

# 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<sup>1</sup> would suggest that this is not yet the case. It also emerges from an international user survey<sup>2</sup> 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

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<sup>1</sup> 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".

<sup>2</sup> 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.

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.

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<sup>3</sup> 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<sup>4</sup>.

<sup>3</sup> ECB (Requirements in the field of general economic statistics, August 2000) and IMF (Special Data Dissemination Standard).

<sup>4</sup> 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 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.

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<sup>5</sup>. Another way to achieve aggregate reliability sooner is to increase sample size for strata which are relatively more important for the aggregated figures<sup>6</sup>. 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<sup>7</sup> and (b) the sample and grossing up framework should address changes in the population of the Business Register in a timely and efficient manner<sup>8</sup>.

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<sup>9</sup>. For variables such as turnover, new orders and production, however, such an approach is inappropriate both from a theoretical and practical point of view<sup>10</sup>.
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<sup>11</sup>, which facilitates

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<sup>5</sup> 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.

<sup>6</sup> 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.

<sup>7</sup> One exception where fully independent samples provide more or less equivalent statistical results is when the variable observed is growth-related.

<sup>8</sup> 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.

<sup>9</sup> For instance, in the UK and Finland.

<sup>10</sup> 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.

<sup>11</sup> 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.

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<sup>12</sup> 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.
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)<sup>13</sup>. 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

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<sup>12</sup> 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.

<sup>13</sup> For example, in the UK.

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 dissemination tools<sup>14</sup> 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).

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<sup>14</sup> 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.

**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 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<sup>15</sup> across the various Member States, approximations for one country could also be modelled<sup>16</sup> 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

<sup>15</sup> 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.

<sup>16</sup> 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".

Persons employed	46 (De)	1
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\*) 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<sup>17</sup> support.

## 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<sup>18</sup> 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<sup>19</sup> 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<sup>20</sup>; estimating missing national data (at the European level); spreading best practices and stimulating and facilitating countries (at the European level).

<sup>17</sup> See footnote 11 for an example at the EU-level.

<sup>18</sup> In addition to the ECB, Austria, Belgium, Germany, Denmark, Luxembourg, the Netherlands, Finland and the United Kingdom took part in the assessment of alternatives.

<sup>19</sup> 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.

<sup>20</sup> 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"

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<sup>21</sup> with the aim of obtaining more definite findings.

#### 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

<sup>21</sup> 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).

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

Annual growth production index of member states & EU (1995-2000)

