PART THREE:
INTERPRETATION AND DISSEMINATION OF
SURVEY RESULTS

3.1. - Interpretation of Survey results

Indicators developed from business-survey results using very simple procedures provide timely signals on activity, employment, and other economic aggregates of crucial importance to short-term economic analysis.

In this section we offer some examples of such indicators and, more generally, "internal" and "external" guidelines for interpreting the Industry Survey results.

The "internal" guidelines consist in displaying the results in the most legible form possible (§3.1.1) and, beyond that, in the most summary form possible (§3.1.2 and 3.1.3).

The "external" guidelines allow the indicators to be interpreted with reference to the aggregate on which the Survey is designed to provide leading information: industrial production and changes in workforce size (§3.1.4).

3.1.1. - Summary of surveyed enterprises' responses to each question: balances of opinion

As we saw in Part 2 (§2.4.3), for each qualitative question asked, the Industry Survey directly supplies a distribution of enterprises into three groups: (1) enterprises giving a positive response (increasing, above normal), (2) enterprises giving an "intermediate" response (unchanged, normal), and (3) enterprises giving a negative response (decreasing, below normal). However, the simultaneous analysis of the changes in three percentages that sum to 100% is fairly inconvenient, whatever the visual representation chosen. This point is illustrated by Charts 1 and 2, taking the example of responses to the question on the change in past production.

Chart 1: Change in past production (% of responses)
"Curve" display
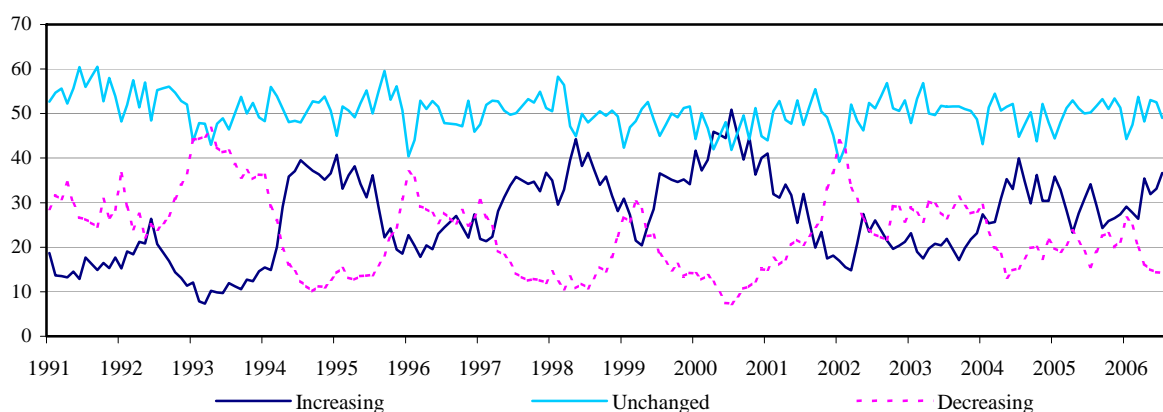
Chart 2: Change in past production (% of responses)
"Bar " display
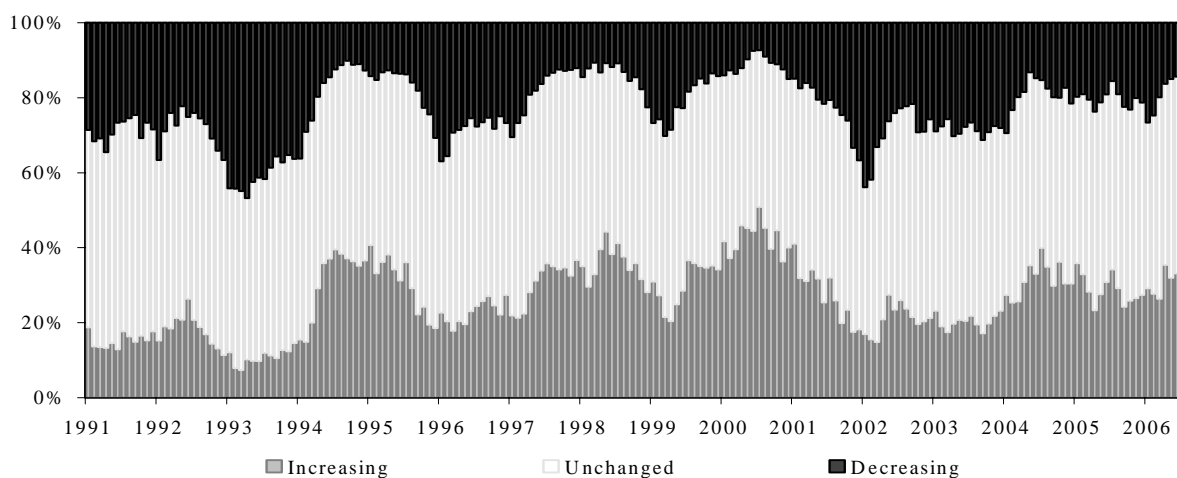
Experience shows that we can simply focus—with a limited loss of information—on the algebraic difference between the two percentages concerning the diametrically opposing opinions (increase and decrease, above normal and below normal). This difference—i.e., the balance of opinion—is more legible and offers a fairly clear reflection of business cycles (see Chart 3 and §3.1.3).

Moreover, in the case of France, balances of opinion prove to be just as effective in forecasting terms as alternative indicators whose preparation is more complex, involving the aggregation of estimated production growth rates for each enterprise on the basis of their individual responses[1].

Chart 3: Change in past production (balance of opinion, *SA*)
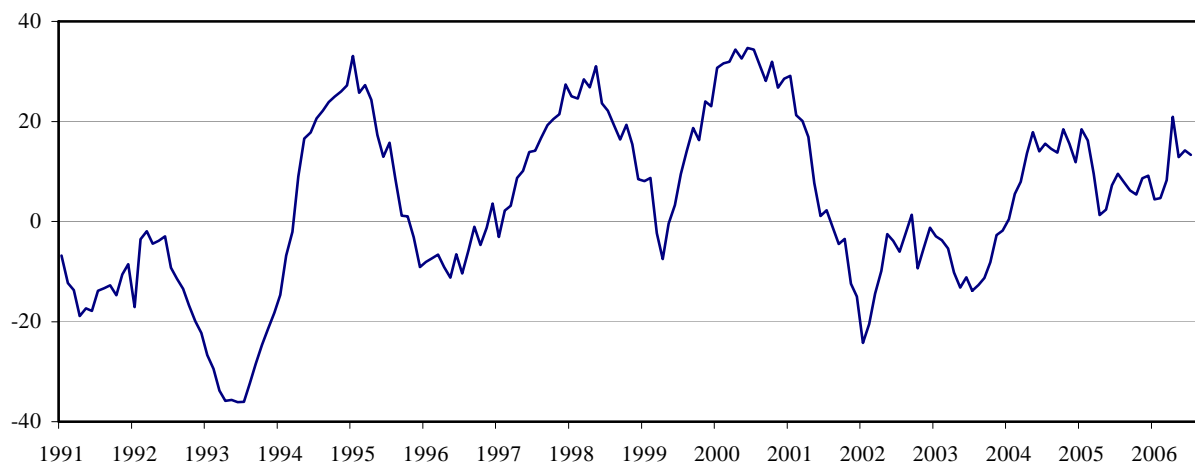
Let us note that the balance of opinion should not be directly interpreted as beeing representative of the growth rate of the variable. In themselves, balances of opinion are abstract numbers: they can only be interpreted by referring to earlier balances or to their long-term averages. The only meaningful way to interpret balances of

---

[1] See Mitchell, Smith, and Weale (2002) on the construction of alternative indicators, and Biau, Erkel-Rousse, and Ferrari (2006) for the method's application to French Industry Survey data.

opinion is thus to track changes in responses over several Surveys. Correlatively, the interpretation of the balances must take account of the factors to which industrialists refer when responding:

- Some business owners view their turnover as satisfactory when it is increasing faster than a given rate. The qualitative indicator may thus be negative for positive production growth rates. More generally, the absolute value of balances may be affected by such "subjective biases", which must be reduced by means of an appropriate method for reading the balances when interpreting the results.

- Some industrialists fail to eliminate seasonal variations, hence the frequent need to observe seasonally adjusted (SA) series in order to assess the trends correctly (see §2.5).

Lastly, the information yielded by a change in an opinion balance is all the more reliable as the percentages of enterprises having responded positively (increasing, above normal) or negatively (decreasing, below normal) are sufficiently high. We must be cautious in interpreting a balance when the percentage of "intermediate" responses (unchanged, normal) is unusually large.

3.1.2. - A synthetic indicator of the information contained in each monthly Survey: the common factor

To summarise the information contained in the Survey by means of a one-dimensional statistic, we can construct a "synthetic" indicator of the business climate—called "common factor"—from the six main balances of the Industry Survey[2], which concern:

- change in past production (*CPP*)
- change in expected production (*CEP*)
- opinion on stock levels (*OSL*)
- total order books (*TOB*)
- export order books (*EOB*)
- general business outlook in industry (*GBOI*).

The principle of the common factor consists in tracking the common change in these balances, allowing a more convenient overall reading of the Survey. The changes in the common factor are thus totally in step with the changes in the Survey itself.

The common factor is estimated from the following statistical model:

$$y_{it} = \lambda_i \; F_t + u_{it}$$

where $(y_{it})_{i=1,...,6}$ represents the vector of the six balances listed above pertaining to the Survey conducted in month t, F_t the common factor, $(\lambda_i)_{i=1,...,6}$ the vector of the unknown parameters, and $(u_{it})_{i=1,...,6}$ the residuals vector.

The model expresses the notion that each balance y_{it} may be decomposed into two orthogonal terms:

- a term whose change is driven by a common dynamic ($\lambda_i \; F_t$),
- a residual term (u_{it}),commonly called "specific component" as it reflects the portion of the balance y_{it} whose dynamic is not common to the six balances.

---

[2] See Doz and Lenglart (1999).

The model is estimated on monthly data using a maximum-likelihood method. The difficulty consists in estimating the unknown parameters $(\lambda_i)_{i=1,\ldots,6}$ and the common factor F_t. The result of the estimation turns out to be very similar to the one obtained with a classical factor analysis. More important, the common factor obtained from this estimation is very similar to the result that would be obtained by estimating a more complex but more rigorous model using the Kalman filter[3].

If we compare the common factor for the industrial business climate with each of its components (balances of opinion for change in past production, change in expected production, stock level, total order books, export order books, and general business outlook in industry), we can isolate the share of information specifically contributed by each balance of opinion. In consequence, the synthetic indicator offers a complete interpretation grid for the Survey.

Chart 4: Comparison between each constituent balance of the common factor (light-coloured curves) and its component driven by common dynamic ($\lambda_i \ F_t$)

Change in past production (*CPP*)

Change in expected production (*CEP*)

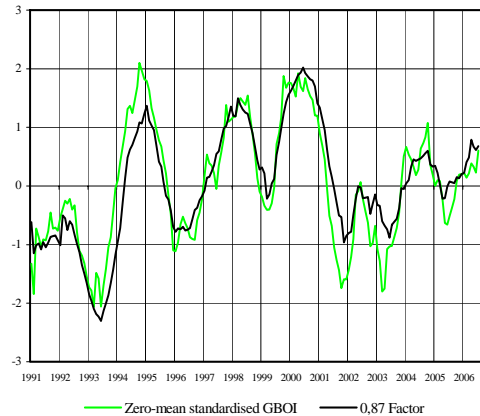**Opinion on stock levels (*OSL*)**

Total order books (*TOB*)

---
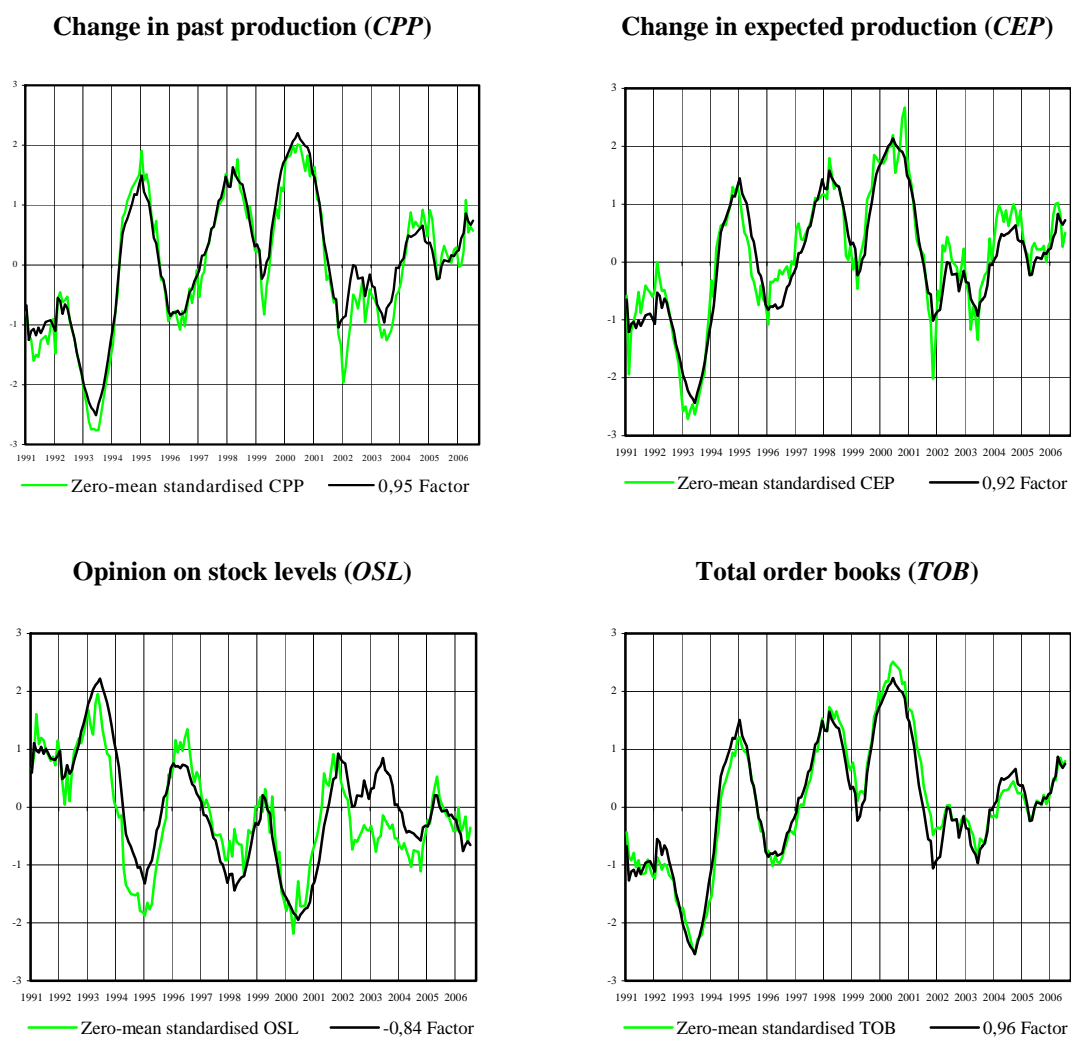
[3] Hamilton (1991) and Kim and Nelson (1999) describe the application of the Kalman filter to time series, illustrated with many concrete examples.

Export order books (*EOB*)
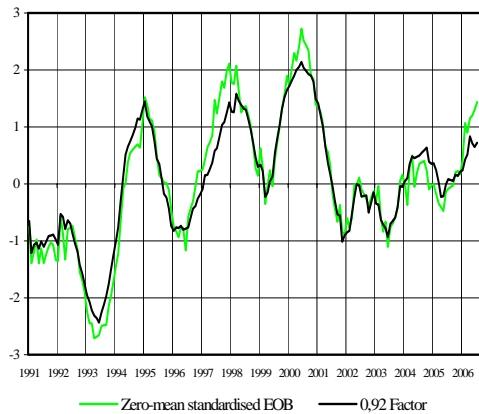
General business outlook in industry (*GBOI*)

Moreover, the monthly common factors for industry and the service sector[4] reflect, to some extent, similar economic cycles, but the service-sector common factor somewhat attenuates the amplitude of certain fluctuations. For example, services seem to have weathered the end-1998 turbulence more successfully than the goods-producing industries[5].

<u>Chart 5</u>: Common factors in industry and services
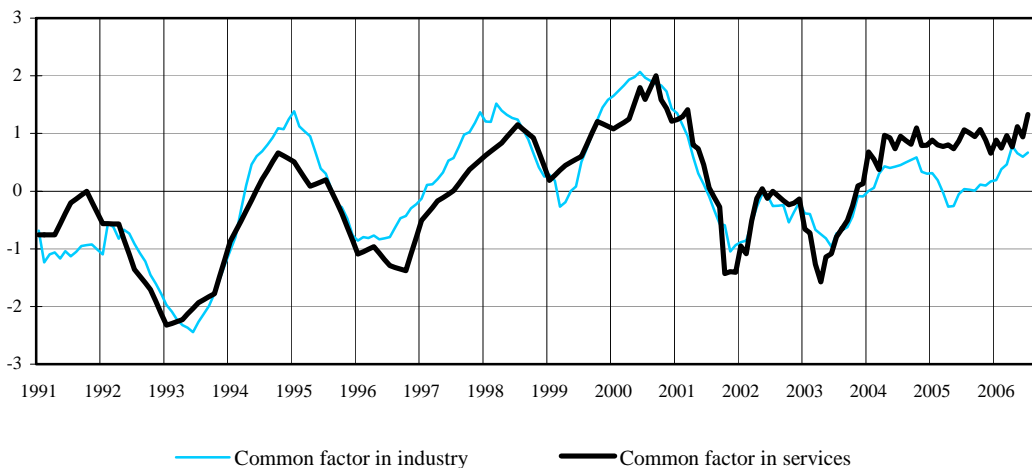
3.1.3. - *Capturing turning-points in the business cycle thanks to the Industry Survey*

Economic analysts have a battery of indicators at their disposal, and track their variations at regular intervals. Whenever a new figure is released, analysts begin by assessing whether each figure brings good news about the business cycle or not. They make their judgement by comparing the new known value with the previously expected value. According to whether the reality is better or worse than what analysts had imagined, the new information provided by the indicator is perceived as a positive or negative signal. Next, analysts examine the full set of signals at their disposal, and weight their opinion according to each variable's track record in reflecting cyclical phases. Depending on how consistent that track record is, and also depending on their degree

---

[4] For the construction of the monthly aggregate indicator for the service industries, see Cornec and Deperraz (2005).

[5] For more details on cyclical differentials between sectors, see Bouton and Erkel-Rousse (2003).

of trust in their assessment of the economic situation in the previous period, analysts will reconsider their opinion on the current period or not. The approach set out above is comparable to analysts' "natural" procedures when seeking to prepare an assessment of economic activity. However, this descriptive approach has a drawback—a major one, in the analysts' view: it rests on intrinsically subjective criteria, drawing on an expertise that is hard to transmit and that cannot be effectively tested on past trends.

As a result, economic analysts tend to be wary of such a priori judgements and to prefer statistical methods that insure the long-term robustness and reproducibility of the results of their analysis. These quantitative methods are constructed in a rigorous mathematical framework that makes it possible, by means of objective criteria, to measure the errors committed and hence to gauge the reliability of the tools used. In this section, we intend, as it were, to rehabilitate the initial approach by formalising it in such a way as to associate it with a precisely defined statistical index. The latter is constructed in two stages, largely inspired by the foregoing description.

Having initially determined a set of indicators to be monitored, we enter the first stage of production. This consists in coding the data, since we turn the set of quantitative variables into a set of qualitative variables. To be more accurate, we describe the change in each variable at each successive date as favourable (code +1) or unfavourable (code -1). To do this, we process each series separately and model its time dynamics, as observed until now. This modelling exercise supplies a predicted value for the variable of study in the following period. The forecast is "optimal" in that it takes into account—within the framework of the chosen modelling method— the total information provided by the indicator's past behaviour. At the following date, we compare the expected value and the value actually observed. From the difference between the two, we can measure the innovation contained in the new value, i.e., the share of truly new—because unpredictable—information just supplied by the indicator. Depending on whether the innovation is positive or negative, we code the variable +1 or -1. In so doing, we qualify as favourable or unfavourable the nature of the cyclical surprise occurring at each date when we discover the indicator. This set of simultaneous signals, refreshed in each successive period, provide the material for the second stage of our work, when we hope to observe, through the signals' consistency, the nature of the cyclical phase experienced.

After the coding stage, therefore, comes the information-aggregation stage, whose purpose is to qualify the current cyclical phase. To do this, we postulate the existence of a qualitative variable—called a hidden variable, as it is not directly observed—which can exhibit two states corresponding to the two possible cyclical phases (favourable / unfavourable). The link between this variable of interest and the set of signals perceived at each successive date is formalised as follows. First, we regard this link not as univocal but as probabilistic. In other words, a signal may be positive or negative, whatever the period examined, but with different odds of occurrence: we are more likely to observe positive signs in a favourable period and negative signs in an unfavourable period. This set of probabilities—called conditional because they are tied to the current cyclical phase—also depends on the indicator considered. We can thus explain a potential disparity of intensity in the measurement of the link between the hidden variable and each of the observed variables: the closer the indicator matches the changes in the economic cycle, the more intense the link and the greater the contrast in the related set of probabilities. Second, past experience teaches us that a cyclical phase displays a certain persistence. Accordingly, we choose to assign this characteristic to the variable of interest, again in probabilistic form: economic conditions at a given date are favourable or not, so there is always a possibility that they may switch at the following date, but the odds of this are low. These probabilities of shifts from one cyclical phase to another are called transition probabilities. In consequence, the greater the certainty regarding economic conditions at a given moment, the more signals perceived as contrary to those conditions will be required to reconsider the assessment of the current economic situation. The framework we have described is now sufficiently precise to enable us, working with the sequence of signals constructed in the previous coding stage, to calculate at each date—taking into account only the signals observed up to that date—the probability that the hidden variable of interest will occupy one of the two states, i.e., the odds that the cycle will be in an ascending or descending phase. Thus, it is at the moment when this probability undergoes an abrupt shift that we hope to be able to identify a cyclical turning point.

The model just described[6] has been estimated on data from the monthly business survey of French industry. Six balances of opinion are used as components of the synthetic indicator: (1) and (2) enterprises' responses on past and future changes in their own production, (3) state of total demand and order books, (4) state of export

---

[6] For its theoretical aspects, see Gregoir and Lenglart (2000).

demand and order books, (5) stock levels, and (6) general business outlook in industry. The results obtained are plotted on a graph showing, at each date, the difference between the probability that the hidden variable will be favourable and the probability that it will not be. The curve therefore fluctuates between -1 and +1. We can interpret it as follows. When the point is very close to +1 (or -1), the cyclical phase is deemed to be clearly favourable (or unfavourable); economic activity is in a period of sharp acceleration (or sharp deceleration, or even contraction). When the point is close to 0, the probabilities that the phase is either favourable or unfavourable tend to converge. These should be viewed as stabilisation moments, i.e., moments when the pace of activity returns to its long-term average, and when the signals received are very varied and so indicate no clearcut upward or downward movement. The economy, so to speak, performs a soft landing or soft takeoff, depending on whether the previous period experienced an acceleration or a deceleration (see Chart 6).

Chart 6: Turning-point indicator
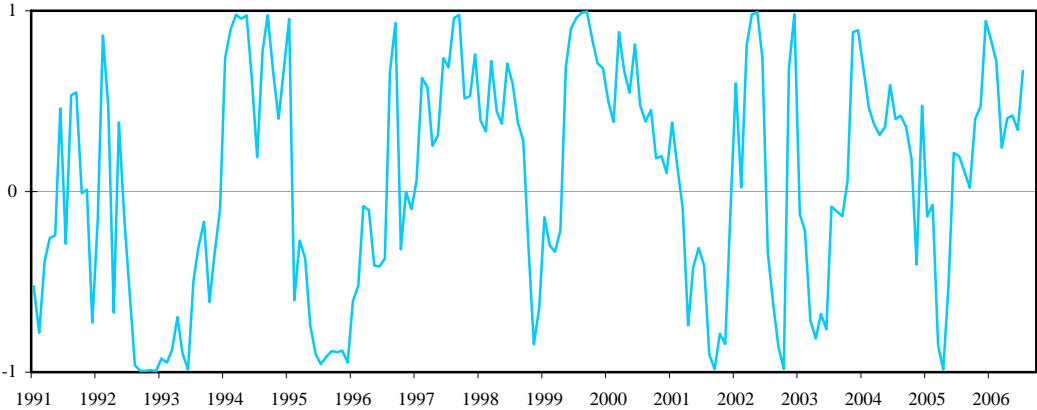
3.1.4. - The Industry Survey as a timely indicator for many macroeconomic aggregates

One of the main goals of the Industry Survey is to collect timely information, particularly on manufacturing production. Hence the importance of verifying the existence of a high correlation between the Survey's main results and this economic aggregate.

This is effectively illustrated by Charts 7 and 8. In particular, we find that the Survey's synthetic indicator—the common factor—very accurately captures the major changes in manufacturing production. Charts 7 and 8 also suggest that we should interpret the synthetic indicator as a source of information on the rate of change in production rather than on the absolute level of production.

Chart 7: Manufacturing production (quarter-on-quarter change)
and common factor in industry

Common factor in industry (left scale) — Qoq change in manufacturing industry (in %, right scale)
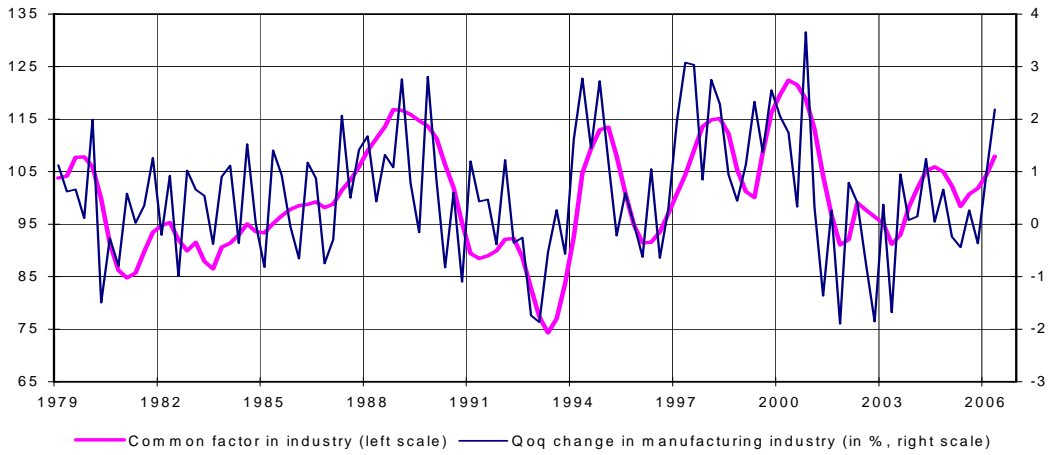
Chart 8: Manufacturing production (year-on-year change)
and common factor in industry

Common factor in industry (left scale) — Yoy change in manufacturing production (in %, right scale)
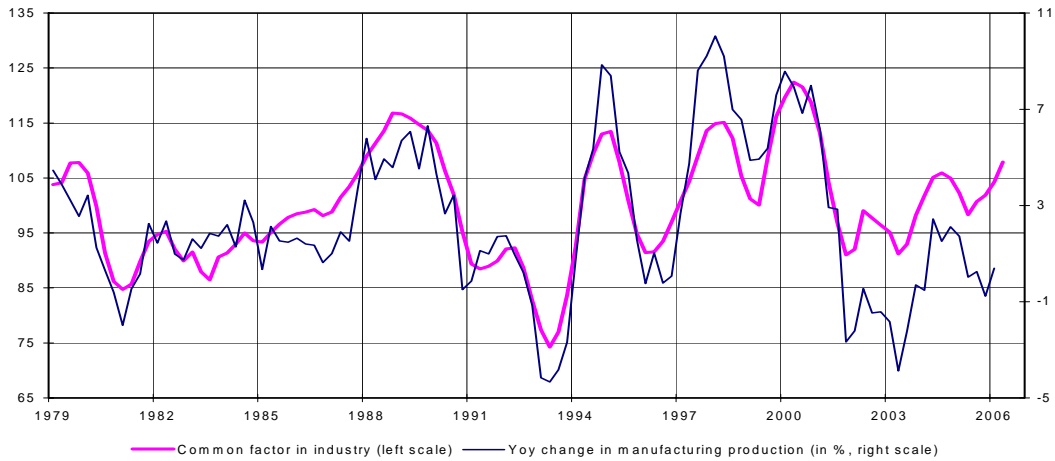
Chart 9: Employment in manufacturing industry
and balance of opinion on recent change in workforce size

Recent change in workforce (balance, left scale) — Qoq growth in manufacturing employment (%, right scale)
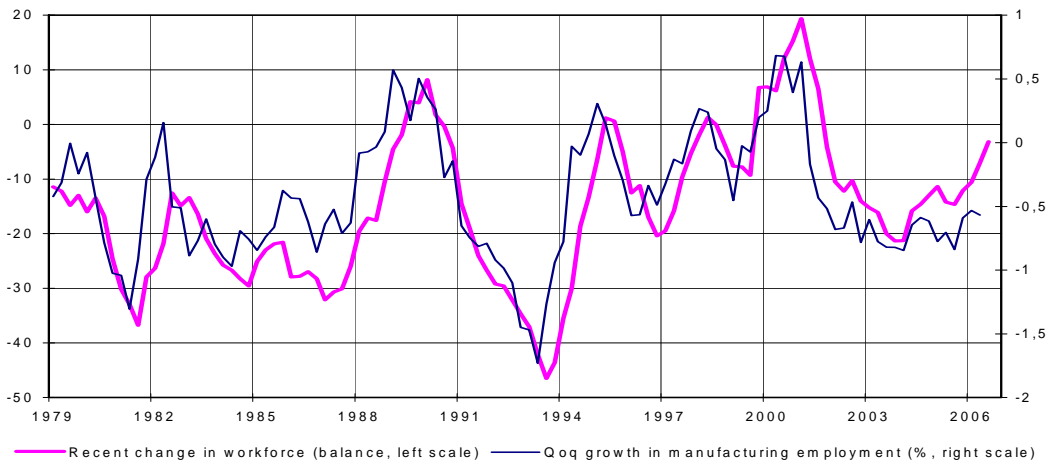
Thanks to the extreme abundance and outstanding diversity of the information that it provides, the Industry Survey is a source highly appreciated by economic analysts. Exploiting the strong correlations illustrated by Charts 7-9, INSEE's Business and Consumer Surveys Division uses the Survey results every quarter[7] as a basis for forecasting several essential economic aggregates—such as manufacturing production and industrial employment—in the preparation of the Institute's serial publications entitled *Notes de Conjoncture* and *Points de Conjoncture* (see Table 4).

Table 4: Selected aggregates for which short-term forecasts are prepared from Industry Survey results

Aggregate forecast two quarters ahead	Balances of opinion used to prepare forecast
Quarterly growth rate of manufacturing production (source: Quarterly National Accounts)	- Balance of opinion on past change in production - Balance of opinion on expected change in production - Balance of opinion on stocks - Balance of opinion on order books - Common factor in industry (source: Industry Survey)
Quarterly growth rate of workforce in industry (end of quarter, source: INSEE Employment Division)	- Balance of opinion on expected workforce in industry - Balance of opinion on past change in demand (source: Industry Survey).
Quarterly growth rate of GDP (source: Quarterly National Accounts)	- Common factor in industry (source: Industry Survey) - Common factor in services (source: Services Survey)

3.2. - Dissemination of Survey results

The Industry Survey is executed every month except August[8] and published in the *Informations Rapides* series.

As the Industry Survey forms part of the Harmonised European Programme of Business and Consumer Surveys, the data from the French Survey are sent to the European Commission, which disseminates them in its own publications.

3.2.1. - Informations Rapides

At the end of the Survey execution month, the Survey's main results are published in the *Informations Rapides* series. The publication is very widely distributed, in particular to economic journalists.

---

[7] For more details, see Reynaud and Scherrer (1996) and Dubois and Michaux (2006).

[8] The August value is obtained by a linear interpolation of July and September Survey data.

3.2.2. - *Personalised information feedback online*

In December 2005, INSEE introduced a personalised online information feedback service. Surveyed enterprises can access a record of their past responses and detailed results on their activity sector.

3.2.3. - Tableau de bord de la conjoncture en France

Tableau de bord de la conjoncture en France is a daily round-up of the main short-term economic indicators. It is chiefly designed to summarise the information produced by INSEE (and published in the *Informations Rapides* series). The *Tableau de bord de la conjoncture en France* is thus a valuable tool for economic analysts and economic journalists.

In particular, the *Tableau de bord de la conjoncture en France* contain charts of the main series of the Industry Survey, along with a general commentary. It is available on the INSEE website[9] (see also §3.2.6).

3.2.4. - *Contribution to* Notes de Conjoncture

The *Notes de Conjoncture* are issued three times a year in March, June, and December. A more concise *Point de Conjoncture* updates the June *Note* in October. Both publications present INSEE's short-term forecasts. French industrial activity and outlook are discussed three times a year in the "Production" section of the *Notes*.

3.2.5. - *Macroeconomic Database (*Banque de Données Macroéconomiques*: BDM)*

The main Building Survey results are available in the BDM. The raw series go back many years; most are also shown in seasonally-adjusted form. At present, the database contains 2,166 industry series, of which 286 are monthly and 1,880 quarterly. The series are accessed via scrolling menus using two alternative paths— "Statistiques françaises" [French statistics] or "Principaux indicateurs" [Main indicators]. The BDM is the prime vehicle for public release of the Survey series. The database is open to INSEE and non-INSEE users.

3.2.6. - *Data available on the Internet*

The INSEE website (www.insee.fr) offers the public a very wide range of information. The short-term indicators section notably includes all issues of *Informations Rapides* (at least in the French version of the site[10]), among them the most recent publication on the Industry Survey. (To access the French version, click on "Conjoncture" [Current economic conditions] then on the row "Enquête mensuelle dans l'industrie" [Monthly survey of industry] in the pop-up table.)

As a complement to its national indicators and analyses and its links to sites presenting European indicators, the INSEE website offers the public a set of analyses of current economic conditions in French regions, prepared by several of the Institute's Regional Offices[11]. Some "dashboards" and analyses presented under the "Conjoncture" [Current economic conditions] heading of INSEE regional websites reproduce the results of the Industry Survey after weighting industrialists' responses by coefficients that reflect the breakdown of the regional economy by activity sector[12].

---

[9] At the following address: http://www.insee.fr/fr/indicateur/tableau_de_bord/tableau_de_bord.asp.

[10] INSEE also provides a summary of the Industry Survey results in the English section of its website.

[11] On the www.insee.fr website, click on "Le portrait de votre région" [Portrait of your region]; select the region you want in order to reach the home page of the corresponding INSEE Regional Office. Then click on "La région en faits et chiffres" [The region in facts and figures], "Conjoncture" [Current economic conditions] heading.

[12] The regional uses of the Industry Survey are listed in the summary technical description of the Survey, Appendix 1, item 9.

3.2.7. - European Commission publications of Industry Survey results

As the French Industry Survey forms part of the Harmonised European Programme of Business and Consumer Surveys, its results are sent to the Commission, which disseminates them in as information about France in the sections of its publications dealing with industry. The French Survey results are also incorporated into the computation of aggregate figures for the euro zone and the EU27.

The European Commission dissemination medium for the harmonised surveys is *European Economy: Business and Consumer Survey Results* available on the Commission website in English only (see Part 4 and references at the end of this document).