigma_i}$$

It allows the direct comparison of indices with different variability.

The ***Weighted standard surprise*** for the index $I_{i,t}$ is:

$$\frac{S_{i,t}}{\sigma_i} w_i = \frac{I_{i,t} - \hat{I}_{i,t}}{\hat{I}_{i,t}} \frac{w_i}{\sigma_i}$$

It allows the ranking of the indices taking into account not only the surprise magnitude but also the different weights.

Once we have detected and ranked the surprising indices (i.e., indices that are not coherent with their past behaviour and therefore can be considered as outliers) we need to measure the impact of each of the microdata on these surprising indices. For this purpose, we use the "influences".

The ***Influence of an individual datum over an aggregated magnitude*** is defined as the difference between the observed aggregated magnitude and the value for this same magnitude when the individual datum is not available.

The ***Influence of the individual datum*** $q_{i_0,j_0,t}$ ***over the product index*** $I_{i_0,t}$ is:

$$INF_{i_0,j_0}^{I_{i_0,t}} = I_{i_0,t-1} \frac{\sum_j q_{i_0,j,t}}{\sum_j q_{i_0,j,t-1}} - I_{i_0,t-1} \frac{\sum_{j \neq j_0} q_{i_0,j,t} + \hat{q}_{i_0,j_0,t}}{\sum_j q_{i_0,j,t-1}} = I_{i_0,t-1} \frac{q_{i_0,j_0,t} - \hat{q}_{i_0,j_0,t}}{\sum_j q_{i_0,j,t-1}}$$

where $\hat{q}_{i_0,j_0,t}$ is an imputed value for the individual datum $q_{i_0,j_0,t}$.

and the ***Influence over the aggregated index*** I_t is:

$$INF_{i_0,j_0}^{I_t} = \sum_i w_i I_{i,t} - \left[\sum_{i \neq i_0} w_i I_{i,t} + w_{i_0} I_{i_0,t-1} \frac{\sum_{j \neq j_0} q_{i_0,j,t} + \hat{q}_{i_0,j_0,t}}{\sum_j q_{i_0,j,t-1}} \right] = w_{i_0} I_{i_0,t-1} \frac{q_{i_0,j_0,t} - \hat{q}_{i_0,j_0,t}}{\sum_j q_{i_0,j,t-1}}$$

This expression measures the impact of the microdata on the index by means of the following factors:

- The product (or activity) weight w_{i_0}.
- The index $I_{i_0,t-1}$ which "updates" the above weight.
- A measure of the relative discrepancy between the real and the imputed individual datum $\frac{q_{i_0,j_0,t} - \hat{q}_{i_0,j_0,t}}{\sum_j q_{i_0,j,t-1}}$.

These "influences" allow us to prioritize the suspicious values in the microdata in order to verify and recontact fewer enterprises.

It may be proved that the microdata which are more influential on the aggregated index are also the more influential on the surprises of that index.

III. FINAL REMARKS

This selective editing procedure fits into the Total Quality Management strategy implemented in the Spanish Industrial Surveys: the editing process is now much more integrated, the repetition of some stages has been eliminated and many tedious tasks have been replaced by fewer and more qualified ones.

And, what is more important, there have been improvements in timeliness (the first quality requirement for our customers) simultaneously with reductions in the resources needed (fewer hours of work for the editing tasks) and in the response burden (fewer recontacts).

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THE DANISH INDUSTRIAL PRODUCTION INDEX

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SUMMARY

For the Danish monthly survey in Industry covering production, turnover and orders there are a number of factors influencing the timeliness aspect.

The survey was established in 1974. Information is collected from enterprises with reference to the Act on Statistics Denmark, which defines this institution to be the central authority of Danish statistics.

Since 1974 the delay has gradually been reduced from one month and 15 calendar days to one month and 7 calendar days at present.

The survey is based on a sample of a manageable size defined by the level of detail in the final statistics. The questionnaire is structured in a way so that preliminary indices based on a response rate around 97% can be published as first results. Minor revisions may occur for up to 2 months after the first publication.

The production plan follows a very tight time schedule demanding similar plans in the enterprises involved.

A major breakthrough in the production process has been the implementation of database techniques in 1993 improving the editing process considerably.

The results are published simultaneously in a News Release and Statistics Denmark's Databank and transmitted to Eurostat. Results corresponding to the Danish publication are available to the public on the Internet for free.

Historically there has always been a high priority attached to the timeliness aspect but since 1995 a number of corporate policies has been defined to support this quality dimension in statistics.

In Strategy 2005 of Statistics Denmark the policies are described in detail. Specifically on timeliness yearly goals are set up for annual, quarterly and monthly statistics. But a number of other policies are also supportive for the timeliness issue. Regarding the relation with the data suppliers, which in industry are often users as well, there is a specific data supplier service policy and regular statistics measuring the response burden has existed since 1996.

Finally the timeliness may be influenced negatively by the implementation of the STS Regulation. This is briefly touched upon in the end of the document.

1.INTRODUCTION (HISTORY)

EC Directive 1972

Following EC Directive of 30 May 1972 Statistics Denmark established in 1974 a survey, which covers a number of the variables in Industry: production, turnover and orders. By then it was decided to base the calculations of the production index on turnover. The calculation of the production index started in 1975.

Sources

The main sources for the monthly statistics are:

Information collected via questionnaires;
Information in the business register;
Information in the quarterly returns on industrial sales of own goods and services (also the source for PRODCOM)
Output prices (domestic) collected in a separate monthly survey
Annual value added data (1995)

Production index

The production index is a Laspeyres index. The production index is mainly based on deflated turnover. 96% of the basic series measure production in deflated turnover and the remaining 4% in hours worked (shipbuilding). The definition of turnover of own products and services (excluding goods purchased for resale in the same condition as received) includes invoices, costs such as transport and packing itemised separately on invoices. Rebates and discounts are deducted. VAT and all other taxes, which fall on products and services when they leave the factory, are also excluded (measured net, in other words including subsidies). Turnover is deflated using the domestic output price index at a detailed level of activity. The weights are based on (KAU) value added at basic prices in 1995 and the source is Structural Business Statistics (annual account statistics).

2.LEGAL ACT

Act no. 599

The statistical law regulating data collection in Denmark is Act no. 599 of June 2000.

Central Authority

According to this act, Statistics Denmark (Danmarks Statistik) is the central authority of Danish statistics. The first version of the Act dates back to 1966. In 1974 the Act was revised in order to adapt to the Membership of EC and in 1992 a major revision took place, which takes into account EU Regulations in general.

Obligation to reply

In section 8 of act no. 599 it is stated that “All tradesmen and businessmen shall, when requested by Danmarks Statistik, supply information about the nature of activities, location and ownership, staff, level of wages and salaries, production, including transportation

carried out and services performed, volume of orders and movements therein, turnover and prices, labour costs, purchases of commodities, other operating expenditure, capital expenditures and stocks". Subsection 2 says that "Societies, associations, institutions, etc. which do not carry on business or trade shall, at the request of Danmarks Statistik, supply information about the nature of activities, location and ownership, use of area, staff, working conditions, level of wages and salaries, labour costs, capital expenditure and about assets and liabilities and their movements".

Fines

In section 13 of act no. 599 it is stated that "Any person (or company) failing to furnish, in due time, the information requested in pursuance of section 3a, or sections 8-12a or the acts adopted by the European Communities relating to collection and processing of statistical data, or knowingly or through gross negligence furnishes wrong information, shall be punishable with a fine.

The basis for data collection

The specific Statistical Law forms the vital basis for the collection of data from the enterprises. In every application to enterprises there is a clear reference to the Law in general and to the specific articles mentioned.

For the monthly industry survey it is worth noting that no enterprise has ever been punished with a fine. It has been an adequate tool to advertise of the risk.

3. TIMELINESS (DELAY)

Current situation

The current situation regarding the timeliness of the Danish Industrial production index can be illustrated by the information available in CIRCA in the Release Calendar for 2001.

Table 1

Release dates. Danish Industrial production index 2001

Month	*Release date*
January	7 March 2001
February	6 April 2001
March	7 May 2001
April	11 June 2001
May	6 July 2001
June	10 August 2001
July	5 October 2001
August	5 October 2001
September	7 November 2001
October	7 December 2001
November	11 January 2002
December	7 February 2002

Source: Eurostat Release Calendar 2001 (CIRCA)

As it appears from table 1 the delay in terms used in the STS Regulation are except for a few cases around one month and 7 calendar days (M+7). The exceptions are the indices for April, which are delayed because of the Whit sun and Constitution Day, the indices for July because of the general industrial holiday and the indices for November because of the Christmas Holiday. In the case of July there will be a reduction in the delay over the coming two years since the industrial holiday is no longer as general as in the past.

For the industrial production index the STS Regulation stipulates a delay of one month and 15 working days, so the timeliness performance of the Danish production index is rather well with the one exception of July. The exception will be eliminated in the near future.

Past progress

Since 1975 there has been a gradual progress in the delay from around one month and 15 calendar days to the delays illustrated in table 1. Various aspects of factors influencing this process and timeliness in more general terms are described in the following paragraphs.

4. QUESTIONNAIRE

Annex 1

The questionnaire is attached in annex 1.

Joint questionnaire

The questionnaire is a joint questionnaire covering 3 variables: turnover, new orders and stocks of orders (all split into domestic- and exports-). It covers a period of the latest 3 months.

Reporting deadline

The deadline for reporting of the requested data is rather short: 10 days after the end of the month.

With respect to the very short reporting deadline the questionnaire is constructed in a way, which gives the participating enterprises the option to report preliminary figures. However this is more frequently the case for the orders information than for turnover.

Revisions

In the individual questionnaire the reported figures are pre-printed. The enterprises may revise the reported figures for the two preceding months by more final figures. This lead to revisions of the first published figures and as a principal rule final figures are published two months following the current month. In practise the revisions are minor and the most significant ones occur regarding the orders information.

Non-response

The short reporting deadline implies that not all enterprises have reported figures by the time of the first publication. To compensate for non-response imputation technique is used.

Using growth rates of the known average of a given industry multiplied with the value of the previous month does the estimation. When results are first published, the response rate is normally around 97%. One month later a major part of the imputed values are replaced by reported data and revised results are published. A further month later only a negligible few imputed values are left.

5. SAMPLE SURVEY

Sample

The basic information is collected from a representative sample of enterprises employing at least 20 persons. The information is grossed-up to represent the full-scale population of enterprises employing at least 20 persons.

Criteria's

The sample is stratified by activity (approximately 70; 2-digit NACE, significant 3-digit NACE and groups of 3-digit NACE) and size class (4). Enterprises employing at least 200 persons in industry activities, approximately 350, are surveyed exhaustively. A sample is drawn for units employing between 20 and 199 persons. Enterprises in the size classes 100-199, 50-99 and 20-49 persons employed are progressively less likely to be included in the sample, but the percentages for each strata also depends on the structure of the industrial branch. The percentage varies between 20 and 60. 1300 enterprises are surveyed, which represents a universe of 3000 enterprises with at least 20 persons employed. The sample covers about 85 percent of the turnover in this universe.

Level of detail

The size and structure of the sample is closely related to the level of detail required in the statistics published.

The existing criteria's was defined when the conversion to NACE Rev.1 took place in 1993 (base year 1990). The STS Regulation was not yet finalised then and the trade-off between timeliness and detail was still heavily debated.

As it is probably well-known Statistics Denmark took a position on this point that is fully in line with the final text regarding the level of detail. The original proposals requiring a level of detail on 3- and 4-digit NACE would for a small Member State have eliminated the use of a sample.

A sample of around 1300 enterprises is manageable on a monthly basis and the use of only a sample gives with respect to the response burden a higher credibility among Trade Organisations, which are important partners in the statistical system.

6. PRODUCTION PROCESS

Production plan

Following the plan of release dates annual production plans at the detailed practical level are drawn up. For year 2001 the dates are illustrated in table 2.

Table 2

Production plan for the monthly survey on turnover and orders. 2001

Written reminder	Telephone reminder	Questionnaires coming month	First set of results	Manuscript News Release
15/1	22/1	30/1	31/1	6/2
14/2	22/2	27/2	28/2	6/3
14/3	22/3	29/3	30/3	5/4
17/4	24/4	27/4	01/5	4/5
14/5	22/5	30/5	31/5	8/6
14/6	22/6	28/6	29/6	5/7
-	30/7	30/7	3/8	9/8
14/8	22/8	30/8	31/8	4/10
13/9	21/9	27/9	28/9	4/10
15/10	23/10	30/10	31/10	6/11
14/11	22/11	29/11	30/11	6/12
-	19/12	19/12	4/1	10/1

Tight schedule

The plan in table 2 reflects a very tight monthly time schedule. This tool was introduced many years ago and only force majeure situations can cause deviations from the plan.

The first set of results initiates a process of "last minute" telephone reminders. In August this process takes somewhat longer time than in other months and to some extent is combined with the procedures for the next month. Twice a year, in July and in December there are no written procedures.

Influencing enterprises

Besides the effect on timeliness in Statistics Denmark a very stable production plan have a positive effect on the reporting enterprises in their understanding of the timeliness aspect. In many cases they have adopted their administrative systems to the relative fixed dates.

Output prices

Output prices are covered by a separate survey originally established to provide data for National Accounts.

Output prices are in fact domestic prices. They are available for a number of representative products, which are then converted into output prices for NACE activities at the levels used for the production index. The primary indices are available with a delay a little less than one month.

7. IT

IT revolution

In the period from 1975-2000 an IT revolution has taken place. For the production of statistics the use of PC's instead of Mainframe and the use of database techniques has been the main events.

1993

In conjunction with the revision of NACE in 1993 a modern database technique was implemented in Oracle.

Improved data editing

The major break through in the production process using the database technique has been the integration of the data editing process. Data recording and the very main checks of the data are carried out simultaneously. Beforehand the handling of data up until the final results was produced was a multi phase process including several potential delays. In the data editing procedure the imputing for non-responses was improved.

8. PUBLICATION

First figures

The first results are published with an approximate delay of one month and 7 calendar days. The results are based on a response rate around 97%. The procedure for handling non-response is described above.

Final figures

The final production indices for a given month are available two months after the first publication, but only a very few revisions occur from the second to the third publication.

News release

The production index is published in a short News Release (4 pages) in conjunction with other short-term indicators for industry: turnover, new orders, stocks of orders and the domestic output price index. Comments are based on seasonally adjusted figures for total industry and the MIG's. At 9.30 in the morning. A more detailed publication is released 2-3 days after the News Release.

The News Release is available on www.dst.dk in pdf format in Danish.

Databank

Simultaneously data for all levels of detail are made available in Danmarks Statistikbank on the Internet (www.statistikbanken.dk). Since 1 January 2001 all statistics covered in the databank is available for free. Including a description of each of the statistics very similar to the STS-sources. For the moment only in Danish, but later this year also in English.

Dissemination division

The Dissemination Division supports the publication process. The deadline for the manuscript of the News Release and data for the databank is 9.30 the day before.

Eurostat

Also at 9.30 in the morning the data are transmitted to Eurostat using Stadium. However Stadium is not always working as it should and in some cases e-mail transmission is used as an alternative. E.g. this was the case for data for November 2000 transmitted 12 January 2001.

OECD, UN

Finally during the same day the data are also transmitted to the OECD in Paris and to the UN Statistical Office in New York. Both transmissions are by e-mail.

9. SUPPORTIVE CORPORATE POLICIES

Focus on timeliness

In Statistics Denmark there has always been focus on the timeliness of statistics.

In recent years a number of explicit corporate policies has been set up to support this important quality aspect of statistics

Corporate Planning

Since 1995 the Corporate Framework and Objectives of Statistics Denmark has been formalised in official documents: Strategy 1996 published autumn 1995 and Strategy 2005 published end 1999. In this period there has been a gradually increasing focus on the timeliness issue and on the relationship to the data suppliers.

Strategy 2005

In Strategy 2005 a number of strategic areas are defined:

- Statistics
- Dissemination
- International cooperation
- Service activities
- Central Business Register
- Personnel and the Organisation

Strategic objectives regarding timeliness and the relation to data suppliers are both related to the strategic area Statistics.

Strategy 2005 is available on the Internet, www.dst.dk, in English in pdf format.

Timliness

Timeliness is part of the strategic objective regarding Qualistat (quality of statistics):
Statistics should be published quickly in order to be of high value to the user. The speed of production is measured in two dimensions. The first dimension is that of *publication time*, i.e. the time distance between the statistics' reference point and the date of publication. The

publication time can be divided into *data supplier time*, before Statistics Denmark has received the data, and the *internal production time*. The second dimension is that of adherence to *specialised goals of timeliness*, determined by Statistics Denmark. Statistics should also be published *on time*, i.e. at a previously determined point in time.

Yearly specific goals

Goals are set up every year for annual, quarterly and monthly statistics. Since 1995 there has been a gradual decrease in the average delay as a whole. Specifically the goal for monthly statistics for Industry and Construction in 2001 is 35 calendar days on average. Included in this measure are the qualitative surveys that are published with a delay of one month only.

Policy on data Suppliers

The policy on Data Suppliers is divided into several specific policies. The main ones, which support timeliness in data reporting, are mentioned below.

Advisory Committees

According to the Act on Statistics Denmark, section 3, the Board can appoint advisory committees. The Board has appointed 6 advisory committees with representatives from various user groups and data suppliers. Committees have been set up for the following statistical areas: social statistics, business, agriculture, economics, energy and the environment, and on research. The advisory committees work within the following areas:

- Strategies for the development of statistics
- . The discussion and evaluation of existing statistics
- . New statistics and large scale changes to existing statistics
- . Dissemination issues
- . Methods of data collection
- . Prioritising issues

The Advisory Committee regarding Business Statistics includes various Trade Organisations, which are both users and suppliers of the data. E.g. the Confederation of Danish Industries.

Data Supplier Service

The data supplier service ensures that Statistics Denmark provides the best service to data suppliers and that all surveys are carried out with common principles in mind. The policy describes a number of initiatives. One example is that enterprises will be informed clearly of reasons why data is needed, to motivate them to provide it. This means that information sheets are must be produced for all surveys. The introductory text for the monthly survey on turnover and orders are attached in annex 2. Before the introduction of this sheet information to the enterprises were rather short and primarily had a reference to the Act of Statistics Denmark. As it appears both the national use and STS Regulation are mentioned in the sheet.

The Respose Burden

The response burden is a measure of the costs for the enterprises reporting data. It is the aim to reduce the response burden for enterprises as much as possible given the constraint that Statistics Denmark is legally bound to carry out the majority of its surveys. In fact the greater part of the response burden is subject to EU legislation.
With the assistance of various trade organisations Statistics Denmark has developed an instrument to measure the time in which enterprises are involved in reporting to Statistics Denmark. Since 1996 the overall response burden has been greatly reduced. Detailed figures are published annually in the beginning of the year. For the monthly survey in industry the response burden in the period 1996 to 2000 has been very stable and is 2.3 man-years.

10. TIMELINESS IN NEAR FUTURE

Commission Regulation on Definition

The Commission Regulation on Definitions in STS variables adopted by SPC in November 2000 may have an impact on timeliness for the industrial production index.

Questionnaire

To be able to implement the definitions by the new base year 2000 information on changes in stocks on a monthly basis will be collected from year 2000 onwards. The revised questionnaires are almost finished and will be sent out end of March. This will lead to a slight increase in the response burden but probably not influence the delay very significantly.

Output prices (deflators)

As described above the production index is basically deflated turnover. In the future also deflation will be an important part of the calculations. So far this procedure has been based on the domestic output price index, which is available with a delay of around one month.
In the STS Regulation there is an obligation regarding output prices of the non-domestic market. It is allowed to meet the requirement by use of unit values from foreign trade statistics. With specific regard to the response burden Statistics Denmark with financial assistance from Eurostat last year launched a pilot project regarding this issue. The study is expected to end in June this year and so far the results have been promising. When the obligation is met there is a further requirement regarding an output price index comprising both domestic- and non-domestic prices.

Increase of the delay?

Supposing in the Methodological Manual it will be recommended to use the latter output price index for deflating purposes. Since the unit value index is by nature expressing average prices the timeliness will be of a different nature than for prices collected at a fixed date in the month. Consequently the delays stipulated by the STS Regulation are somewhat longer for the two indicators mentioned: one month and 15 working days instead of one month and 5 working days. It will be possible to meet the official deadline for the two variables but it has some negative implications for the delay of the production index. It will

be possible still to meet the deadline of one month and 15 working days but it will reduce the existing timeliness by approximately one week.

Ideas welcome

For the moment Statistics Denmark have only identified the future problem and no method to avoid the increase in the delay has been elaborated. Any ideas from the seminar, from Eurostat or Member States are very welcome.

ANNEX 1. DANISH QUESTIONNAIRE ON ORDERS AND TURNOVER IN INDUSTRY

To be returned before *10 days* after the end of the month
Name
Address

31 March 1999
2413-01
ID No. KAU

Branch

ID No. Enterprise

Please correct any change in name and adress if relevant

Orders and turnover. Industry - March 1999

The information reported covers the following establishments: | Instructions

Turnover of own goods and services, new orders received and stocks of orders

Month	January 1999	February 1999	March 1999

Reference period.
Please indicate each month (with x) which is the reference period closest to the accounting practise in your company

☐ 1 calendar month	☐ 1 calendar month	☐ 1 calendar month
☐ 4 working weeks	☐ 4 working weeks	☐ 4 working weeks
☐ 5 working weeks	☐ 5 working weeks	☐ 5 working weeks

Type	Sales- or invoice value 1 000 DKK	Sales- or invoice value 1 000 DKK	Sales- or invoice value 1 000 DKK
Turnover domestic market			
Turnover export market			
New orders received domestic market			
New orders received export market			
Stocks of orders end of month domestic market			
Stocks of orders end of month export market			

Comments

Company contact person

Name

Telephone

For the validity of the information

Date

Signature

Sejrøgade 11
2100 København Ø
Tlf 39 17 39 17
Fax 39 17 34 19
http://www.dst.dk
Direkte E-post khl@dst.dk
Hanne Lange
Direkte tlf. 39173553

ANNEX 2. MONTHLY SURVEY ON ORDERS AND TURNOVER IN INDUSTRY. INFORMATION SHEET. INTRODUCTORY PART

Purpose and use of Orders and turnover statistics

The purpose of the Monthly Orders and Turnover Statistics for Industry is to give a current basis for assessment of the short-term development for the industry.

The statistics give a description of the monthly turnover, new orders and stock of orders broken down on the domestic market and the export market.

Trade organisations, the banking and financing sector, politicians, public authorities, private authorities and the press use the Orders and Turnover Statistics.

The statistics are furthermore part of the common European short-term statistics, which Statistics Denmark through our membership of the European Union by regulation is obliged to work out. The Orders and Turnover Statistics were established in 1974. The current EU-regulation in force is the Council Regulation dated May 18, 1998

UK WORKING PRACTICES THAT ALLOW AN EARLY DELIVERY OF THE PRODUCTION INDEX

Ian Richardson and Ann Lewis, UK Office for National Statistics

SUMMARY

The Index Of Production is a monthly series measuring changes in industrial activity. Countries within the EU present their figures to Eurostat at varying times. This paper sets out to show how the UK Index of Production is produced within 26 days, setting out the importance of the Index and the processes used to achieve the target date. It also considers whether the time period could be improved upon and if so at what costs to the accuracy of the Index.

INTRODUCTION

The Index Of Production is a monthly series measuring changes in industrial activity. It is a key short-term indicator used by the Bank Of England and the Treasury, as well as other Government departments and outside organisations, it measures about 27% of the UK economy. It is produced using turnover data. The First Release is published 26 working days after the end of the month and presented at the monthly press conference.

Monthly production inquiry

The main source of data for the Index of Production is the Monthly Production Inquiry (MPI). Data is also provided by other government departments, for example the Ministry for Agriculture, Fisheries and Food provides information on the Food Industries. Outside organisations also supply data, for example the Motor Trade Association provides data on the production of cars. A limited amount of the data received is quarterly and so must be adjusted to cover the correct reporting period.

The MPI is a compulsory survey - it is required by law that the forms are completed and returned. Enforcement can be used if a company does not return forms for three consecutive months. A stratified random sample of 9,000 out of 160,000 registered companies is taken. Companies with a large number of employees are sampled every month, and smaller companies stay in the sample for 15 months before being replaced. The inquiry form is a single page form. It asks for gross turnover for the month, which most companies are able to supply. Most other countries ask for volume measures but this can ignore quality improvements. The form also requests figures for Employment, Exports, Merchanted Goods and Orders on Hand.

USING TURNOVER DATA

To some extent production data are not available monthly because there is no appropriate statistical survey. Turnover data are, however, usually based on their own separate survey and are therefore usually available. In sectors with extensive product ranges turnover data can be collected more easily and more economically than production data. Current

turnover is also frequently available more quickly than collecting a large number of production quantities.

In order to exclude pure price effects, a deflation with the appropriate price indices is necessary. Producer Price and Export Price Indices are used. As a result a volume measurement is obtained. The indices are derived from measurements through the application of a weighted mean, with weights derived from the value added in the base year, currently 1995. Quality differences and changes in the individual products are reflected in turnover, so the producer price indices must also take account of such influences.

The turnover index actually measures production sold at the market, this can differ from the target of production activity. Produced goods can go into stock or products can be sold ex stock. Also the intermediate production of finished/semi-finished products for further processing in the same company are not taken into account. These differences need to be taken out by using information on the change in inventories. From a methodological point of view, value added figures would be preferred to turnover. However, the practical advantages of turnover outweigh any doubts.

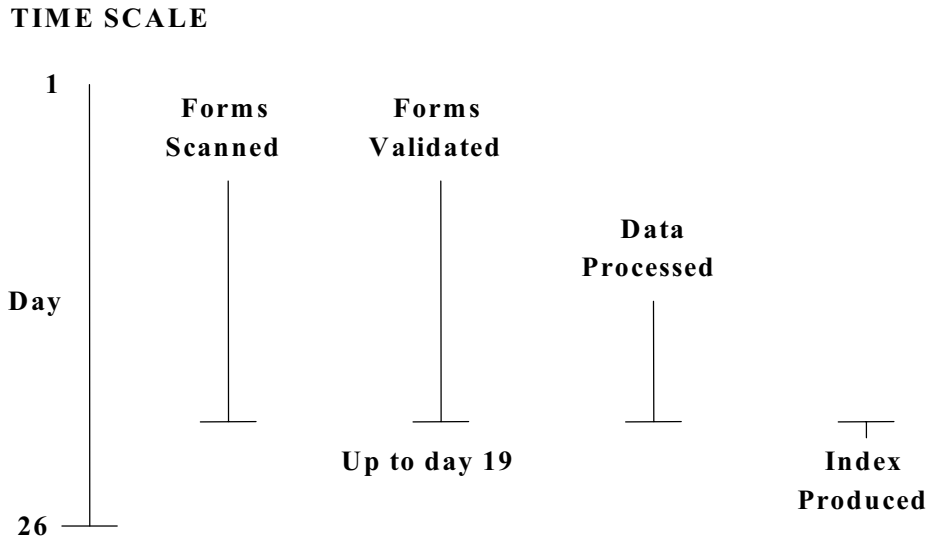
PRODUCING THE IOP

The first department involved in the process is responsible for sending out the forms and scanning them when they are returned. The sample is selected and the forms sent out a week before the end of the month, so the companies have the forms ready to fill in at the end of the period. As forms are returned they are scanned and the data is held on a shared computer system. All departments have access to this system, but at different levels.

The next department involved in the process (the Data Validation Unit) is responsible for validation and collection of data. Once the forms are on the system they are validated. The system automatically date adjusts the data and adjusts for £,000 errors. Any that fail the validation and can not be explained are then queried with each company, any information gathered from these queries is added to a Lotus Notes database that stores all comments. The centralisation of the data validation department has led to investment in scanning technology that has increased the proportion of forms scanned. In a recent US survey the UK had the highest proportion of scanned forms of any national statistical office.

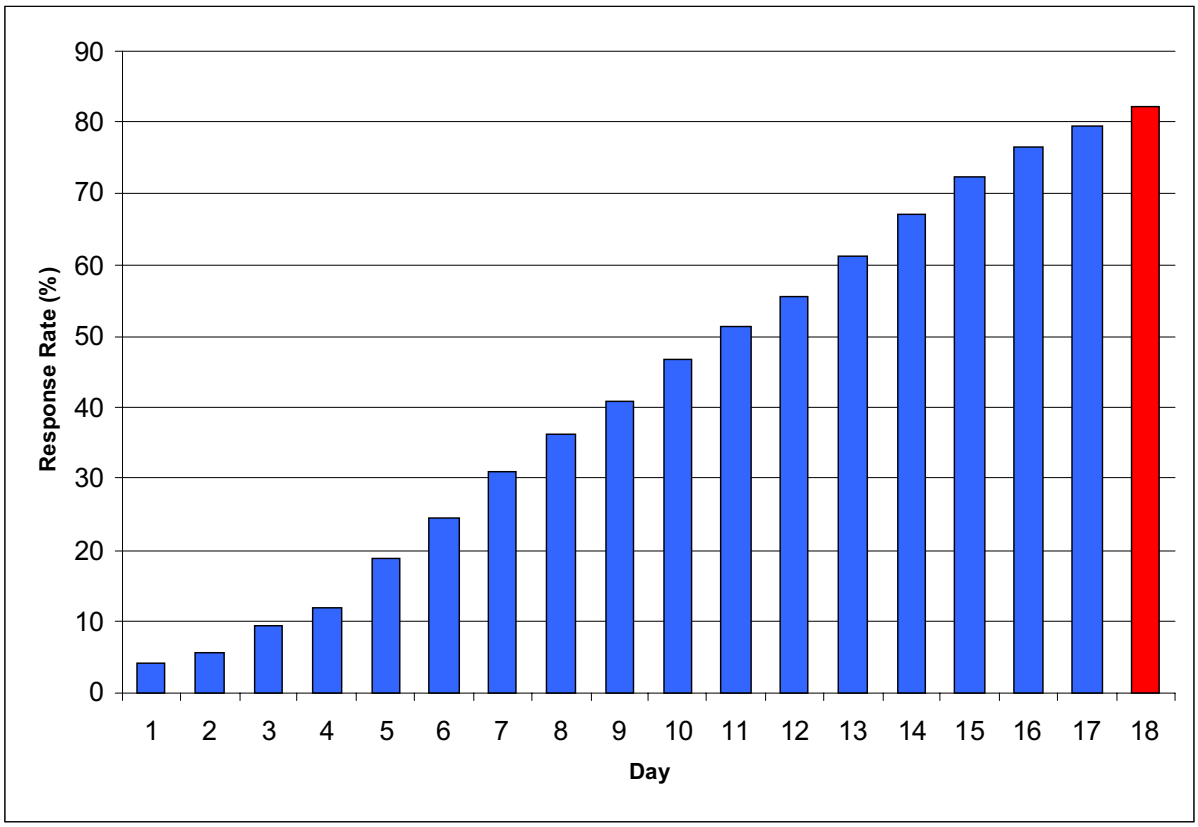
Target is to achieve an 80% response rate before producing the published index. After the return deadline has passed non-respondents are contacted first by post then if they still do not return the data they are contacted by telephone. At this stage it is requested that the data be returned by fax or over the telephone. Key respondents are targeted first but even the smallest companies can be telephoned. Lunchtime transfers used to clear errors for final pass. New initiative currently being looked at, to forward leaflets to new contributors in order to provide more information about National Statistics.

Once there is sufficient data to work with the next stage of the process starts. Any missing data is imputed to account for non-respondents, and final checks are done on the data. On day 19 the data is frozen and passed over to the results and analysis division. The gross turnover figures are deflated using Producer Price Indices and information about changes in inventories is taken into account. They then produce the index and a press release is published on day 26.



An important feature of the process is the way the different departments work parallel to each other. Provisional results are run so that each department does not have to wait for the previous one to finish before they can start. There exist good lines of communication between departments allowing them to interact at every stage of the process. A query database exists between the validation and processing departments, one is also being implemented between the results and processing departments. Up to day 22 departments stay late to answer any last minute queries that may arise.

RESPONSE RATES



The target is to get an 80% response rate, so that the index can provide accurate information a short time after the period and revisions are kept to a minimum. The average response rate is 83% at the end of day 18, this can vary month on month depending on holiday periods or other events that could delay returning of forms. The length of the process could be reduced by accepting a lower response rate, for example
60% response rate results in 5 day reduction
70% response rate results in 3 day reduction

The cost of a reduced response rate would be that index would be less accurate and more revisions would be needed.

CONCLUSION

At the expense of the response rate, an earlier production of the index could be achieved but the accuracy would have to be questioned. Having a target rate of 80% response means there is little scope to quicken the process significantly. The key to obtaining the target rate of 80% response by day 19 is achieved in the main through chasing non-respondents from an early stage. The other key factor is that the sections have good lines of communication with one another and work alongside each other to maximise efficiency.

FRENCH ACTION PLAN FOR REDUCING THE TIME REQUIRED TO PUBLISH THE INDUSTRIAL PRODUCTION INDEX

Michel Euriat, INSEE, France

This paper is based on the observations and recommendations of an audit carried out, at the request of the Ministry of economic affairs, finance and industry, by the General Inspectorate of INSEE (A. Mothe), the General Inspectorate for Trade and Industry (M-C. Ledur, P. Deforges) and the Inspectorates of the Ministry of Agriculture (B. Bourget).

SUMMARY

Until now, of the large industrialised countries, France has probably been the country requiring the longest time to compile its industrial production index (IPI): 53-54 days on average following the end of the reference month when July is excluded, 58 days when it is included. This can be compared to the 45 day deadline provided for by Regulation 1165/98 on short-term statistics and the 38 day deadlines observed in Germany or the United Kingdom. Faced with such a situation, two audits were organised in September 2000, at the request of the Minister of Economic Affairs, Finance and Industry, one to focus on the "manufacturing industry" part of the IPI, the other on the "food, beverages and tobacco industry" part. The respective reports were submitted to the Minister at the end of 2000 and their proposals were widely approved within the public authorities. This paper presents a synthesis of these reports and their main recommendations, which has now been adopted in the form of an action plan. Despite the specific nature of the French situation, it appeared useful to describe these actions during the Seminar on Short-term Statistics, as they can be of interest to Member States confronted with similar circumstances.

I. HISTORICAL BACKGROUND AND CURRENT SITUATION

I.1 Background

Monitoring of industrial production in France really dates from the 2nd World War. During the War a central office for the distribution of industrial products was responsible for distributing scarce raw materials between 150 organising committees, which in turn distributed them between the enterprises of their respective branches on the basis of the monthly production returns submitted by the latter. After the war, the organising committees were dissolved and replaced by professional bodies which continued to conduct statistical surveys allowing the calculation of a monthly industrial production index.

The law of 7 June 1951 on statistical coordination, obligation and confidentiality led to new arrangements for the branch surveys. These became official and obligatory; the law developed the approval procedure, which made it possible to delegate almost all the surveys to professional bodies, of which there were about 300.

I.2 The half-century 1951 - 2000

The very heterogeneous nature of the questionnaires, classifications and methodologies used in the various surveys, the almost impossible task of coordinating 300 bodies, led to two categories of reform during the period 1951-1980:

- first, partial take-over of some of the surveys by the statistical department of the Ministry of Industry (SESSI);

- second, standardisation, as far as possible, of the sets of data used to compile surveys, classifications and questionnaires.

After 1980 there was a policy of even closer cooperation between the public authorities and the professional bodies in certain branches, in particular in the field covered by the Federation of Engineering and Metallurgy Industries, leading to the creation of a joint statistical body of about thirty trade associations (MECASTAT).

In addition, the methodology for calculating the IPI was improved with each successive "base year" of the industrial production index: 1952, 1959, 1962, 1970, 1980, 1985, 1990, 1995.

I.3 The situation in 2000

The French IPI is characterised by a wide variety of data collection methods, survey periodicities, players involved, means of data transmission. In general, in other countries, the industrial production index is calculated from the results of a single monthly survey carried out by one administrative body.

The wide variety of collection methods

While the data required to calculate the industrial production index are obtained mainly from business surveys, some come from administrative records (slaughterhouses, tax or customs data, data on the arms and aeronautics industry). Production expressed in physical quantities is the most common variable, but where this is not available, indirect indicators are also used (deliveries, invoices, orders, hours worked, raw materials used).

The different periodicities

While more than two thirds of the statistical data are collected each month in line with the IPI target, in a certain number of branches production is monitored only quarterly. In particular, this is the case for most capital goods in mechanical engineering and ship building, but also in certain industries such as textiles and leather goods.

The variety of players

SESSI, the statistical service for industry, conducts direct surveys in companies which account for about 40% of the IPI weightings; the SCEES, the statistical service for agriculture and the agri-food industries, only conducts three surveys itself, but summarises the information received from the slaughterhouses; about 100 professional bodies conduct surveys used in the IPI (between 30 and 35% of weightings); for energy there is involvement by the Energy Observatory, the raw materials and hydrocarbons Directorate, Electricité de France, Charbonnages de France; the Ministry of Defence is responsible for providing data on the armaments and aeronautical industries; lastly, some useful sources (customs, taxes, ...) call for contacts with various administrative departments, boards of agriculture, etc.

The varied means of transmission

INSEE, the coordinating body responsible for calculating the industrial production index, collects none of the required data directly. These may be collected by the statistical services at ministerial level, then transmitted to the INSEE. They may also be collected by the professional bodies, transmitted to the data protection authority, and retransmitted to the INSEE. In some cases there are two intermediaries (a joint trade association group and the data protection authority). The means of transmission vary. Mail, fax, electronic mail, are all used. As a result the transmission times vary; they may take one week when there are one or several intermediaries.

II. WAYS TO IMPROVE

II.1 The basic principles

There are two main new ideas underlying the actions introduced:
- To give priority to complying with the deadlines laid down in the European Regulation and anticipate further improvements. Also, the proposed improvements should not detract from the reliability of the statistics.
- To take account of the exceptional French situation.

The simplest solution to the problem of cutting the publication deadlines for the industrial production index would be to have the administrative authorities assume responsibility for all the surveys required to compile it, as in the other European countries or the USA. But such a solution would come into conflict with the tradition of industrial statistics in France and would, at best, be likely to take a long time to implement. This is the reason why the action plan retains the role of the professional bodies.

II.2 The actions

These should make it possible, in the near future, to transmit the IPI data to Eurostat within a period of 45 days from the end of the reference month, and to reduce the deadline by an additional week in 2002.
In the case of the first objective, which would represent a monthly gain of about 8 days compared to the situation which prevailed in 2000, the actions aim to transmit the statistical results, where necessary in the form of provisional results, to INSEE between the 30th of the month (M+1) and the 8th of the month (M+2) for the monthly surveys, and the end of the following quarter (t+1) for the quarterly surveys (pending monthly surveys).

To make a general changeover to monthly surveys
A changeover to monthly surveys is one of the primary guarantees of methodological consistency and effective management in the compiling of data. Experience has clearly shown that monthly estimates calculated econometrically on the basis of quarterly data are not satisfactory and that their calculation and analysis extends the deadline for obtaining the IPI. Such a changeover to monthly surveys is possible if the necessary funds are released. The SESSI is preparing for this and the professional bodies have also been unequivocally invited to do likewise.

To increase supervision of the professional bodies
There must be effective regulation of the professional bodies. It is to this end that the administration has drawn up a "quality charter for surveys in branches of industry". The objectives proposed in the draft charter are also potential indicators for a scoreboard for monitoring the approved professional bodies (OPAs). Such monitoring would be supplemented by more regular and formal contacts between the statistical services and the OPAs. Those professional bodies experiencing deadline problems have been invited to speed up the follow-up for companies within their sector or to tighten follow-up procedures. The very heterogeneous nature of the standards adopted by the bodies calls for special monitoring of the methods and frequency of follow-up. For data transmission there is a need for methodological work leading to a transmission protocol.

To transmit provisional results if it is likely that deadlines will be exceeded
There is a strong temptation to await the return of a maximum number of questionnaires before internal processing, in particular on the part of those who wish to be accountable to

their members. The OPAs, and likewise the SESSI and the SCEES, should transmit provisional results if the follow-up efforts have not been successful in obtaining definitive results by the prescribed deadlines. Of course, such an approach should include a study of the sensitivity of the results to the response rate and should adopt methods to estimate non-responses where this has not already been done. The OPAs should be able to benefit from the assistance of the ministerial statistical services; this links up with the need outlined above to tighten supervision of the OPAs, in particular as regards methodology. In the long term, the aim is to attach the previous month's results to the questionnaires sent to the enterprises at the end of a month.

To promote more rapid means of transmission

a) transmission of results

Some OPAs continue to send their results by mail. This should be abandoned rapidly in favour of electronic transmission, by fax or e-mail. Priority will be given to a study of the technical difficulties which may be linked to such transmission. Some OPAs transmit parallel results to the SESSI or the SCEES on the one hand and to INSEE on the other. This practice will be adopted generally, in the awareness that the necessary checks may mean that results corrected by the SESSI or the SCEES are transmitted a second time to the INSEE.
Likewise, the e-mail transmission of results between the ministerial statistical services and the INSEE should become the rule, in order to avoid new onscreen inputs and to achieve optimum legibility of the data transmitted, which is not the case with faxes.

b) data transmission by the enterprises

Except where there are security issues, which will need to be studied, the collection of company data via the Internet, currently proposed by the SESSI for its direct survey, should be encouraged. Obviously only a few sectors are currently in a position to fully meet this objective: in the SESSI, the collection rate by Internet is currently not much higher than 10%. The professional bodies will study ways of assisting the companies to develop this system.

To encourage transparency between the collecting services, the SESSI, the SCEES and the INSEE
When revising the survey processing software in the ministerial statistical services, arrangements will be made to give the INSEE team responsible for compiling the IPI direct read-only access to the individual data: this is to allow it to evaluate certain trends, for example when making seasonal adjustments.

To introduce a scoreboard measuring the quality of the index
When monitoring how the IPI is compiled, it is vital to check certain points which can influence the quality of the results. The above-mentioned quality charter lists them: of these, there will be close monitoring of production times, which represent one aspect of survey quality, in particular in the initial phase where the aim is to gain 8 days. This task will be entrusted to a controller who will draw up a scoreboard and monitor it. The situation will be examined at the end of 2001 to assess improvements in deadlines and to consider new actions to shorten these further.
To address sectors which are not supervised by the SESSI or the SCEES
The Energy Observatory which, in the context of the opening-up of energy markets, is responsible for organising collection of the data needed to monitor energy policies, is

helping to review data collection and transmission methods, which currently rely on "traditional" operators.
A similar action will be undertaken in the field of armaments, and in those of ship building and aircraft manufacture.

To have the administration take over those surveys conducted by failing OPAs
The quality charter for surveys in branches of industry, to which the OPAs will have to subscribe, will serve as the reference for retaining approval.
To simplify some monthly questionnaires
Some monthly questionnaires include a large number of questions useful for the professional bodies, but whose inclusion delays response times. The OPAs will be consulted with a view to simplifying the monthly surveys approved by the authorities by transferring the collection of this type of data to optional surveys or to quarterly or annual surveys.
To study the specific case of the month of July
The concentration of summer holidays in France in the month of August makes it difficult to collect data in that month, and the INSEE does not release any industrial production index for the month of July, but combines July and August in one index. It is the only industrialised country which resorts to this practice, and this situation has a negative impact on the compiling of European indices for this period. An investigation will be conducted to study if some data collection, even of a somewhat lower standard, might not permit the compiling of gross indices.

Lastly, it should be mentioned that the audit reports on which the above action plan is based also called for the release of the funds necessary to conduct good surveys and to allow the departments concerned to supervise the OPAs, and also for protocols to be drawn up on information exchange between administrative authorities.

CONCLUSIONS OF THE SEMINAR

Adrien Lhomme, Eurostat

The objectives of the seminar have been to throw light on the possibilities to improve the timeliness of data by:

- Understanding the current practices in the National Statistical Institutes (NSI);
- Identifying 'good practice' among the initiatives of NSIs;
- Adjusting organisational procedures;
- Using statistical methodologies in various stages of the data treatment;
- Using simple and pragmatic tools;
- Comparing with experiences in Member States and the US for those indicators for which a good timeliness is already achieved.

All discussions have been conducted under the assumption that timeliness needs to be improved without jeopardising data quality. All the Member States and Eurostat are aware that there is a certain trade-off between quality and timeliness but the discussions show that current procedures in the index calculation can be accelerated without a major negative impact on timeliness.

The objectives of the seminar have largely been achieved. The wide range of topics discussed covered:

Co-operation with respondents

1. Attempts to communicate more intensively with the respondents and to motivate the respondents to answer fast have shown positive results in various cases;
2. The time needed for collecting the data can be significantly reduced if there is a rapid and reliable reaction to enterprises in case errors are detected;
3. The necessary manual operations by respondents can be reduced by simple improvements for the questionnaire handling, such as response envelops already addressed and equipped with stamps;

Usage of better technical tools

4. The usage of information and telecommunication technology, E-Mail, FAX, Internet, etc, have been successfully employed in reducing the transmission delays;
5. A number of systems on the market allow an integrated collection and administration of data. Presentations in the seminar reported on experiences from implementations in Italy and in form of a call centre in Belgium;
6. An optimisation of the organisational process can result in earlier distribution of the questionnaire and faster data entry after the reception of the questionnaires in the NSI.
7. Tools for following the evolution of the incoming responses may allow to achieve the required thresholds for calculating indices earlier;

Methodological improvements

8. The editing of the data can be improved and accelerated by the usage of time series analysis methods, such as the usage of ARIMA models for forecasting and selective editing;
9. The editing process can also be improved by estimation procedures that help to deal with missing data from non-responses;
10. Undertaking regular data quality checks instead of ad hoc analysis may help to improve the regularity of the processing of incoming data;

Co-operation between NSIs and Eurostat

11. Creating task forces for clarifying and harmonising methodological concepts, such as the task force for the review of the statistical units can create an important basis for accelerated procedures;
12. The NSIs should study the possibility of creating early estimates for aggregates with the calculation of detailed levels later on;
13. Attempts for a harmonisation of the national revision policies could lead to the positive result that the European aggregates would become more stable.

These points of improving the timeliness can best assist the statistical process within organisational procedures that are redesigned under a general awareness about the importance of timely indicators.

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