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**Comparison of National versus European Commission Confidence
Indicators**

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1. Introduction

The Joint Harmonised EU Programme of Business and Consumer Surveys combines the results of monthly and quarterly surveys carried out among enterprises and consumers in all EU Member States. The surveys are conducted at country level in accordance with a harmonised questionnaire by institutions such as the IFO institute in Germany, the INSEE in France or the ISAE in Italy. These institutes send the results of their surveys to the European Commission (EC) which publishes them on the last working day of the survey month.

The surveys are conducted in five different sectors of the economy, namely

- Industry
- Services
- Retail trade
- Construction
- Consumers (Households).

In addition to publishing the results question by question, the EC also computes sectoral confidence indicators. For instance, an Industrial Confidence Indicator is published for the industrial sector, a Services Confidence Indicator for the service sector, and so on. The results of all sectors are furthermore combined in the so-called Economic Sentiment Indicator (ESI) which is designed to be representative for the whole economy. Importantly, these indicators are computed in a uniform way for all individual Member States and for the total of the EU and the euro area. While the emphasis of the EC publication lies on the EU and euro area results, thanks to their inter-comparability the country results are useful as well.

Most of the institutes that carry out the surveys also publish the results of their surveys at national level. In spite of being based on the same survey data, these results often differ from the results published by the EC. Although there are manifold reasons for such discrepancies, survey users often are puzzled by the fact that results based on one and the same data base can lead to different results. This paper attempts to give an overview on the main factors behind divergences between national survey indicators and the indicators published by the EC.

In section 2, the paper presents a short summary of the methodology applied by the EC for the calculation of the confidence indicators and the ESI. In section 3, possible sources of discrepancies between EC indicators and national indicators are discussed in more detail. In a first part of this section we present a synoptic table containing information about methodological differences between the national institutes and the EC in constructing survey indicators. For practical purposes the analysis is limited to those national survey indicators that are available to the public through the internet. In a second part of section 3 we study the effects of such methodological differences on the resulting indicators for a selected number of countries. Section 4 summarises the results of the paper.

2. The confidence indicators and the ESI published by the EC¹

a. The balance statistic

Most survey questions in the Joint Harmonised EU Programme of Business and Consumer Surveys have a three-way answer: positive (P), neutral (E) and negative (N). An example is question no. 1 of the industry survey:

Question: How has your production developed over the past three months?

Answer: Increased (P)
Remained unchanged (E)
Decreased (N)

The EC receives from the survey-conducting institutes summary tables with the percentage of respondents giving a positive, a neutral and a negative answer. The transmitted percentage figures are normalised so as to yield a sum of 100, i.e. non-responses are not taken into account. The figures sent to the EC are in many cases rounded to one digit after the decimal point or sometimes also to the next integer value.

Using these three percentages, the Commission calculates for each question the balance (B) between the positive and negative answers ($B=P-N$). The balance statistic is obviously confined to lie between -100 and 100 and should normally fluctuate around a mean close to 0. An increase in the value of the balance statistic means, with a few exceptions, an improvement and *vice versa*.

The balance statistic was introduced by Anderson in 1952² and is one of many ways to quantify the qualitative information included in the answers to the question in one single number. Another popular statistic is the so-called diffusion index (DI) which is defined as $DI = P + 0.5E$. Under the restriction that $P + E + N = 100$, the diffusion index is a simple transformation of the balance statistic ($DI = 0.5B + 50$) and restricted to the interval from 0 to 100.

There are a number of other more complex quantification methods which are often based on distributional assumptions. However, as noted in the OECD Handbook on Business Tendency Surveys³, there is a “very high correlation between the balances and alternative methods when three-option replies are used. This is a comforting finding since most business tendency surveys, including the harmonised system, uses three-option replies.”

Some questions, mostly in the consumer survey, also have a 5-way answer. For instance, question no. 1 in the consumer survey reads:

¹ A more extensive description of the methodology used by the European Commission is available at: http://europa.eu.int/comm/economy_finance/indicators/business_consumer_surveys/userguide_en.pdf

² Anderson, O. (1952), The Business Test of the IFO Institute for Economic Research, *Review of the International Statistical Institute*, Vol. 20, 1-17

³ <http://www.oecd.org/dataoecd/29/61/31837055.pdf>

Question: How has the financial situation of your household changed over the last 12 months?

Answer: Got a lot better (PP)
Got a little better (P)
Stayed the same
Got a little worse (N)
Got a lot worse (NN)

For these questions the balance is calculated as follows: $B = PP + 0.5P - 0.5N - NN$.

b. Seasonal adjustment and smoothing

The EC publishes the balances for almost all questions of the five surveys. Before publication the balances are seasonally adjusted. The EC currently uses Dainties as the method of seasonal adjustment of the survey data. This method has yielded satisfactory results for business and consumer survey data. The main advantage of Dainties besides its ease of use is the absence of revisions when adding data at the end of the time series. This enhances the affirmative character of the data. As business and consumer survey data are economic agents' opinion at a certain point in time, revisions of the historical data are more difficult to explain to users than is the case for hard data.

There are a number of other methods of seasonally adjusting survey data. The most frequently used methods by the institutes carrying out the surveys at national level are X-12 RegARIMA and Tramo-Seats.

Survey data is sometimes subject to considerable volatility making it difficult to discern a clear signal. For this reason, in addition to being seasonally adjusted the balances are occasionally smoothed. But at the level of the EU or the euro area country shocks are often evened out so that the data are usually significantly smoother than country data. As a consequence, the EC does not apply a smoothing procedure before publishing the data.

However, at country level this might result in some excess volatility in the data. This problem is particularly acute for smaller countries where sample sizes are often fairly small. These countries, therefore, apply sometimes smoothing procedures to their data. The simplest method to do so is by taking a two-month or three-month average. While this procedure smoothes out some of the erratic movements in the data it also leads to a phase shift which could delay the detection of turning points.

c. From the balances of individual questions to confidence indicators

To derive sectoral confidence indicator the EC uses the simple average over the balance statistics of a number of selected questions. The following subset of survey questions is used for the sectoral confidence indicators (an asterisk after the question means that the balance for this question enters with reversed sign in the calculation of the confidence indicator):

Industry:

- Do you consider your current order books to be ?
- Do you consider your current stock of finished products to be ? (*)
- How do you expect your production to develop over the next three months?

Services:

- How has your business situation developed over the past three months?
- How has demand for your company's services changed over the last three months .. ?
- How do you expect the demand for your company's services to change over the next three months?

Consumers:

- How do you expect the financial position of your household to change over the next 12 months?
- How do you expect the general economic situation in this country to change over the next 12 months?
- How do you expect the number of people unemployed in this country to change over the next 12 months? (*)
- Over the next 12 months, how likely is it that you save any money?

Retail Trade:

- How has your business activity developed over the past three months?
- Do you consider the volume of stock currently hold to be? (*)
- How do you expect your business activity to change over the next three months?

Construction:

- Do you consider your current overall order books to be ...?
- How do you expect your firm's total employment to change over the next three months?

The choice of questions used for the calculation of the confidence indicators was guided by the aim of achieving an as high as possible correlation of the confidence indicator with a reference statistics such as industrial production or GDP at the *aggregate* (EU or euro area) level. While this selection of questions might be "optimal" at the aggregate level it is often less apt to achieve a high correlation between a national confidence indicator and the corresponding national reference series. For this reason, national institutes often base their confidence indicators on a selection of questions which is different from that of the EC.

In addition, calculating an arithmetic average is only one among many methods of deriving composite indicators. Alternative methods which have gained some popularity in recent years are factor-analytic models. Typically, factor-analytic models use a larger number of input variables than are used in a composite indicator based on an average. The EC computes and publishes currently one indicator, the Business Confidence Indicator (BCI), which is based on the classical static factor model. The BCI derives a composite indicator for the industrial sector using the following questions:

- How has your production developed over the past 3 months ...?
- Do you consider your current order books to be ?
- Do you consider your current export order books to be ?
- Do you consider your current stock of finished products to be ?
- How do you expect your production to develop over the next three months?

d. Aggregation to the Economic Sentiment Indicator.

The ESI combines the results of all five sector surveys in an overall activity-related indicator. The same questions are selected as those used for the calculation of the sectoral confidence indicators. However, before aggregation these questions are standardised to have a mean of 0 and a standard deviation of 1. This is to avoid that questions with a high standard deviation implicitly get a higher weight than questions with a lower standard deviation. After standardisation the questions are multiplied by the following weights:

- Industry: 13⅓%
- Services: 10%
- Consumers: 5%
- Retail: 1⅔%
- Construction: 2½%

Taking into account the number of questions selected per survey this results in the following sector weights:

- Industry: 40%
- Services: 30%
- Consumers: 20%
- Retail: 5%
- Construction: 5%

The weighted series are then aggregated by computing a simple average.

In a last step, the resulting series is normalised so as to have a long-term average of 100 and a standard deviation of 10. Assuming normality, about 95% of the observations would lie in the interval of 80 to 120.

3. Possible sources of discrepancies between EC indicators and national indicators

a. Synoptic overview of methodological differences

When comparing results of business and consumer surveys it is very important to keep the methodological differences in calculating the indicators in mind. In this section we will have a look at the effects of differences in methodology on the outcome of the confidence indicator. As the above discussion has shown, differences can arise at various steps in the calculation of survey indicators. These are, in particular:

- Rounding
- Quantification
- Seasonal adjustment
- Smoothing
- Selection of questions
- Weighting scheme
- Standardisation
- Sector coverage (especially for overall activity-related indicators)

Table 1 gives an overview of differences in methodology between national institutes and the EC. The table is limited to surveys whose results are made available to the general public on the internet. An empty cell indicates that the national institute and the EC apply the same methodology, while cells with an “x” indicate a difference. In the column for seasonal adjustment (S.A.), “none” indicates that the national institute does not seasonally adjust the series. If an overall activity-related indicator similar to EC’s ESI is published by a national institute this is indicated by an entry “OAI” directly below the sectors that are included in this indicator.

The table does not specifically mention differences in rounding as they are expected to lead to minor differences only. Furthermore, the quantification method is not addressed because basically all institutes use the balance statistic as a method of quantifying the qualitative survey information. Moreover, standardisation schemes are not mentioned either, as such standardisations are strictly monotonic (and therefore reversible) transformations of the original series. Although they produce different numerical results - a fact that needs to be borne in mind when comparing figures from different publications - they typically do not affect the fundamental information carried by the series⁴. Finally, differences in sector coverage for overall activity related indicators are made evident by showing the sectors that are included in the calculation of the overall activity-related indicator above the row “OAI”.

As can be seen, most of the differences exist regarding the seasonal adjustment method, followed by the selection of questions. There are also some differences regarding the weighting scheme, and two institutes apply a smoothing procedure before publication. In some cases differences are limited to one dimension (e.g. for the Danish Industrial Confidence Indicator (ICI) only the seasonal adjustment method differs) but for many countries differences exist in more than one dimension.

b. Comparison of a selected number of indicators

This subsection presents some examples with a view to illustrating the effects of various types of differences in the procedures used. The first few examples present cases where such differences between the national and the EC indicator occur only in a single dimension. Following this, examples are given where methodological differences occur in more than one dimension.

The analysis will be based on a graphical comparison as well as on the correlation coefficients between the two published series. However, what catches the attention often more than the level of the series in a certain month is the change from one month to the other. For this reason we also base our analysis on the first differences of the published (level) series. Moreover, since due to different normalisation procedures the numerical values of the month-on-month changes are often difficult to compare we also analyse for every example the concordance of the *direction* of change as indicated by the differenced series.

⁴ Strictly speaking this is only true when the standardisation is applied to the composite indicator. If the standardisation is applied to the constituent series, this changes implicitly the weights each series gets in the subsequent aggregation procedure.

Table 1: Methodological differences between national and EC survey indicators

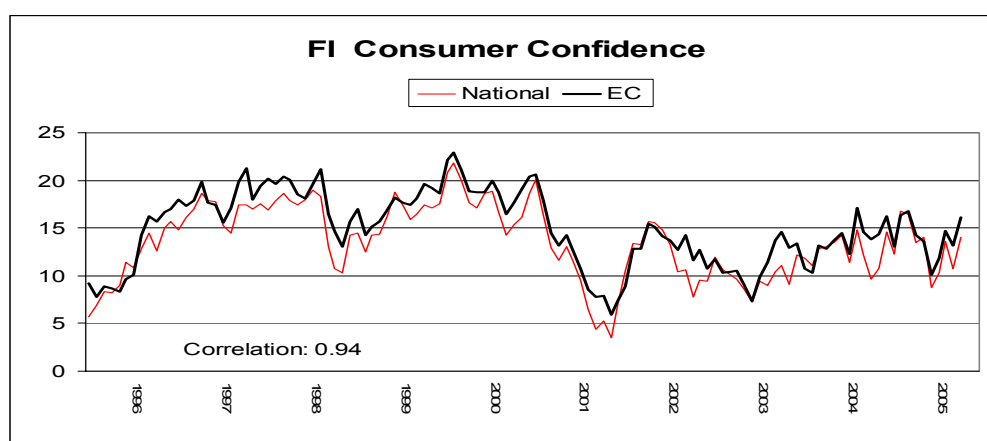
Country	Sector	S.A.	Smoothing	Questions	Weighting	
Belgium	Industry	x	x	x		
	Retail	x	x	x		
	Building	x	x	x		
	OAI	x	x	x	x	
	Services	x	x	x		
Czech Rep.	Consumers	x				
	Industry	x				
	Retail	x				
	Building	x				
	Consumers	x				
Denmark	OAI	x			x	
	Services	x				
	Industry	x				
	Germany	Industry	x		x	
	Retail	x		x		
Germany	Building	x		x		
	Wholesale	--	--	--	--	
	OAI	x		x	x	
	Consumers	none		x		
	Spain	Industry	x			
Spain	Retail	none		x	x	
	Building	none				
	Consumers	none		x	x	
France	Industry	x		x	x	
	Services	x		x	x	
	Consumers	x		x		
Ireland	Consumers	x		x		
Italy	Industry	x				
	Services	none				
	Retail	x				
Lithuania	Consumers	x				
	Industry	none				
	Services	none				
Hungary	Retail	none				
	Consumers	none				
	Industry			x		
	Retail			x		
Netherlands	Building			x		
	Consumers			x		
	OAI			x	x	
	Industry	x				
	Consumers	x		x		
Portugal	Industry	x	x			
	Services	x	x			
	Retail	x	x			
	OAI	x	x		x	
	Building	none	x			
Slovenia	Consumers	x	x			
	Industry	x				
	Retail	x				
	Consumers	x				
	OAI	x			x	
Slovakia	Services	none				
	Building	none				
	Industry	x				
	Retail	x				
Finland	Building	x				
	Consumers	x				
	Industry	x				
	Services	x				
Sweden	Building	none				
	Industry	X				
	Building	X				

- *Consumer Confidence Indicator for Finland: seasonally adjusted versus non-seasonally adjusted data*

As mentioned before the most common source of difference is the seasonal adjustment procedure. For this reason we want to demonstrate, in a first step, the effect seasonal adjustment has on the results. For this purpose we use the Consumer Confidence Indicator (CCI) for Finland. Finland Statistics constructs this indicator in the same way as the EC except that it does not adjust it for seasonal variations⁵.

Fig. 1 shows the level data for the two series together with the correlation coefficient between the two series. The graph suggests that the two series match pretty well and this is also confirmed by a correlation coefficient of 0.94. The conclusion could be that seasonal adjusted series do not deviate importantly from non-seasonally adjusted series.

Figure 1: The CCI for Finland: the national and the EC indicator compared (levels)

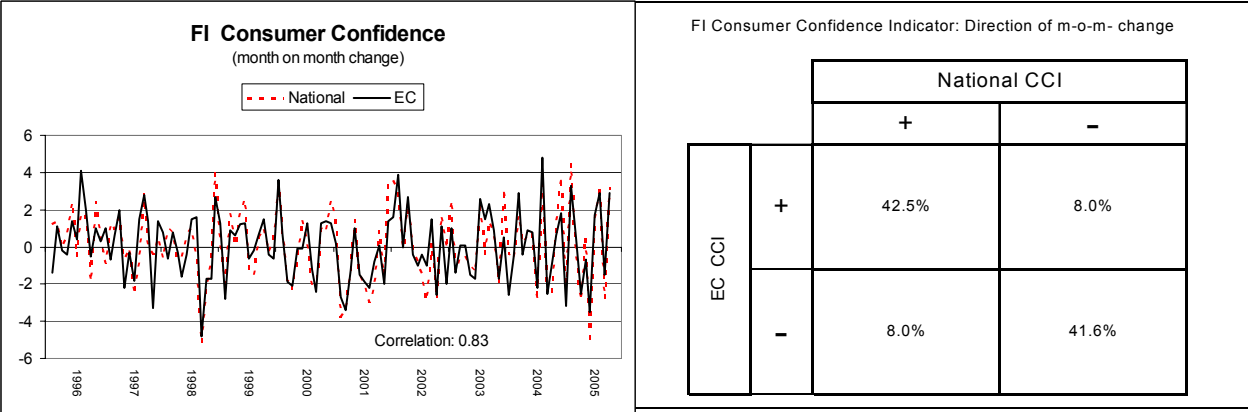


However, this conclusion is not corroborated when month-on-month changes are compared. As shown by Fig. 2 (left-hand side), the correspondence between the monthly changes is clearly less strong. In particular, the correlation coefficient falls to 0.83.

The right-hand side of Fig. 2 presents a cross-tabulation of the direction of change. The figures along the diagonal from the upper left to the lower right show the share of observations for which both indicators point in the same direction (up or down) while the figures along the diagonal from the lower left to the upper right show cases where the two indicators point in the opposite direction. The figures reveal that for around 16% of the observations the seasonally adjusted series points in the opposite direction from that of the non-seasonally adjusted series.

⁵ In fact, the indicator published by Statistics Finland differs from the EC indicator also for another reason. In particular, Statistics Finland computes one of the balances (related to the question concerning household savings) used for the construction of the indicator by applying household weights rather than individual weights, while the EC uses consistently individual weights in the calculation of all four balances entering the confidence indicator. This difference creates a small level shift for the Finnish indicator which does, however, not affect to a significant extent the month-on-month changes.

Figure 2: The CCI for Finland: the s.a. and the non-s.a. indicators compared (m-o-m changes)



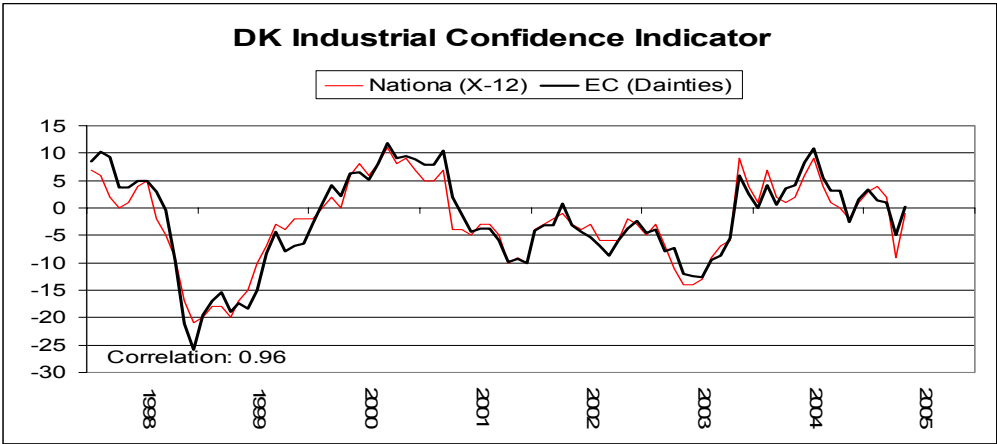
The conclusion from this analysis is that seasonal adjustment can have a noticeable effect on the series of month-on-month changes. The more the underlying data is subject to seasonal variations the stronger this effect will be.

- Industrial Confidence Indicator for Denmark: different methods of seasonal adjustment

The previous example demonstrated that seasonal adjustment, while not making a big difference for level figures, introduces significant discrepancies when month-on-month changes are compared. A related question is to what extent different methods of seasonal adjustment lead to discrepancies in the series. In order to shed some light on this question we use the Industrial Confidence Indicator (ICI) for Denmark. The Danish Statistical Office uses the same methodology in constructing its ICI as the EC, except for the seasonal adjustment procedure. While Statistics Denmark uses X-12 RegARIMA, the EC applies, as mentioned, Dainties.

Figures 3 and 4 present the same analysis as before. Regarding the level data, Fig. 3 shows again a very high correlation between the two series, with a correlation coefficient of 0.96.

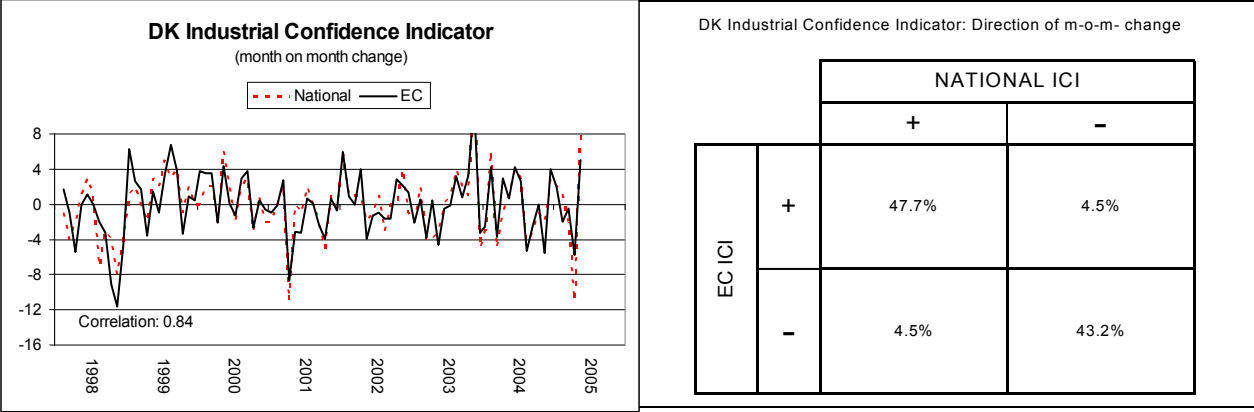
Figure 3: The ICI for Denmark: the national and the EC indicator compared (levels)



Moving to the month-on-month changes of the series (left part of Fig. 4), a still fairly high correlation is shown although the correlation coefficient declines somewhat to 0.84. Looking

at the direction of changes (right part of Fig. 4), we note that in 9% of the observations the direction of change differs between the series adjusted using X-12 RegARIMA (Denmark Statistics) and the series adjusted with Dainties (EC). In other words, in almost one out of ten cases the indicators point in a different direction. While this is surprisingly high the differences are, nevertheless, somewhat smaller than those we have encountered in the comparison between seasonally adjusted and non-seasonally adjusted data.

Figure 4: The ICI for Denmark: the national and the EC indicator compared (m-o-m changes)

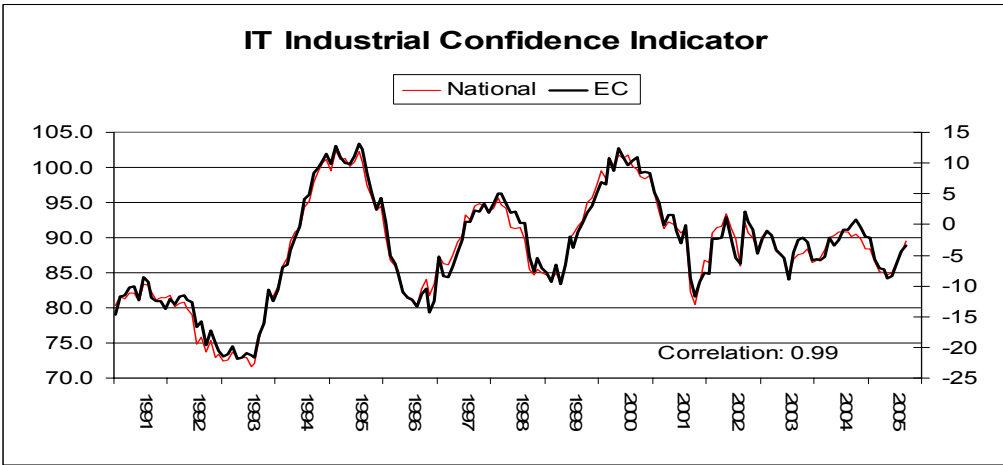


- ICI for Italy: different methods of seasonal adjustment

The Italian ICI is a similar case to the Danish one. The ISAE uses the same methodology as the EC to construct the ICI except for the seasonal adjustment method and the standardisation procedure. Instead of X-12-RegARIMA, the ISAE uses Tramo-Seats as the procedure for seasonal adjustment. Moreover, ISAE standardises the results by setting the average value for 2000 at 100.

For the level series (Fig. 5), we can see almost identical movements between the two indicators. The correlation coefficient amounts to 0.99.

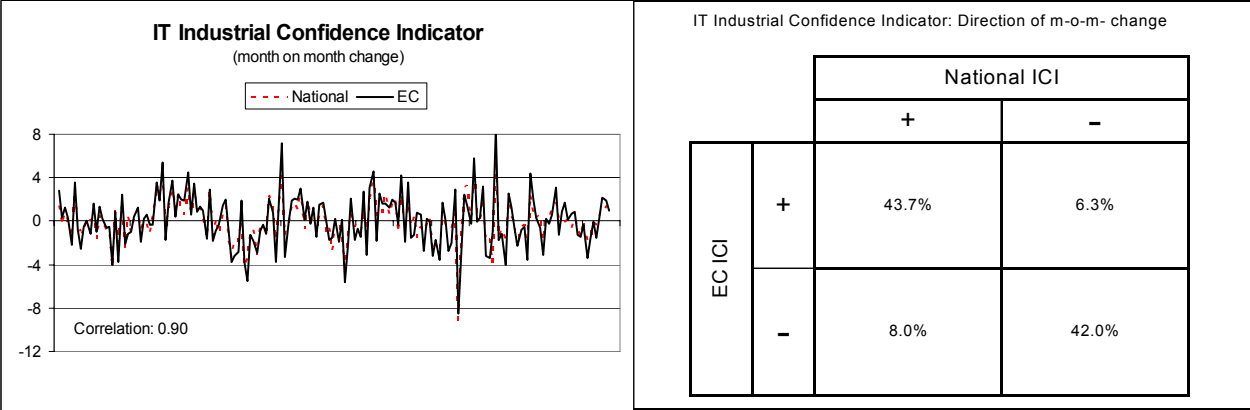
Figure 5: The ICI for Italy: the national and the EC indicator compared (levels)



Looking at the m-o-m change series (Fig. 6), the correlation coefficient for the m-o-m change series is still at 0.90. Concerning the direction of the change, in around 15% of the cases the

indicators point in the opposite direction. In the face of a fairly high correlation a surprisingly high number of observations do not coincide regarding the direction of change.

Figure 6: The ICI for Italy: the national and the EC indicator compared (m-o-m changes)

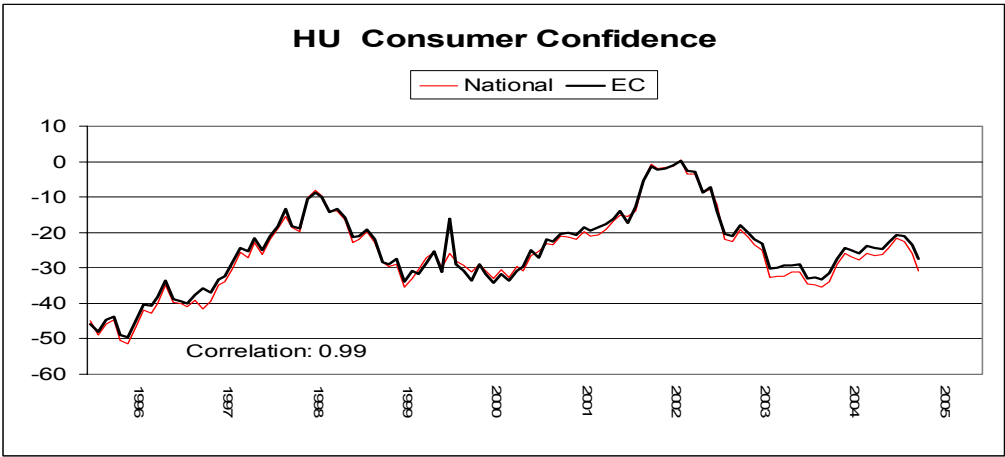


- CCI for Hungary: different selection of questions in constructing the indicator

The next issue we want to look at is the effect of the choice of questions in constructing the indicator. For this we have selected the Hungarian Consumer Confidence Indicator. The Hungarian GKI and the EC apply the same methodology except for the questions selected. The EC selects the questions relating to consumers’ expectations (financial situation of the household, general economic situation, employment and savings) while GKI uses the questions on the general economic situation (both recent and expected developments), the financial situation of the household (also both recent and expected developments) and whether or not the consumer believes that the time is good for major purchases.

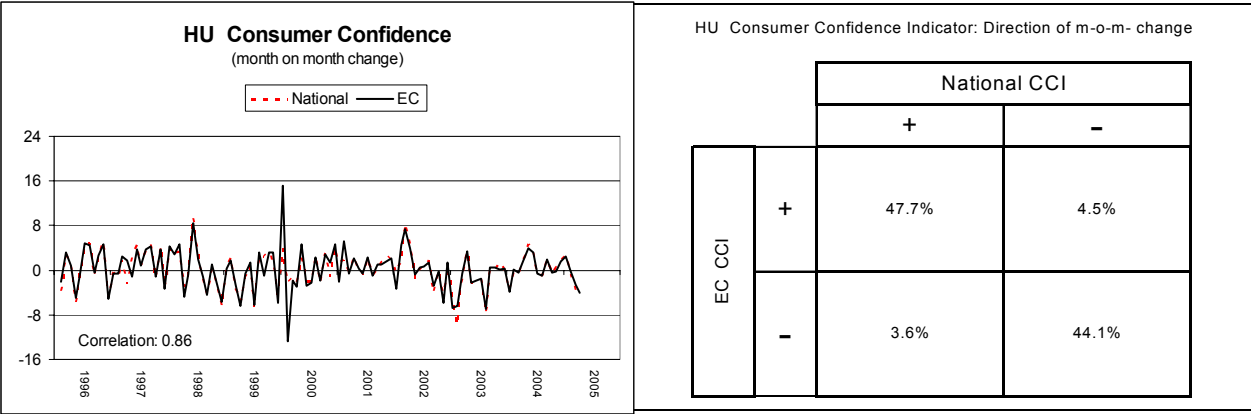
As can be seen in Fig. 7, hardly any difference can be discerned for the two level series. This is also confirmed by a correlation coefficient of 0.99.

Figure 7: The Consumer Confidence Indicator for Hungary: the national and the EC indicator compared (levels)



Moving to change data (Fig. 8), the correlation coefficient declines to 0.86. When comparing the direction of the month-on-month changes slightly more than 8% of the observations point in different directions.

Figure 8: The Consumer Confidence Indicator for Hungary: the national and the EC indicator compared (m-o-m changes)

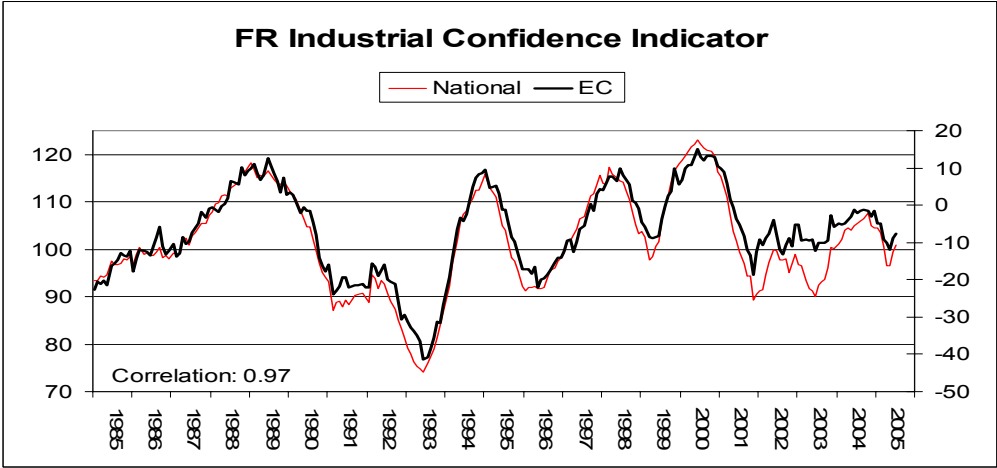


- ICI for France: several methodological differences combined

After having shown the effects of methodological differences in one single dimension, we now look at the combined effects of differences in several dimensions. The first example is the ICI for France. The national methodology in constructing the ICI differs from that of the EC in several dimensions. First, the national indicator is seasonally adjusted by X-11. In addition, the INSEE uses a factor-analytic model to derive the composite indicator using the following questions as input variables (in standardised form): recent and expected production; stock of finished products; export order books; expected selling price developments; expected development of general industrial production. Note that the last question is not part of the harmonised questionnaire.

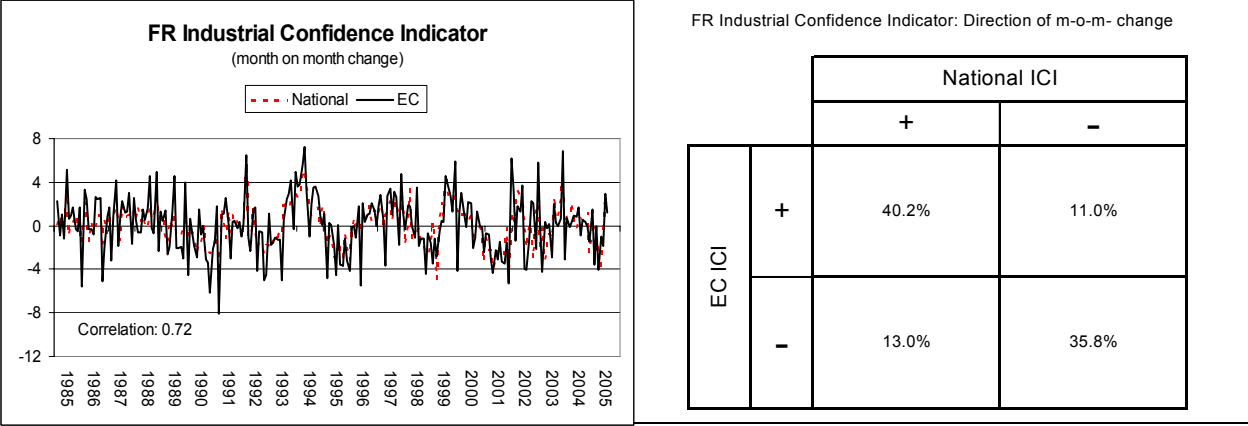
Despite the apparent differences in methodology, the two level series show a remarkable resemblance (Fig. 9). This is also confirmed by a correlation coefficient of 0.97.

Figure 9: The ICI for France: the national and the EC indicator compared (levels)



For the month-on-month changes, however, the correlation coefficient falls to 0.72 (Fig. 10). In addition, in almost one out of four cases the two indicators point in opposite directions.

Figure 10: The ICI for France: the national and the EC indicator compared (m-o-m changes)

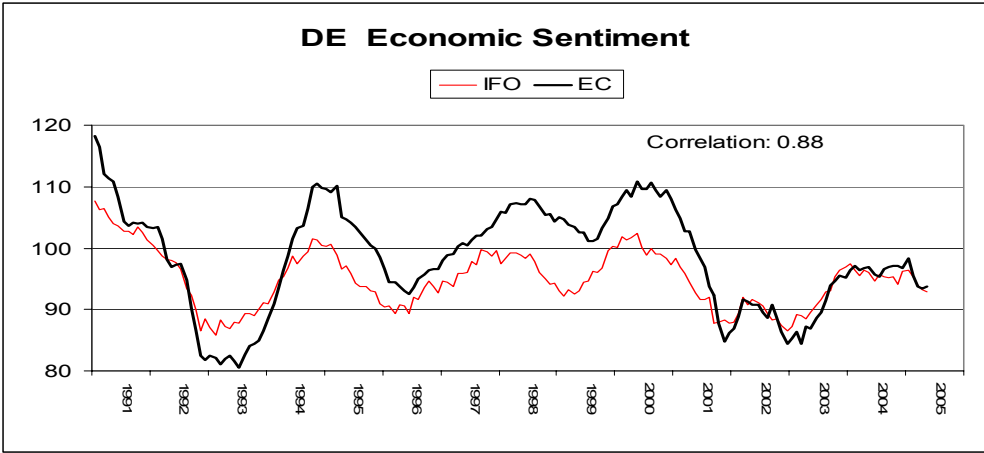


- The ifo Business Climate Indicator versus the EC’s ESI for Germany

The last example is the German ifo Business Climate Indicator. Since this indicator comprises the sectors industry, construction, retail trade and wholesale trade it resembles more an overall activity-related indicator than a sectoral confidence indicator. We can therefore compare it with the EC’s ESI for Germany. However, the methodological differences between the indicators relate to several dimensions. First, the ifo business climate indicator is seasonally adjusted with the so-called ASA II procedure. Second, it uses different questions (current and expected business situation). Third, it includes different sectors than the EC’s ESI (it does not include the services sector and consumers but it includes wholesale trade).

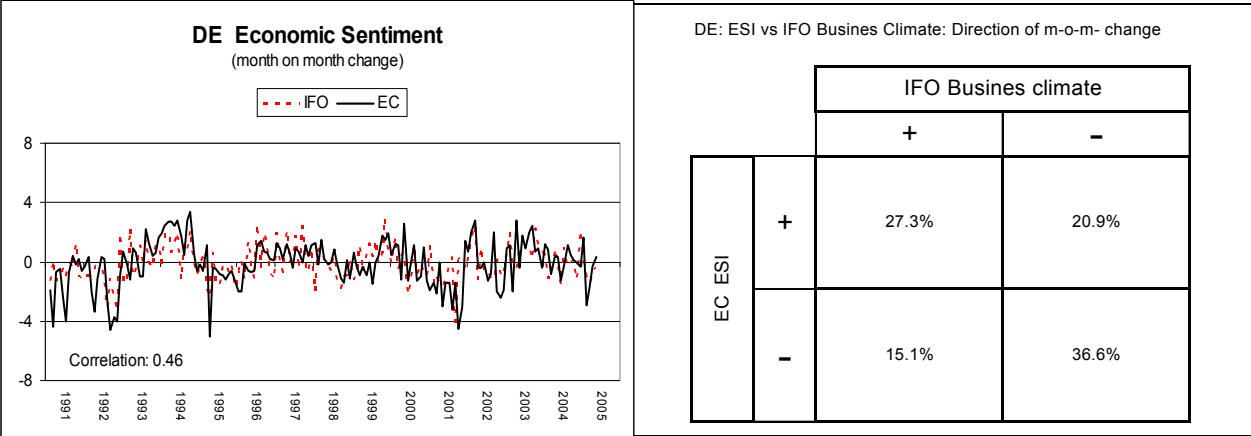
In view of the multiple deviations in their construction it is not surprising that there is only a moderate correlation between the two indicators. As for the level data, the correlation coefficient is 0.88, still surprisingly high given the visual impression of some notable discrepancies. In particular, Fig. 11 suggests that the EC indicator clearly lags the ifo indicator.

Figure 11: The ifo indicator and the EC’s ESI for Germany compared (levels)



The fairly weak correspondence between the two indicators becomes more distinctly visible by looking at month-on-month changes (Fig. 12). The correlation coefficient drops to 0.46. Moreover, regarding the direction of change, for more than on third of the observations the direction of change does not coincide.

Figure 12: The ifo indicator and the EC’s ESI for Germany compared (m-o-m changes)

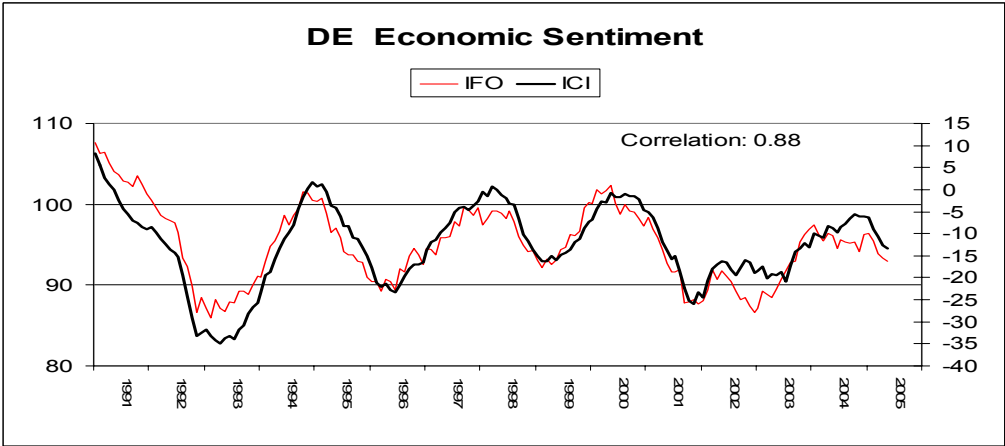


- The ifo Business Climate Indicator versus the EC’s ICI for Germany

In the EC’s ESI for Germany, the Consumers Confidence Indicator and the Services Confidence Indicator have a combined weight of 50%. Since these two sectors are not included in the ifo Business Climate Indicator an alternative comparison would be with the EC’s ICI.

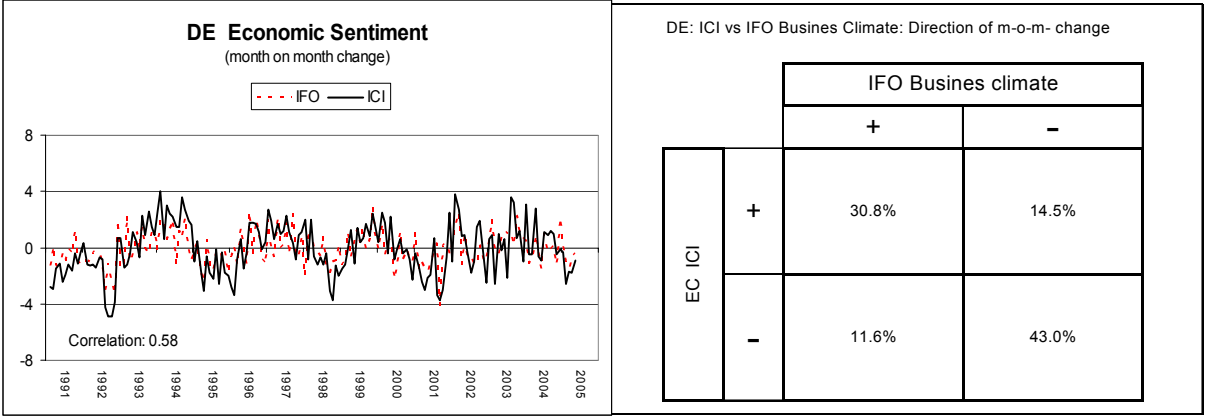
The results of the comparison with level data are shown in Fig. 13. The visual impression is that these two indicators show a higher correspondence, although this is not corroborated by the correlation coefficient which is, as before, 0.88.

Figure 13: The ifo indicator and the EC’s ICI for Germany compared (levels)



Regarding the m-o-m changes (Fig. 14) the correlation coefficient is, indeed, somewhat higher for the ICI than for the ESI. In addition, a significantly smaller share of observations (around one quarter) point in opposite directions. But the differences remain considerable.

Figure 14: The ifo indicator and the EC's ICI for Germany compared (m-o-m changes)



4. Summary

The EC publishes the results of the business and consumer surveys at the last working day of the month. Many of institutes which carry out the surveys for the EC also publish their own national results. In order to make the results comparable between the countries the EC applies a harmonised methodology for the construction of indicators. National institutes are not bound by this methodology and can apply the methodology which they consider best for their purposes.

Due to these differences in the applied methodology there can be differences between the national results and the results published by the EC. In this paper we have tried to quantify these effects.

The main results are that when comparing the level series the effects of methodological differences seem to be relatively small. However, with respect to the series of the month-on-month changes the effects can be much larger. Similarly, when considering the direction of monthly changes differences in methodology can lead to considerable discrepancies in results.

Looking at the methodological differences in isolation, the paper has shown that it matters for the resulting month-on-month changes whether or not a series is seasonally adjusted. Concerning the discrepancies generated by different seasonal adjustment methods, they seem to be somewhat smaller. However, even here the number of cases where the monthly changes of series, which were adjusted with different methods, point in opposite directions is by far not negligible. Concerning the influence of the choice of question the results appear to be case dependent. As shown for the cases of the Hungarian Consumer Confidence Indicator but also for the French ICI, if there is a sufficiently large overlap in the questions, results do not appear to deviate strongly. By contrast, as in the case of the ifo Business Climate Indicator, where the overlap is small, more substantial deviations are to be expected. There is furthermore some evidence that differences in the sector coverage of overall activity-related indicators may lead to significant deviations.

The paper also showed that the higher the number of dimensions in which the methodologies differ the more important are the discrepancies between the resulting indicators - as is to be expected.