# An Overview of European Economic Indicators: Great Variety of Data on the Euro Area, Need for More Extensive Coverage of the New EU Member States[1, 2]

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*This contribution provides an overview of the most common short-term indicators of economic development in the euro area. These indicators are useful when official data are released with long time lags or if they are subject to major revisions. Indicators based on surveys among businesses, households, financial market analysts or forecasters have the advantage of providing detailed and timely information on individual sectors on a monthly basis and largely without later revision. As an additional instrument, composite indicators, which are calculated by combining a variety of measures into a single indicator with the help of regression and factor analysis, offer an attractive tool for drawing conclusions from different, often divergent signals. Even the most reliable economic indicators, however, can only be interpreted as constituent elements of comprehensive economic analysis. With regard to the new EU Member States, coverage is found to be limited as yet. This study also shows that the forecasting quality of the European Commission's business and consumer surveys for the new Member States is not as high as for the other EU Member States. As the reliability of economic indicators increases as forecasting institutions and respondents gain more experience, coverage of established indicators should be extended early on to this group of countries, in particular as some of the new Member States may soon join the euro area.*

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## 1 Short-Term Economic Indicators – Integral Components of Economic Analysis

New data on short-term economic indicators regularly make headlines. The release of new Ifo index data for Germany, for instance, can even top the latest GDP growth figures in terms of media presence. This is because prudent economic and monetary policies are geared toward future economic development and reflect all available data that help gauge current and future economic trends. To direct economic policy according to past data alone would be like steering a car while looking only in the rear-view mirror.

For the very same reason, economic indicators are an important tool for Eurosystem central banks. To fulfill its mandate, the Eurosystem pursues a future-oriented strategy, which is geared toward economic development in the medium term. Monetary policy is unable to respond to short-term fluctuations owing to the lags in the transmission process and owing to the degree of uncertainty that surrounds the effects of monetary policy because of the complexity of the transmission process. With a medium-term monetary policy strategy, excessive activism and the introduction of unnecessary volatility into the economy can be avoided (ECB, 2004b).

The Eurosystem central banks base their economic analysis – one of the two pillars of monetary strategy – on not only the latest economic data available but also on short-term economic indicators and forecasts that are, in turn, based on such data and indicators. Forecasting models are most reliable when the economy is on a stable growth track. By contrast, they are far less reliable in signaling turning points. Economic indicators help to reduce this uncertainty and are therefore an integral component of economic analysis in the Eurosystem's monetary strategy.

Furthermore, economic indicators enjoy great popularity because official data on real GDP growth – a key reference measure for indicators – are not

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adequate for short-term economic analysis owing to a number of problems. First, real GDP figures are published only on a quarterly basis, and related monthly series for the most part refer to the manufacturing industry, with the service sector being covered unsatisfactorily. Second, they are released with long time lags and frequently subject to major revisions. Lastly, the series are subject to measurement errors and problems in both data gathering and processing, and they are not comparable internationally due to methodological differences.

Of these aforementioned problems, the release lags are most critical in the analysis of economic performance. As a case in point, the first release of quarterly real GDP growth figures for the euro area does not become available until about two months after the end of a given quarter, and even a flash estimate based on the data of some Member States is released with a time lag of one and half months. By contrast, data on consumer and industrial confidence calculated by the European Commission are available on the last day of the quarter for all three months of the quarter. The European Commission's Euro Area GDP Indicator, a range estimate of quarterly growth, is released even five months before the confidence indicators and subsequently updated monthly in the light of new information.

A large number of economic data commonly come under the umbrella of short-term economic indicators for the euro area. These can be broken down into the following categories:

– *Measurable economic data* can help to assess the performance of GDP growth in a timely manner. First, these can be data on GDP subcomponents (individual countries or individual sectors) that are released earlier on. For instance, growth in industrial production is often used as an indicator for GDP growth. Second, data reflecting the early stages of the production cycle may be very useful. These can be data from sectors or countries specialized in intermediate goods but also data on inventories, building permits and overtime hours.
– *Surveys* are a common method of obtaining data from economic actors (consumers, company executives, financial analysts, forecasters) on their assessment of the current or future economic situation. Individual reponses are aggregated to derive sentiment indicators.
– *Composite indicators*, finally, are a product of statistical methods that extract a single indicator from a large number of data that, in addition to aforementioned variables, also include key determining factors of future economic development, e.g. oil prices and interest rates.

This study focuses on sentiment indicators based on surveys (section 2) and composite indicators (section 3) that are particularly closely watched by the media and by economic experts in the euro area. Section 4 presents a few rather peculiar indicators that are also repeatedly mentioned in the media. All in all, the indicators presented here do not necessarily reflect all existing types of indicators, but they represent the key methods and problem areas. Although the focus is on indicators for the euro area as a whole, national indicators are also presented if they are followed in the euro area.

The overview of indicators in each section starts with a technical description of survey methods, sampling properties and availability of data and also

addresses critical aspects of the calculation method of which one should be aware for interpretation purposes. The indicators are assessed according to various quality criteria provided they are directly comparable. To illustrate the uncertainty that may surround indicators, the post-9/11 period is taken as a specific example of the most recent past when, after an initial mood of crisis, it was impossible to say which way the economy was going. In early 2002, several sentiment indicators issued mistakenly strong signals of an upturn that never materialized. In the final quarter of 2002, GDP growth came to a mere 1.1% year on year. Even if this period cannot be described as anything but exceptional, it is nevertheless worth looking at the experience with individual indicators, as it highlights the problem that respondents often do not see the situation any clearer themselves in times of great uncertainty.

Section 5, finally, examines the extent to which comparable indicators for the ten new EU Member States (NMS) are already available and whether they qualitatively differ from indicators for countries that have published such measures for decades. Given that some of the new EU members could join the euro area shortly, the availability of such indicators for the NMS may soon be of relevance for the euro area, on which this contribution – and most economic analysis – focuses primarily. Although the economic importance of most of these countries is limited, they currently constitute the most dynamic region in Europe to which greater attention will be paid in future. Above all, the still inadequate quality of official economic data in many cases will stimulate interest in reliable short-term economic indicators.

## 2 Sentiment Surveys: Indicators of Long-Standing Tradition

Many of the most common economic indicators are determined in the form of surveys among businesses, households, financial analysts or forecasting institutions. Although the surveys for the most part ask qualitative questions, quantitative indications may be required too. Whereas the results of surveys are primarily used to anticipate the performance of key economic variables, they can also throw light on underlying factors or help assess the consequences of extraordinary events early on.

In a summary article, the European Central Bank (ECB, 2004a) cites a number of advantages sentiment indicators have over officially published data. First, they are released far earlier on than the latter. Second, data are released on a monthly basis whereas their reference series are frequently available only as quarterly data. Third, surveys can provide data that cannot be directly gathered (e.g. capacity utilization in manufacturing industry). Fourth, survey data tend to be less volatile, as they are not (or less) influenced by one-off events (storms, strikes) and should therefore identify turning points sooner. Lastly, survey data are rarely revised.

All these advantages are also accompanied by certain drawbacks. For instance, surveys provide primarily qualitative data that are not easy to convert into quantitative assessments. Furthermore, survey data on different sectors may not necessarily be comparable. Finally, the quality of the results depends to a great extent on how strong the motivation of respondents is to answer questions carefully. The quality of the survey is itself difficult to monitor, as series cannot be subject

to quality checks on an ongoing basis. Despite these drawbacks, long experience with some of these sentiment indicators puts them among the most popular short-term economic indicators.

A common methodological approach, which was developed by the U.S. National Bureau of Economic Research (NBER) for a U.S. indicator, consists in providing respondents with set responses for their assessment of the current or future economic situation. These can be broken down into the following categories: positive (e.g. "the situation will improve considerably (PP)" or "the situation will improve slightly" (P)), neutral ("the situation will remain unchanged"), negative ("the situation will deteriorate slightly" (N), "the situation will deteriorate considerably" (NN)) and the nil response ("No idea"). If *p*, *pp*, *n* and *nn* represent the respective share of respondents in the corresponding reponse category, then the index value is given by the difference between the positive and negative reponses according to the formula

$$I = (pp + \alpha p) - (\alpha n + nn),$$

where $\alpha$ is the weight (generally ½ or 1) with which slight movements are downgraded relative to strong ones. If respondents are given only one negative and one positive response among which to chose, the formula is $I = p - n$.

Sections 2.1 and 2.2 present several indicators from consumer, business and financial market surveys which are calculated either directly for the euro area or are related to individual euro area countries that are considered to be important for the region as a whole. The box "Internet References" provides the web link for the relevant indicators. Table 1 presents a comparison of key features of indicators. Whereas all these indicators are published monthly, they do differ in terms of release dates in relation to the first release of GDP growth figures, historical availability, statistical correlation with the reference series and their representativeness for the economy as a whole.

To analyze the statistical relation between indicators and economic development, this paper uses growth in the euro area's seasonally adjusted industrial production rather than GDP growth as a reference series. Although industrial production accounts for only some 25% of GDP in the euro area, it is published on a monthly basis and is, moreover, responsible for more than half of the fluctuations in GDP. In addition, many services (transportation, supplies, repairs) are directly related to industrial production.

Table 1 shows the maximum correlation coefficient between a given indicator and growth in industrial production that can be reached by adjusting the time lag between the two series. The series are standardized in a way such that they have mean 0 and standard deviation 1. The relative lag is shown in parentheses, with a negative figure indicating an actual lead of the indicator, a positive figure representing a lag and 0 signifying that the correlation is highest when both series are coincident. If, for example, the correlation coefficient is highest when the indicator series is lagged by two months (–2) relative to industrial production, then the January indicator will offer the best insights into the growth of industrial production in March. If, however, the indicator data are lagging, say, by one month (+1) with respect to industrial production, then only an earlier indicator release date could offer added value. In other words, a coincident or slightly lagging indicator can

act as a leading indicator in practice if it is published sufficiently early.

Furthermore, a Granger causality test is used to test the statistical relation between the indicator and reference series. Under ideal circumstances, the indicator (I) is Granger causal for growth in industrial production (IP) but not vice versa (this is denoted in table 1 as I→IP). Mutual (I↔IP) causality can be established only in two instances. A final test lastly checks how many months earlier (negative value) or later (positive value) an indicator reaches a turning point than industrial production figures. Table 1 shows the average lead or lag across the entire sample as well as the maximum and minimum time lead or lag in parentheses.[4] This is intended to illustrate the great uncertainty that surrounds the actual timing of an economic turning point signaled by the latest indicator values.

A further statistical test is to check how well reference series can be predicted using short-term indicators. One possibility is to use the historical relation between the reference series and indicator data (estimated on the basis of the full range of data) to predict economic performance at individual reference dates and then check the forecasts against actual outcome (in-sample approach). The other possibility is to rerun estimates for each refernce date using only the data available prior to the given forecasting period (out-of-sample approach).[5] Examples of such forecasting excerises are Dreger and Schumacher (2005) or Hüfner and Schröder (2002) for various German indicators. This study systematically analyzes the forecasting quality only for the individual components of the European Commission's ESI (section 5).

### 2.1 Sentiment Indicators in the Euro Area

The *Economic Sentiment Indicator (ESI)*, the origins of which go back to the 1960s and which has been published by the European Commission (2004a) on a monthly basis since 1985, follows the methodological approach of constructing a balance of positive and negative reponses from sentiment surveys as described above. While initially only five countries took part in the project, today data are collected with a standardized questionnaire for all EU Member States (with the exception of Malta) as well as for Bulgaria and Romania, which are scheduled to accede in 2007 or 2008. EU and euro area aggregates are also published. Some of the surveys are conducted by public institutions and some by private national institutions.[6] The indicator, which is pub-

[4] *Turning points were calculated as extreme values of the three-month moving averages of both indicator series and growth in industrial production. Since the early 1990s, growth in industrial production has accordingly posted five peaks and troughs. Since the fourth peak and fifth trough represent only a slight economic improvement in the quarters post 9/11, followed by a further dent in growth (and not an upturn and a downturn in the current meaning of a business cycle), neither of these turning points was taken into account here. For most indicators, the lead or lag properties also have a historically atypical pattern in this period. If the same test is repeated with all ten turning points, the average lead or lag of the indicators differs from the value recorded in table 1, but the pecking order of the individual indicators will remain essentially unchanged.*

[5] *Inoue and Kilian (2004) show that in-sample tests more frequently indicate good forecasting properties than out-of-sample tests. For instance, a model based on past data may have fairly good predictive powers whereas a structural break in the respective forecast horizon gives rise to forecasting errors.*

[6] *Examples of the wide range of forecasting institutions are the Nationale Bank van België/Banque Nationale de Belgique (NBB/BNB), Germany's Ifo Institute for Economic Research, the Austrian Institute of Economic Research (WIFO), Hungary's GKI Economic Research Institute, the Czech Statistical Office and the U.K.'s Confederation of British Industry (CBI).*

Table 1

**Comparison of Sentiment Indicators:**

**Indicator Quality for Growth in Industrial Production in the Euro Area**

| | Publishing institution | Published since | Currently released for the following EU countries | Lead on GDP publication[1]) | Sample size in 1,000 | Sectors covered | Number of subindices[2]) | Maximum correlation coefficient[3]) | Granger causality[4]) | Lead/lag of turning points[5]) |
|---|---|---|---|---|---|---|---|---|---|---|
| **ESI** | European Commission | 1985 | EU, euro area, 24 countries | 62 | 141 | Consumer, industry, construction, retail, services | 15+27 | 0.85 (+1) | I→IP | +1.9 (−1; +5) |
| Industry confidence indicator | European Commission | 1985 | as above | 62 | 36 | Industry | 3+11 | 0.89 (+1) | I→IP | +1.5 (−1; +4) |
| Service sector confidence indicator | European Commission | 1996 | as above | 62 | 28 | Services | 3+2 | 0.69 (+1) | I→IP | +2.7 (−1; +5) |
| Consumer confidence indicator | European Commission | 1985 | as above | 62 | 33 | Consumer | 4+10 | 0.71 (+3) | I→IP | +4.0 (0; +11) |
| Construction confidence indicator | European Commission | 1985 | as above | 62 | 21 | Construction | 3+2 | 0.39 (+5) | I→IP | × |
| Retail trade confidence index | European Commission | 1985 | as above | 62 | 23 | Retail trade | 2+2 | 0.47 (+3) | × | × |
| Production expectations component | European Commission | 1985 | as above | 62 | 36 | Production expectations | 1 | 0.90 (−1) | I↔IP | −0.3 (−3; +5) |
| **PMI (Manufacturing)** | NTC | 1997 | EU Euro area, 11 countries | 60 | 5 | Manufacturing | 8 | 0.87 (−1) | I→IP | −0.2 (−3; +2) |
| **Ifo business climate-index** | Ifo | 1984 | Germany | 66 | 7 | Manufacturing, construction, trade | 8 | 0.64 (0) | I→IP | −1.6 (−5; 0) |
| Ifo business situation component | Ifo | 1984 | Germany | 66 | 7 | Manufacturing, construction, trade | 4 | 0.58 (+3) | I↔IP | +2.4 (+1; +7) |
| Ifo business expectations component | Ifo | 1984 | Germany | 66 | 7 | Manufacturing, construction, trade | 4 | 0.69 (−2) | I→IP | −2.9 (−6; −1) |
| **ZEW indicator** | ZEW | 1991 | Germany | 73 | 0.35 | Financial market | 1 | 0.80 (−5) | I→IP | −4.6 (−9; −3) |
| **Belgian Business Survey** | NBB/BNB | 1954 | Belgium | 69 | 6 | Manufacturing, construction, trade | 3+1 | 0.79 (−1) | I→IP | −1.0 (−3; +1) |

*[1]) Interval between the publication of the indicator value of the last month of every quarter and the first release of GDP growth of the corresponding quarter, measured in days, average of the first three quarters of 2005.*

*[2]) For the indicators published by the European Commission and the Belgian central bank, the first figure indicates the number of subindices included in the calculation of the relevant indicator. The second figure refers to the additional indicators released for each field.*

*[3]) Maximum correlation coefficient between indicator and growth in industrial production in the euro area. The degree of the lead/lag (in months) between the series, for which the maximum correlation is reached, is indicated in brackets; a negative value implies a time lead of the indicator.*

*[4]) Test at the 5% level. For the European Commission's retail index, the null hypothesis (no Granger causality) cannot be rejected in either direction.*

*[5]) Average interval (in months) between the turning points of the indicator and those of growth in industrial production. Maximum and minimum interval in brackets. Turning points are calculated using the relevant three-month moving average. A negative value implies a time lead of the indicator. The exercise was carried out only for indicators showing all tested peaks and troughs in industrial production.*

lished on the last working day of each reference month, is seasonally adjusted and standardized in a way such that the long-term average has a value of 100.

The questionnaire and the sectors covered have steadily grown in size and number. Some questions relate to the economy as such (business situation, production expectations, order books, level of inventories); others relate to the inflation and the employment expectations of households and to their financial situation, saving rate and big-ticket purchases. The ESI composite indicator aggregates five confidence surveys for the following sectors: industry (weight: 40%), services (30%), consumers (20%), construction (5%) and retail trade (5%), with each of these components being drawn from

several individual questions.[7] This indicator is thus composed of 15 individual components in all. In addition, data derived from a further 27 questions, some of which are surveyed only on a quarterly basis, are also presented. Furthermore, an investment survey is conducted every six months in the industrial sector. Overall, 108,000 enterprises and 33,000 households throughout the EU take part in these monthly surveys.

ESI's great advantage is its long historical time series and large sample as well as the EU-wide standardization of its survey method. At the same time, a distorting effect may arise from the fact that the balance of opinion reflects a rather rough quantification of the expected degree of improvement and/or deterioration ("somewhat better" or "much better"). Moreover, it should be borne in mind that the ESI is a slightly lagging indicator relative to growth in industrial production, as the analysis of correlation and turning points demonstrates. In other words, the index value published in a given month is in fact an indicator for a past month of the reference series. In practice, the ESI serves as a leading indicator nonetheless as it is published around two months before the industrial production series. Indeed, all five main components are lagging indicators, with industrial and service sector confidence having the best indicator properties for industrial production (short lag and high correlation). A truly leading indicator is a subcomponent of industrial confidence (also shown in table 1), which asks explicit questions bearing on production expectations in the three months ahead and of which particularly good leading properties relative to industrial production can therefore be expected. Section 5 examines the properties of the ESI in detail.

The Purchasing Managers Index (PMI) is modeled on its U.S. equivalent and has been calculated on a monthly basis for the euro area since 1997 by NTC Research on behalf of Reuters for the manufacturing and service sectors. All in all, more than 5,000 businesses from eight countries (Germany, France, Greece, Ireland, Italy, the Netherlands, Austria and Spain), accounting for a total of 92% of the euro area, are covered by the survey. The PMI is published on the first working day following the end of each reference month and is broken down by sector and country. The questionnaire for the the most frequently used Manufacturing PMI covers the reassessment of output, employment, new orders, suppliers' delivery times and inventories (eight subindices in all) compared with the previous month. The PMI is standardized in a way such that an index above 50 shows expansion while an index lower than 50 reflects contraction in the economic situation. However, the signaling function of this threshold value may be somewhat flawed at times, which is why fluctuations in value should always be interpreted in relation to the level as well. The PMI is popular also on account of its international comparability. After all, every G-8 country has been surveyed according to the same methodology since 2002. The PMI also enjoys great trust because its questionnaire is based

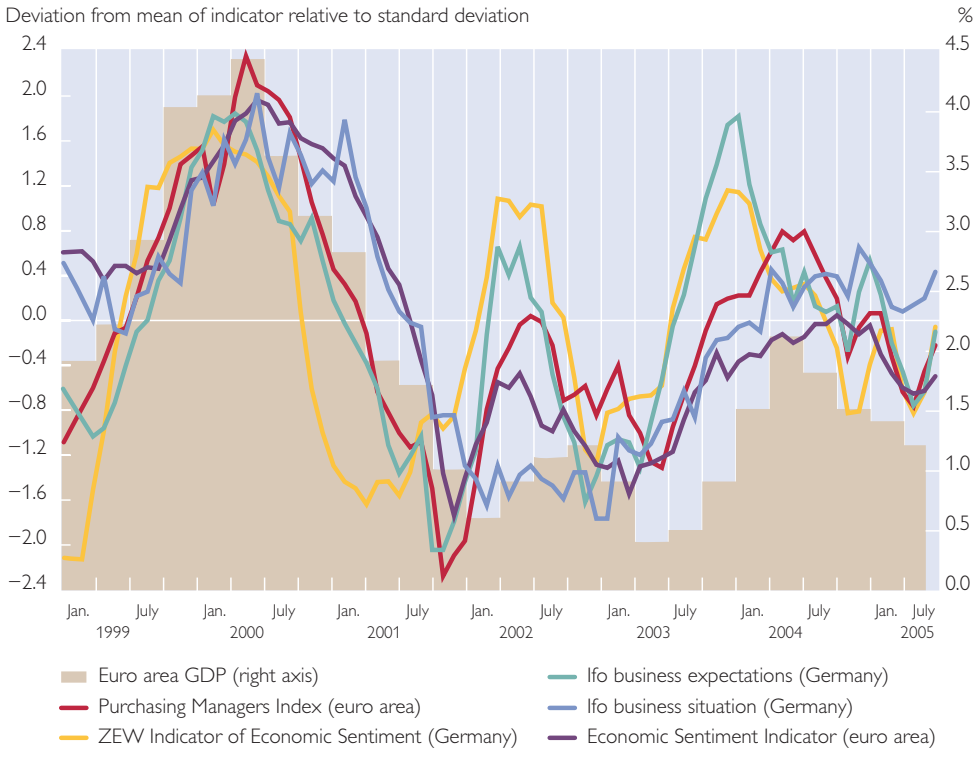
[7] *The weights are determined from both the relevant component's importance for GDP and the level of correlation with the reference series. The service sector has been surveyed since 1996 and has been a component of ESI only since 2004 (European Commission, 2004b). The European Commission expects that the inclusion of the service sector survey will increase the correlation of the index with the reference series and shorten the length of the indicator's lag.*

on actual facts and not on expectations. Accordingly, table 1 shows the Manufacturing PMI to be a slightly leading indicator with a high correlation. NTC Research (2002) shows that the British PMI has in the past had a better handle on the definitive GDP growth figure than the first release of GDP figures.

As chart 1 illustrates, the ESI composite indicator has proved to be relatively accurate in the post-9/11 period. In early 2002 it trended up only slightly, reflecting the weak and temporary upturn in the economy relatively well. By contrast, the PMI rose steeply, overstating the ensuing economic trends.

Chart 1

**Comparison of Business Climate Indicators from 1999 onward**




*Source: European Commission, Ifo, ZEW, NTC Research, Eurostat, OeNB.*

### 2.2 Germany and Belgium – Representatives for the Euro Area

In addition to these indicators that explicitly cover the euro area, national indicators are also often considered to be an important gauge of the euro area's economic health. Those hogging the spotlight are Germany's Ifo Business Climate Index, Germany's ZEW Indicator of Economic Sentiment and Belgium's Business Survey.

The *Ifo Business Climate Index* is published on the 25th of each reference month by Germany's Ifo Institute for Economic Research. Senior managers in more than 7,000 businesses in German trade and industry are asked to give their assessment of the current business situation and their business expectations for the six months ahead. The balance of responses is determined according to the aforementioned methodology. The geometric mean of both these indices is the most frequently used Ifo Business Climate Index, which is standardized at an interval of +/–100. The in-

dex is also broken down by subsector (manufacturing, construction, wholesale and retail trade). Separate indices used to be published for eastern and western Germany until 2004. Now this distinction is no longer applied, as the economic trends of both regions have sufficiently converged. The Ifo Business Climate Index is coincident or even slightly lagged relative to German GDP. That the index nonetheless has such a high profile in the media is also its association with a very memorable rule of thumb, according to which three rises or falls in the index in succession herald a turning point in GDP growth. This rule is frequently applied also to the euro area on account of Germany's high GDP weight.

This rule of thumb never failed in the first 40 years of the Ifo index's existence. However, in the aftermath of 9/11 the index slumped temporarily to then rise three times in a row without being followed by a turning point in GDP growth. This false signal for the very first time in its history prompted a debate about the indicator's reliability. Although the situation at the time should be seen as an exceptional event since an excessive downward correction was immediately followed by signs of equally unfounded euphoria, this case underlines that sometimes just when the degree of uncertainty about the future is at a peak, economic indicators are also subject to increased uncertainty. Ever since, the two subcomponents of the Ifo index have received greater attention, as the false signal in early 2002 emanated only from the business expectations component but not from its current business situation counterpart (chart 1). Although the correlation analysis in table 1 shows that the current business situation indicator has a three-month lag,[8] while the expectations index has a two-month lead, leads should not overrule reliability in times of great uncertainty. Kunkel (2003) goes as far as concluding that the three successive signals issued by the Ifo business climate index only indicate a turning point reliably when they are subsequently confirmed by three successive signals from the business situation indicator.

The *ZEW Indicator of Economic Sentiment* is a perfect foil to the Ifo Index since it consults precisely those experts in Germany who are not included in the Ifo sample, i.e. financial analysts. The Centre for European Economic Research (ZEW) has been surveying 350 German financial experts from the banking, insurance and major industrial sectors on a monthly basis since 1991. The ZEW indicator asks these experts for their opinion on the six-month prospects of the German economy. It also asks them for their assessment of key financial indicators such as interest rates, equity prices, oil prices and inflation, as well as for their views on economic trends in the euro area, Japan, the U.K. and the U.S.A.

As table 1 shows, the ZEW indicator has a lead of some five months on industrial production in the euro area, thereby enjoying a significant lead relative to the Ifo business expectations. It is also published a week or so before the Ifo index. Hüfner and Schröder (2002) show that the ZEW index is more suitable for medium-term forecasts of the German economy than

[8] *The significant lag of the business situation index conforms to mutual Granger causality (I↔R). The type of questions bearing on the current business situation make past industrial production trends a key determining factor for the indicator.*

the Ifo index of business expectations. The ZEW indicator is, however, generally more volatile than the Ifo index for the following reasons: its more limited sample size, its smaller questionnaire and the fact that its respondents react more strongly to general market sentiment and political or economic news and are not themselves involved in business life. Hüfner and Schröder (2002) show that the Ifo index of business expectations is more reliable for short-term forecasts (up to three months). Like the Ifo index, the ZEW indicator also falsely suggested an upturn in the aftermath of 9/11 (chart 1).

Whereas the high profile of both these indicators can be easily explained in view of Germany's size, the significance attached to the Belgian Business Survey – conducted on a monthly basis since 1954 by the Nationale Bank van België/the Banque Nationale de Belgique (NBB/BNB) among 6,000 senior managers of Belgian industry (manufacturing, construction, trade, corporate services) – requires a few words of explanation. Belgium is a small, open economy, with the euro area as its main trading partner. It specializes in intermediate goods and has a high share of small and medium-sized businesses. This is why economic changes in Belgium can be ascertained earlier on than for its trading partners in the euro area. As a result, turning points in the Belgian business cycle have a significant lead on those in the euro area. Accordingly, the Belgian business climate index also has a lead relative to GDP growth in the euro area (table 1; Vanhaelen et al., 2000). Furthermore, the popularity of the Belgian economic survey is based on the long historical time series and the internationally comparable methodology used for the European Commission's ESI.

To sum up, the great advantage of these sentiment indicators is that they have been in use for many years, their calculation method is simple, they are published early on and they are by and large not revised retrospectively. Past experience has shown that sometimes a longer lead comes at the expense of reliability in periods of great uncertainty owing to a future-oriented perspective. In practice, this means that economic signals issued by leading indicators should be substantiated by signals from indicators that are more closely related to the present.

### 2.3 Surveys of Forecasters

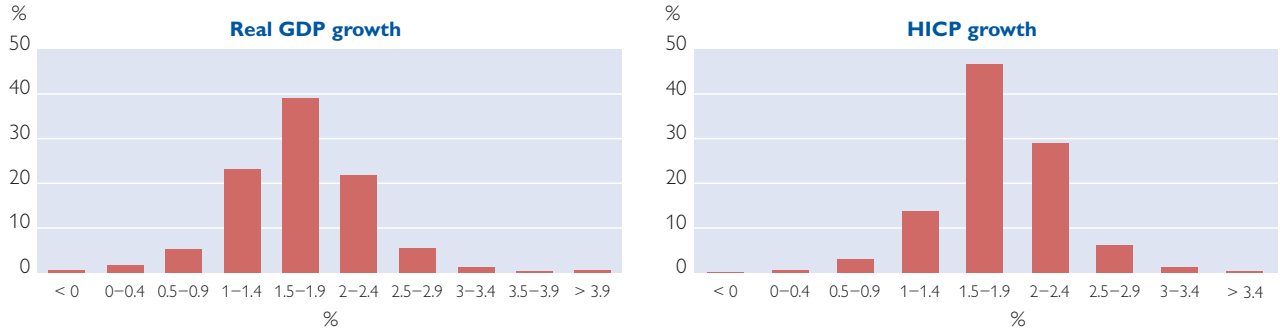
The last two indicators in this section focus on a completely different group of respondents. Unlike the previous indicators, for which consumers, businesses and financial analysts are interviewed, these indicators reflect the opinion of professional forecasters. The idea, which is also substantiated by the relevant literature (Batchelor, 2001; Blix et al., 2001; Zarnowitz, 1984), is that although individual forecasters may outperform the average of a group of forecasters in certain cases, an individual forecaster rarely outperforms *systematically*. A consensus forecast should thus minimize the risk associated with forecasts and provide a more reliable indicator.

Since 1989 *Consensus Economics*, a private British survey firm, has been conducting a monthly survey of 400 economists worldwide for their forecasts of GDP growth, inflation, the current account balance and interest rates in more than 70 countries. The forecasts are classified by individual country and regional group and released in four volumes (industrialized countries, Asia-Pacific, Latin America and Eastern Europe). Twice a year, Consensus Economics also undertakes

Chart 2

**Results of the Survey of Professional Forecasters in Q3/2005**

**Probability distribution of forecasts for 2006, share of respondents**




*Source: ECB.*

special surveys on long-term forecasts. In April 2005, for instance, long-term inflation expectations in the euro area (reference year: 2010) stood at 2.0%, as did potential growth in the euro area.

Since early 1999 the ECB has been conducting the *Survey of Professional Forecasters (SPF)*, which asks a panel of nearly 90 EU-based participants (financial institutions, research institutes, as well as employers' associations and trade unions) in quarterly intervals for their predictions for the euro area (Garcia, 2003). SPF forecasters are free to use a forecasting method of their choice (model forecasts, rule-of-thumb forecasts, subjective forecasts). Typically, about two-thirds of those polled will respond. The SPF questionnaire asks for expected GDP growth, inflation and employment. A distinctive feature of the SPF is that, unlike Consensus Economics, it does not only ask for point estimates but also for complete probability distributions. Accordingly, forecasters are to allocate subjective probabilities to intervals (i.e. a range of possible outcomes) with a width of 0.5 percentage point. This throws light on the risk spread around the most probable forecast value and highlights the uncertainty surrounding the forecast. The main results are published in the ECB's monthly bulletin. Once a year, long-term forecasts (five years ahead) are also collected. In the third quarter of 2005, for instance, long-term inflation expectations stood at 1.9%, potential growth at 2.1% and structural unemployment at 7.6% (reference year: 2010).

A basic problem with surveys of forecasters is that the expense and time involved to make the forecasts cannot be verified in practice. Although a certain continuity of participants is expected, model forecasts are likely to be made only at large intervals of time whereas a purely subjective update can be issued in between these periods. By way of surveys of interest rate forecasters, Bewley and Fiebig (2002) show that the latter tend to indicate values in the safe consensus range so as not to stick their neck out with forecasts that dramatically deviate from the mean. This would lead to a bias in the distribution toward the mean, resulting in an unsatisfactory picture of the risk profile. In this sense, it is good that SPF participants remain anonymous and that the survey is conducted only on a quarterly basis. This ensures that forecasters do not come under excessive pressure to participate in surveys every time – even if a current forecast update is not available.

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ZEW Indicator of Economic Sentiment: *www.zew.de*
Belgian Economic Survey: *www.nbb.be*
Consensus Forecasts: *www.consensuseconomics.com*
Survey of Professional Forecasters: *www.ecb.int/stats/prices/indic/forecast*

## 3 Composite Indicators

With the emergence of suitable statistical methods of calculation and correspondingly powerful computers, composite indicators, which sometimes reflect hundreds of data series, have experienced a boom in recent years. The basic approach is to obtain information from data that are considered to be leading indicators signaling economic trends, that respond quickly to economic fluctuations (e.g. overtime hours) or are themselves the cause of economic fluctuations (e.g. oil prices, interest rates and exchange rates). The aim is to extract the "essence" from all these data series and to filter out disruptive factors such as contradictory signals issued by individual indicators, measurement errors and calendar or base effects. This would make the movements of composite indicators more straightforward and easier to interpret. Likewise, economic fluctuations can have various causes and characteristics and be reflected in a variety of indicators.

A range of statistical methods is available to derive composite indicators from data series. These methods differ in terms of how the composite indicator's input series are selected, standardized (correction for different margins of fluctuation), synchronized (time lead or lag in the composite indicator's constituent series compared with the reference series), corrected for outliers/seasonal fluctuations and weighted, and also differ with regard to how the indicator is extracted. Of the statistical methods available, regression analysis and factor analysis have prevailed in practice. These two methods are roughly outlined here. In addition, there are many other methods (e.g. Markov switching model, state space model etc.), of which an overview can be found in Marcellino (2006).

For both regression analysis and factor analysis, the data series suitable for further testing initially need to be selected from a large number of potential candidates. The selection criteria include statistical (long time series, few revisions, low volatility, timely release) and economic factors (stable empirical correlation with the reference series and economic plausibility). In regression analysis, the definitive selection of series, their time lead or lag and the calculation of their weights are carried out by using *regression equations*. These weights are then used to calculate the economic indicator or directly predict growth based on the latest economic data. The weights and the selection of series are usually kept constant over a certain period of time but are subject to regular reviews. This is necessary, as composite indicators are only ex post efficient since the correlations between input series and reference series are subject to changes over time (Emerson and Hendry, 1996).

A far more sophisticated approach is factor analysis, which became popular in the 1990s. The *Dynamic Factor*

*Model* (Sargent and Sims, 1977; Geweke, 1977) was developed in the 1970s on the basis of the *Static Factor Model* (Burns and Mitchell, 1946). The development of the *Generalized Dynamic Factor Model* by a research group at the Centre for Economic Policy Research (Forni et al., 2000; Forni and Lippi, 1999; Forni and Reichlin, 1998) made this method also applicable to large data sets at the end of the 1990s. The basic idea is to decompose each data series on different variables and countries in a large panel of time series into two unobservable components, of which one is strongly correlated with the other (common component) while the other one is not correlated at all or correlated only weakly (idiosyncratic component). The common component is driven by a small number of common "factors" or shocks, which can be interpreted as a synthetic indicator. The weights are therefore derived from the properties of individual time series, within the entire gamut of constituent data series.

In Europe, factor analysis is used for two purposes. First, it offers a means of estimating on a timely basis data series that are only released with a large time lag and are subject to frequent and major revisions. The OeNB's short-term economic indicator (weblink: *www.oenb.at/de/geldp_volksw/prognosen/prognosen.jsp*), which has been published on a quarterly basis since 2003, is based on this method (Fenz et al., 2005; Schneider and Spitzer, 2004). Second, factor analysis offers a novel approach of estimating nonobservable time series such as the core inflation rate.

Many institutions such as the OECD have been publishing composite indicators for decades in order to assess economic trends early on. In the last few years, however, a number of new composite indicators of this type have been established. It is extremely difficult to compare the various approaches in terms of their informative quality and reliability, as their specific methods are very different. For instance, they refer to different reference series (GDP growth, growth in industrial production, prediction of turning points) in various presentations (annual, quarterly or annualized growth rate), have different leading properties and are released as an index value or explicitly as a growth forecast (point estimator or range). The large number of data series that are embedded in composite indicators comprise:

– *Survey data:* Consumer or industrial confidence, construction industry surveys, purchasing managers' index, financial investor surveys;
– *Real economic data:* Industrial production, building permits, labor market indicators, car sales, U.S. and Asian economic data;
– *Price data:* Consumer and producer price data, core inflation rate, oil and other commodity prices;
– *Financial data:* Interest rates, interest rate spread, exchange rates, equity indices, international interest rate gap;
– *Monetary aggregates:* M1, M2, M3.

The variables are included in the indicator calculation with a time lag/lead of varying length. Furthermore, many composite indicators also include data on errors in previous publications, which makes them into "self-correcting" indicators. Table 2 systematically presents these methodological differences. The box "Examples of Composite Indicators" (see p. 79), provides additional information on sampling, the calculation method, the input series and the relevant web links.

**Examples of Composite Indicators**

*The OECD has been publishing its Composite Leading Indicator (CLI), which is considered to be a good indicator for turning points since the 1980s (www.oecd.org/std/cli). It is now ascertained for 23 countries and 7 economic areas. The CLI for the euro area (weighted mean of individual countries' CLIs) has been published since 1999. The CLI's calculation includes 5 to 10 series per country. For the euro area, this involves 75 series in all. The weight of sentiment indicators is almost 50%. The CLI has a comparatively weak correlation with the industrial production reference series, but it has a relatively long lead of six months on average. However, the CLI is also only published six weeks after the end of each month.*

*Handelsblatt, Germany's financial daily, has been publishing an indicator for turning points in western Germany since 1992, for eastern Germany since 1995 and, finally, for the euro area since 1999 (www.handelsblatt.com). The Euro Area Economic Indicator is "self-correcting" and is improved regularly as a result, the lead could be extended from one quarter to up to three quarters, according to Handelsblatt sources. The reference parameter is seasonally adjusted, annualized growth of real GDP. The calculation includes five individual series, with the weight of sentiment indicators having been reduced from an initial 50% to a current 30%.*

*The Financial Times has been publishing the Euro Growth Indicator since 2000. This is calculated by the Euroframe group (nine research institutes from Germany, France, Italy, the United Kingdom, the Netherlands, Finland, Ireland and Austria), (www.euro-frame.org). The indicator aims to predict annual real GDP growth two quarters ahead of official statistics. The forecast considers eight data series in all, three of which are sentiment indicators surveyed by the European Commission. Factor analysis is used to extract the key factor from individual questions on industry, retail and construction. To arrive at a short-term forecast, these factors need to be predicted (Charpin et al., 2000).*

*The Centre for Economic Policy Research (CEPR) has been publishing the EuroCOIN Indicator for the euro area and for Germany, France, Italy, Spain, the Netherlands and Belgium since 2002 (www.cepr.org). Its reference parameter is seasonally adjusted, quarterly growth of real GDP. The EuroCOIN provides an estimate of the cyclical component of GDP, adjusted for measurement errors and idiosyncratic regional and sectoral shocks. The calculation, which is based on factor analysis, includes around 1,000 monthly series from the six largest countries in the euro area. These series are adjusted by filters for measurement errors and short-term fluctuations.*

*The European Commission has been publishing the Euro Area GDP Indicator for quarterly real GDP growth in the euro area since 2002. It is released for the two quarters ahead, for which neither preliminary GDP data nor flash estimates have been released, in the form of a range (95% confidence interval based on the standard error of the regression). The calculation includes four real variables and two financial data series (Grasman and Keereman, 2001). Furthermore, the European Commission has been publishing the Business Climate Indicator (BCI) for the euro area on a monthly basis since 2000. The common component and information specific to every individual question are extracted from five individual questions on industrial confidence (euro area aggregate) using factor analysis. Information on the driving forces behind the business cycle can be derived from the specific components. The weblink for the Euro Area GDP Indicator and the BCI is europa.eu.int/comm/economy_finance/indicators_en.htm.*

Studies by the publishing institutions that compare composite indicators with the reference series often show an impressive correspondance with very high correlation coefficients. However, it should not be forgotten that, at the time a new index value is being established, some input series are yet to be released and will only be added with a time lag, or must even be forecast and will be substituted at a later date. Or the input series will be revised retrospectively, e.g. industrial production. Composite indices are therefore often themselves subject to major revisions (unlike sentiment indicators, see section 2). The correlation of the first release of an index value can sometimes be well below that which is calculated ex post on the basis of the definitive value, and it is precisely the latest indicator values that

are associated with greater uncertainty. This problem is illustrated in the box "Forecast Revisions Due to New or Revised Input Data of the Euro Area GDP Indicator" (see p. 81). Diebold and Rudebusch (1991) carried out a formal analysis of the forecasting quality of a well-known U.S. composite indicator (*Census Bureau's Index of Leading Economic Indicators)*. Comparing the results of an *in-sample* forecast with those of the *out-of-sample* forecast for both final indicators and first releases shows that the inclusion of the composite index can reduce forecasting errors in the first two instances whereas this is only partly the case for the *out-of-sample* forecast based on the first releases. This proves that only the analysis of real-time data can throw light on the indicator quality of a composite index.

Many of the aforementioned indicators were created and flourished at the end of the last century. However, evidence after 9/11 has highlighted their limitations. At a time when opinions about the reactions of both markets and consumers to the attacks diverged, signals issued by composite indicators were paid particular attention. Many composite indicators issued false signals, just as the Ifo or ZEW confidence indicators did, primarily because of the high input weight attached to the confidence indicators. Since then, the composition of composite indicators has received greater attention in interpreting signals issued. Institutions that publish composite indicators have also taken action and, in several cases, reduced the weight of the constituent sentiment indicators.

In a summary article on composite indicators the ECB (2001) concludes are useful as an additional tool but cannot replace extensive coverage in economic analysis. The relationship between indicators and the business cycle is frequently not stable. This is why especially the latest indicator values have a limited informative quality. Although turning points (at least based on definitive indicator values) were often indicated early on in the past, this does not permit conclusions to be drawn about the exact date or feature of future turning points especially since the lengths of leads fluctuate strongly and false signals are issued. The added value of composite indicators for short-term forecasting is considered to be very limited.

To sum up, composite indicators offer an attractive tool for drawing conclusions from different, often divergent signals. However, the informative quality of the latest relevant index values can be reduced by input series that are included with a time lag and subject to revisions. In any case, composite indicators cannot replace the analyses of individual data series, as only these permit conclusions to be drawn about the driving forces behind a trend.

Table 2

**Comparison of Composite Indicators**

| | Publishig institution | Published since | Currently released for the following countries | Frequency of publication | Number of input series | Revisions[1]) | Reference series | Type of publication[2]) |
|---|---|---|---|---|---|---|---|---|
| OECD-CLI | OECD | 1980 | 23 OECD countries and 7 economic regions | monthly | 75 | J | Industrial production | I |
| Euro Area Economic Indicator | Handelsblatt | 1992 | Germany, euro area | monthly | 5 | J | Annualized annual GDP growth | P |
| Euro Growth Indicator | Euroframe | 2000 | Germany, euro area | monthly | 8 | J | Annual GDP growth | P |
| EuroCOIN | CEPR | 2002 | Euro area and 6 individual euro area countries | monthly | 1,000 | J | Quarterly GDP growth | Z |
| Euro Area GDP Indicator | European Commission | 2002 | Euro area | monthly | 6 | J | Quarterly GDP growth | B |
| BCI | European Commission | 2000 | Euro aera | monthly | 5 | N | Annual growth in industrial production | I |

*[1]) Y = systematically retrospective revisions due to delayed publication or revisions of the input series, N = no retrospective revisions of the input series (the BCI's historical index values may, however, be revised whenever the factor analysis is carried out again using the latest industrial confidence values).*

*[2]) I = publication as an index value, F = publication as a forecast for the following quarters, E = estimate of the cyclical component of GDP, R = publication as a range forecast for the following quarters.*

**Forecast Revisions Due to New or Revised Input Data of the Euro Area GDP Indicator**

*The European Commission's Euro Area GDP Indicator is published for the two quarters ahead, for which GDP growth data have yet to be released. It is updated on a monthly basis with the latest data available. For every quarter, there are therefore six sequentially published range estimates for real GDP quarterly growth.*

*A systematic record of the experience of the 14 quarters since the launch of the GDP indicator in January 2002 allows the following conclusions to be reached: The current range is 0.4 percentage point (until mid-2003: 0.3 percentage point) and is therefore relatively wide. The range shifted by as much as 0.5 percentage point within the six publications for a specific quarter. Whereas the relevant last two publications of the range include subsequent actual GDP growth in 86% of cases, this was true for only 55% of cases on average for the first three publications and this despite the relatively broad range. All in all, the Euro Area GDP Indicator's accuracy should be seen as being only moderate – especially for the indicator's initial releases.*

## 4 Peculiarities

This section presents a few somewhat peculiar indicators that are repeatedly referred to in the media as leading indicators. An example of this is the R-Word Indicator, which uses a U.S. model to measure the frequency with which the word "recession" appears in the financial media. According to a study by Bayerische Hypo-Vereinsbank AG based on articles in Handelsblatt and Frankfurter Allgemeine Zeitung, this measure is also a useful leading indicator for signaling an imminent downturn in Germany. The R-Word Indicator delivers a correct signal in two out of three cases. However, the Indicator's causality is not entirely clear, as writing about a recession can in itself push recessions.

Another indicator is based on the observation that growing consumption and investment are reflected early on in the freight costs incurred by the transportation of raw materials and intermediate goods. The Baltic Dry Index (BDI), an index of freight costs on the world's most important shipping routes, is considered to be a good leading indicator not only for global indus-

trial demand but also for German exports. The BDI already indicated sharp swings to an extent never seen before when the raw material-intensive economic boom in China and its repercussions for the global economy only just began to be discussed in the media. The BDI is calculated by the Baltic Exchange in London, a global freight market place. Similarly, indicators of flight prices could also be mentioned here.

A final example is the Luxury Goods Index, which is a leading indicator of the global economic cycle based on the equity prices of leading luxury goods manufacturers worldwide. The underlying idea is that the manufacture and sales of luxury goods are particularly sensitive to economic developments. However, a certain qualification needs to be made. This indicator cannot accurately predict the strength of an upturn, as equity prices can be influenced by many factors that are not necessarily cyclical. Hypo-Vereinsbank nonetheless uses such a luxury goods indicator for its economic forecasts for Germany. The indicator's lead is about six months, according to bank sources. Of particular interest is the fact that the Luxury Goods Index – unlike the Ifo or ZEW Index – did not issue a false signal in 2002, indicating an upturn.

## 5 Economic Indicators for the New EU Member States

The ten countries that joined the EU on May 1, 2004, were faced with new data provision requirements upon accession. In many cases, the preparatory groundwork had been carried out in the runup to EU accession. This led to the timely release of comparable data. In other cases, governments were granted a period of grace, so that satisfactory data series can only be expected in the years to come. This fragmentary availability of data and/or inavailability of qualitatively satisfactory data is tapping interest in alternative economic indicators. In countries where the economy is still undergoing a period of radical structural change, growth is also particularly difficult to forecast.

This section looks at the availability of short-term economic indicators for the new EU Member States. Although certain national indicators look back to a longer history, these are not examined here. Instead, an overview is presented on which of the established indicators for the EU cover the new EU Member States in conformity with a standardized methodology. After all, a few new EU Member States will soon join the euro area. However, only a handful of the established institutions that have long been determining leading indicators for European countries have so far focused on this region. Even the CLI calculated by the OECD, of which Hungary, Poland, the Czech Republic and the Slovak Republic are members, has yet to extend its scope to this group of countries. Similarly, the PMI has so far been surveying only Polish and Czech data using a comparable methodology.

Of the best-known indicators, only two can be accordingly cited as positive examples: the European Commission's confidence indicator and the Consensus forecast. Consensus Economics has been surveying more than 140 forecasters in Central and Eastern Europe every two months since May 1998 and deriving the mean values of 19 individual countries. Consensus Economics therefore surveys all the new EU Member States (except for Malta) and countries to be joining the EU shortly such as Bulgaria and Romania, as well as candidate countries such as

Croatia and Turkey, not to mention Russia and some of the former Soviet Federal Republics.

The European Commission's survey on economic confidence also provides full coverage of all EU Member States (except for Malta). The new EU Member States have been participating in these surveys not only since May 2004 – some of them have been doing so since the mid-1990s. Bulgaria and Romania have also been taking part in the survey for years. On the basis of these data gathered by the European Commission, the question is examined as to whether sentiment indicators in the new EU Member States have a similar reliability and forecasting quality as indicators published for countries that have been covered for a longer period of time. After all, a certain experience with this type of survey is required by both forecasting institutions and respondents. Likewise, the population and businesses could lack the experience of assessing the current and future development of their economy correctly. As regards the following analysis, however, it should be emphasized from the outset that, owing to the recent availability of data in the new EU Member States (data on growth in industrial production has generally been released only from 1999 onward), the results should be interpreted with caution.

The results presented in table 1 help select the ESI's subcomponents for the purposes of further analysis. Those ESI components that are the most heavily weighted in the ESI composite indicator are also found to have the highest correlation coefficients: industry, consumers and the service sector. With the exception of the consumer confidence indicator, these indicators also have a relatively small lag, which means that they can be expected to provide added value. Production expectations in industry, a subcomponent of the industrial confidence indicator, are highly related and show a slight lead. The indicators in the construction and retail sectors, which each have a weight of only 5% in the ESI composite indicator, show both a very small correlation and long lags and do not signal some turning points in industrial production at all. The analysis below therefore includes the ESI, industrial confidence, consumer confidence and production expectations in industry. The service sector is not included, as survey data in the service sector have only been released for the new EU Member States since 2002 – a fact that does not ensure reliable analysis.

A panel data regression of growth in seasonally adjusted industrial production on sentiment indicators is now carried out, using these data for each of the nine new EU Member States (NMS) surveyed and for the remaining 15 long-standing EU Member States (EU-15). The model

$$(IP_{i,t} - IP_{i,t-1}/IP_{i,t-1} = \alpha_i + \beta I_{i,t+j} + \epsilon_{i,t},$$

is specifically estimated, where $\alpha_i$ is a country-specific constant and $j$ a whole number at an interval of $\pm 12$ that is calculated as the degree of lead or lag for which the fit of the model (expressed by the adjusted correlation coefficient $R^2_{adj}$) is maximized. In table 3, $R^2_{adj}$ is marked for each indicator in the first line, as is the degree of lead or lag of the indicator series in brackets for which the fit of the model is maximized. In the second line, the estimated coefficient is indicated. For the EU-15, the table presents the results for both the entire sample and the sample restricted to the 1999 to 2005 period in order to take account of the fact that confidence indicators and indus-

trial production data have been released for most NMS only from this date onward.

Finally, the forecasting quality is evaluated for each indicator and for each of the samples, whereby it is specifically analyzed what added value sentiment indicators can offer for forecasts of growth in industrial production. The methodology used is the *out-of-sample* approach outlined in section 2. For a specific start month a few years following the start of the relevant sample (long sample: January 1995, short sample: January 2002), a panel model, which includes the previous values of both industrial production growth and the indicator with different lag structures, is estimated. The optimal model is the one for which the goodness of fit ($R^2_{adj}$) is maximized. This model is used to forecast growth in industrial production with a forecast horizon of one, three, six and twelve months. The sample is then extended by a month and the exercise recommences. This procedure is repeated until the full-sample estimate is reached. Whereas the long sample generates 123 forecasts (with a horizon of one, three, six and twelve months, respectively), the short sample generates only 39 forecasts.

By comparing these forecast values with the realized values, the root mean squared error (RMSE) can be separately calculated for each forecast horizon and each country, with lower RMSE values signifying better forecasting quality. For each forecast horizon, the average RMSE across each group of countries can be compared with the corresponding RMSE of a benchmark model. A simple panel autoregressive process, which forecasts growth in industrial production based exclusively on its own previous values, is used here as a benchmark. For each forecast horizon (denoted in this instance as $\gamma-1$, $\gamma-3$ etc.), the improvement in the RMSE between the indicator model and the benchmark model in percentage terms is thus a measure of the added value sentiment indicators offer for forecasting. This figure is comparable between groups of countries and individual indicators.[9]

Table 3 presents interesting information on indicator properties, their stability over time and a comparison of the groups of countries. The degree of lead or lag for which the goodness of fit is maximized confirms the conclusion drawn from table 1, according to which only the production expectations for the EU-15 are actually a leading indicator. However, even if the ESI and the industrial confidence indicator are coincident or lagging slightly, they can provide additional information on account of their date of publication, which is six weeks earlier. By contrast, the quality of the consumer confidence indicator is heavily dependent on the sample, which mostly has a strong lag. It is clear from the goodness of fit that the degree of fit is maximized for industrial confidence, followed by ESI and production expectations. However, which indicator is actually best suited to forecasting growth in industrial production can be assessed only on the basis of the aforementioned comparison of forecasting quality with that of its benchmark model. This study confirms across all the samples

[9] *Diebold and Mariano (1995) propose a test to check whether RMSE values actually differ from each other significantly. However, the benefit of this test is doubtful since, in practice, one always falls back on the model with the lower RMSE – even for non-significant differences. See Kunst (2003) for a critical view of tests investigating relative forecasting quality.*

Table 3

**Regression Comparison of EU-15 and New EU Member States (NMS)**

| | Coefficient | EU-15 (1985) | EU-15 (1999) | NMS (1999) |
|---|---|---|---|---|
| ESI | $R^2$adj[1]) | 0.31 (+1) | 0.27 (0) | 0.26 (0) |
| | Coefficient[2]) | 0.55* | 0.52* | 0.52* |
| | γ-1/ γ-3/ γ-6/ γ-12[3]) | 12.5 / 12.8 / 14.0 / 14.7 | 3.4 / 10.0 / 11.2 / 5.0 | –1.4 / 0.7 / 2.1 / 11.2 |
| Manufacturing | $R^2$adj[1]) | 0.34 (+1) | 0.31 (0) | 0.30 (0) |
| | Coefficient[2]) | 0.58* | 0.56* | 0.55* |
| | γ-1/ γ-3/ γ-6/ γ-12[3]) | 15.3 / 16.3 / 17.4 / 18.4 | 10.2 / 11.1 / 11.8 / 10.1 | 2.5 / 5.5 / 5.2 / 10.9 |
| Consumer | $R^2$adj[1]) | 0.12 (+3) | 0.12 (–1) | 0.08 (+7) |
| | Coefficient[2]) | 0.35* | 0.36* | 0.30* |
| | γ-1/ γ-3/ γ-6/ γ-12[3]) | 4.8 /–0.5 / 0.8 / 2.9 | –5.3 /–1.6 / 0.6 /–6.1 | –5.9 /–12.9 /–12.6 /–4.1 |
| Production expectations | $R^2$adj[1]) | 0.30 (–1) | 0.25 (–1) | 0.10 (0) |
| | Coefficient[2]) | 0.56* | 0.50* | 0.34* |
| | γ-1/ γ-3/ γ-6/ γ-12[3]) | 9.6 / 11.0 / 12.1 / 13.5 | 0.4 / 7.0 / 7.9 / 6.0 | –2.5 /–5.8 /–1.1 / 5.0 |

*[1]) Maximum coefficient of determination of the panel regression of growth in industrial production on the indicator. The degree of the time lead/lag (in months) of the indicator relative to the reference series, for which the maximum coefficient of determination is reached, is indicated in brackets. A negative value implies a time lead of the indicator. All series are standardized in a way such that they have mean 0 and standard deviation 1.*

*[2]) * represents significance at the 1% level.*

*[3]) Improvement of the RMSE of a forecast model including the relevant indicator compared with the RMSE of the panel autoregressive process, in percentage terms, for each forecast horizon of one, three, six and twelve months. A negative value stands for a forecast model that is outperformed by the panel autoregressive model. Start month for the forecast analysis is for the long sample January 1995 and for the short sample January 2002.*

that the forecasting quality of industrial confidence indicators for the forecast outstrips that of ESI production expectations rank in third place.[10] Forecasts based on consumer confidence perform worst and are frequently outperformed even by simple autoregressive forecasts.

The two samples for the EU-15 illustrate the extent to which indicator properties have changed over time. Table 3 shows that, for the first two indicators, the lag has disappeared in the shorter sample. Likewise, the consumer confidence indicator now has a slight lead. This could suggest an improvement in indicator properties. For the shorter sample, however, the coefficient of determination tends to be lower. This outcome is shown in chart 3, in which the coefficient of determination for the panel regression of growth in industrial production on the coincident ESI value is shown in a moving five-year window. According to this, $R^2_{adj}$ attained a trough in the five-year window from 1994 to 1998 and stagnated thereafter for two and half years at a low level before subsequently stabilizing again at a higher level. Table 3 also shows that the added forecasting value of the indicators is higher in the longer sample. This is likely to be connected with the fact that economic fluctuations in 2002 and 2003 were historically particularly poorly signaled by indicators in view of 9/11 and that this period is prominently represented in the short sample. The aforementioned pecking order of the indicators according to their forecasting quality remains stable over time.

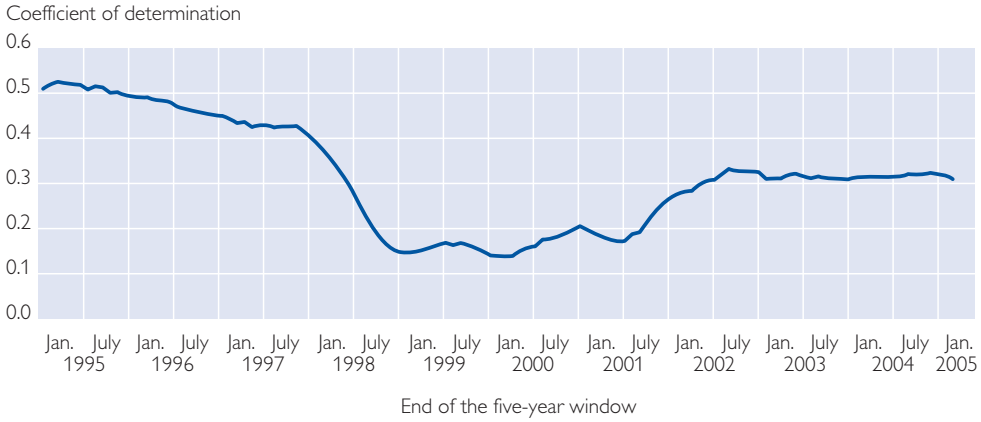
The comparison of both groups of countries (EU-15 and NMS) with a comparable sample length shows that coefficients and coefficients of deter-

[10] *Although these and the following statements apply to forecasts with a horizon of one, three and six months, they do not always hold for the twelve-month forecast. However, the forecasting errors for these long-term forecasts are very high. This could be connected with seasonal patterns that have not been entirely remedied or the fact that indicators only contain information for a shorter period ahead.*

Chart 3

**Panel Regression in a Moving Five-Year Window for the EU-15**

**Adjusted coefficient of determination for the panel regression of industrial production growth on ESI**




*Source: European Commission, Eurostat, OeNB.*

mination are for the most part not significantly different, but that the leading properties in the NMS are worse for production expectations and that the lag is longer for consumer confidence. In just the same way, the added value of the indicators is lower. Frequently, forecasts are even outperformed by the simple panel autoregressive model. However, the pecking order of the individual indicators is also maintained in the NMS.

An explanation for the lower added value of NMS indicators could be that both respondents and forecasting institutions in the NMS still partly lack experience with such surveys owing to the indicators' more recent history. This may reflect initial technical surveying and processing difficulties, as well as the fact that both people and businesses in the NMS still lack experience in assessing the current and future development of their economy owing to the radical transition in the past 15 years. In addition, many of the forecasting institutions emerged from former government institutions and, in many cases, are still not considered as fully independent of government influence. In contrast, the shorter lead of production expectations could be due to the fact that, in the NMS, businesses that are highly specialized in exporting intermediate products to their western European parent companies respond particularly quickly and flexibly to changes in demand conditions. As a result, the lead is shorter than is the case for traditional trade cooperations.

To sum up, the results indicate that the industrial confidence indicator throughout has the highest forecasting quality for growth in industrial production, followed by ESI. In both cases, the indicators are coincident or slightly lagged but do provide added value on account of their earlier date of release. The analysis of the regional comparison should be interpreted with caution in the NMS due to their relatively recent history of data gathering. Whereas statements on the pecking order of indicator properties also apply to this group of countries, the forecast analysis suggests that the added value of NMS indicator forecasting is not equal to that of countries that have been constructing sentiment indicators for many years.

## 6 Summary

This contribution provides an overview of the most common short-term indicators of economic development in the euro area. First, indicators are presented that are compiled from (international or national) surveys of businesses, households, financial analysts and forecasters. The advantages of indicators obtained from such surveys are their early date of release, their monthly basis of publication, the fact that they are largely not subject to revisions, and their provision of detailed information on each sector. Most survey indicators are well-established and are a popular component of economic analysis due to their simple structure. Second, a broad spectrum of composite indicators, which are calculated by combining a variety of measures into a single indicator with the help of regression and factor analysis, was presented. They offer an attractive tool for drawing conclusions from different, often divergent signals. However, their limitation lies in the substantial revisions to which they are sometimes subject due to input series being included with time lags. As a result, the informative value of the latest relevant signals is limited.

Even the most reliable economic indicators, however, can only be interpreted as constituent elements of comprehensive economic analyses. After all, post-9/11 experience has shown not least that economic indicators sometimes issue false signals at the very moment when uncertainty about future economic development is at a peak. Recently, the debate about whether the service sector, which is steadily growing in weight, is reducing the informative value of leading indicators, is becoming increasingly vehement. As a result, indicators, which are primarily based on manufacturing industry data, could lose their representativeness. The selection of leading indicators should take account of their lead quality, date of publication, the occurrence of retrospective revisions to which they are subject and the breadth of their economic basis.

Only a handful of these economic indicators also survey the countries that have become EU Member States since May 2004. Only Consensus Economics and the European Commission's Economic Sentiment Indicator offer full coverage. This is not least likely to be due to the fact that, in many of these countries, experienced forecasting institutions that could conduct these surveys are still scarce. This study also shows that the NMS survey results released by the European Commission are not fully comparable with those of the EU-15. For instance, the additional forecasting quality of sentiment indicators in the NMS is lower, and some of the lead properties differ between the NMS and the EU-15. This could have something to do with the NMS' relatively recent experience with business and consumer surveys. After all, forecasting institutions and respondents require experience in compiling reliable and stable indicators. This is what makes the appeal to established institutions to extend their surveys early on to cover the NMS – of which a few could soon be joining the euro area – all the more important.

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