

German leading indicators: Which one should be monitored?

Economic indicators theoretically enjoy the capacity to ascertain cyclical reversals in advance. The financial markets thus closely monitor their publication.

For the German economy, four surveys are available: the IFO, ZEW, PMI and ESIN surveys.

*How are these indices compiled?
Do they, really, enjoy a real power to forecast economic activity?
Which is the most reliable?*

*Testing their relation to short-term fluctuations of the business cycle, our Model reveals that the ZEW and the IFO expectations index are the best leading indicators.
However, they are better able to forecast the activity in manufacturing sector than the GDP.*

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Leading German indicators: Diverging philosophies

- IFO index

West German business sentiment

The IFO survey questions every month more than **7,000 business leaders and senior managers**, from all sectors and **excluding the financial sector**. The index reflects exclusively **West German sentiment**. However, the latter covers most of industry, since the contribution of eastern Länder to the manufacturing sector excluding construction stood at 10.2% at end-2000. An index for the new Bundesländer is calculated separately.

The monthly survey asks a total of **twelve questions about the specific, current and expected situation of each firm** in terms of level of production, prices, orders and inventories. The answers provided are of a closed qualitative type, leaving usually the choice between assessing an improvement, a stagnation or a worsening of the situation.

Two sub-indices are drawn from this survey: **a current sentiment component and a expectations component**. Since January 2002, the current sentiment provides an assessment of the last two to three months. Although officially the expectations component sets a six-month horizon, 80% of questions bear on three-month expectations.

The overall IFO index is calculated as the geometric mean of both components, as a diffusion and an index value. **Chart 1A shows that the expectations component is the more leading of the two components.**

Moreover, each component is broken down by sector (**Chart 1B**). Because of the survey's large panel, the **IFO's sectoral sub-components offer a useful sentiment indicator for top-down approaches.**

Chart 1A
IFO index and components

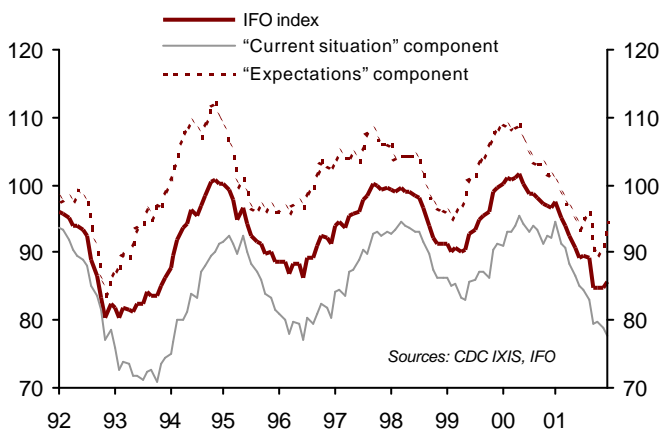
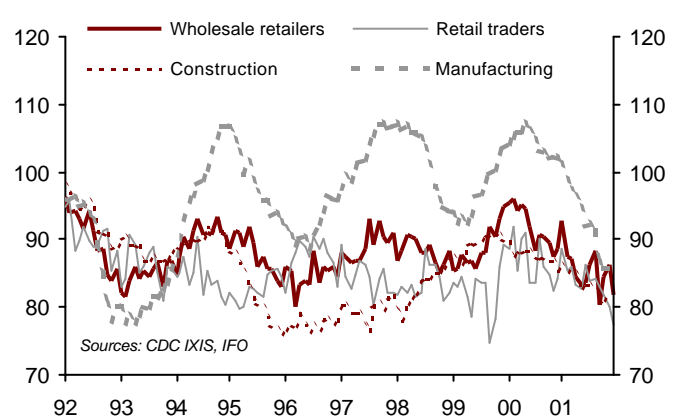


Chart 1B
Sectorial sub-components of the IFO index



- **ZEW index**

German financiers' sentiment

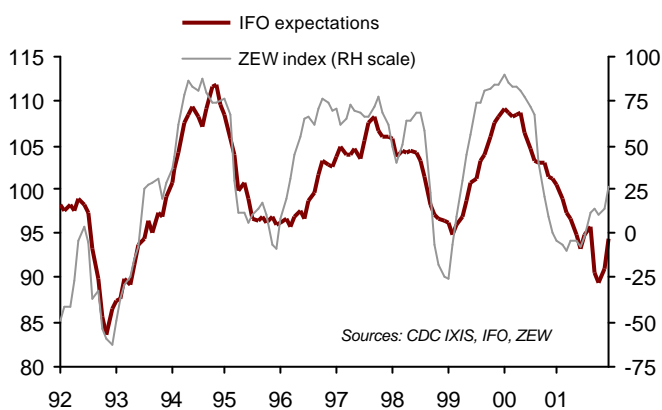
The monthly survey conducted by the ZEW institute echoes the opinion of the **German banking sector**. It occupies in that way the space left free by the IFO survey. At the most 350 analysts and investors are contacted, of which 77% in the major German banks.

The questionnaire, drafted in December 1991, includes **nine questions bearing on the current and expected overall economic situation**, for the G-7 countries with the exception of Canada. Just one question bears on current sentiment. The others relate to six-month prospects in terms of the inflation rate, interest rates, stock market indices, money as well as Brent spot prices, and company profits per sector.

A **current sentiment and a expectations index** are drawn from this survey. Unlike the IFO components, both indices reflect every time the balance of opinion to just one question. They are exclusively calculated as a diffusion value.

The philosophy of the ZEW index diverges from that embodied by the IFO index, and therefore offers an interesting alternative for the user of surveys. However, the ZEW presents a **higher risk of over-reaction (Chart 2)**, because its panel is smaller and more standardised while the number of questions asked is small.

Chart 2A
ZEW index and prospects component of the IFO index



The opinion of purchasing managers

- **PMI manufacturing index**

The PMI manufacturing index is disseminated by the Reuters agency, in association with the German association of **purchasing and logistics managers**. It draws on a monthly questionnaire, and polls 400 members of this association.

The survey highlights any **change in sentiment in comparison to the previous month**. The main variables surveyed are: production, new orders, payrolls, delivery delays and the stock of purchases. For each variable, a diffusion index is calculated. **An index above 50 shows expansion, while an index lower than 50 reflects a contraction in the situation.**

The PMI is a composite index pooling the **five main individual indices**. The weight used for each is identical to those applied by ISM (ex NAPM) for its US survey (**Table 1**).

Table 1: Weighting of the PMI

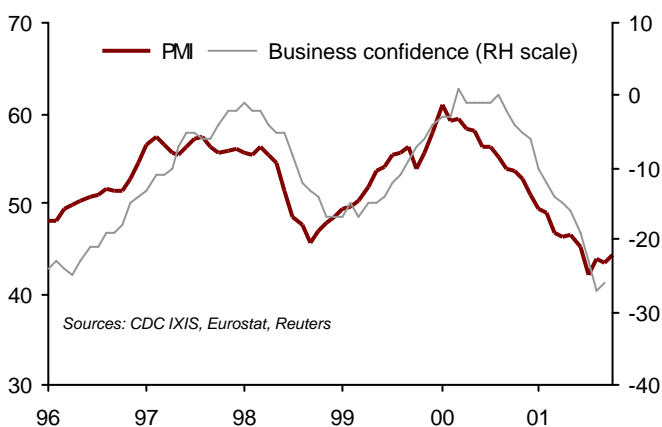
Individual indices	Weighting
New orders	0.30
Production	0.25
Payroll	0.20
Delivery delays	0.15
Stocks of purchases	0.10

Source: Reuters

The PMI is calculated for each country of the euro zone, what it provides a comparison indicator. However, this advantage remains limited, given the extent to which its **historical comparison base still is small**: the German PMI has been calculated since April 96.

Since July 1998, a PMI has also been calculated for services. Even though this index is young, it should eventually become an interesting tool in terms of assessing trends in this sector.

**Chart 2B
PMI and economic sentiment**



An indicator of overall economic activity

- **The ESIN economic sentiment indicator**

The ESIN (Economic Sentiment Indicator) index, published by the European Commission, embodies yet another philosophy, since **it questions four stages in the economic circuit**: the manufacturing, construction and retail sectors as well as consumers.

A confidence indicator is calculated for each sector. The ESIN composite indicator then aggregates the four confidence indices, by weighting them according to their contribution to cyclical changes in GDP (**Table 2**).

Table 2: Weighting of the ESIN index

Confidence indicators	Weighting
Business confidence	0.40
Confidence in construction	0.20
Consumer confidence	0.20
Confidence in retail	0.20

Source: Reuters

The four confidence surveys draw on qualitative questions, leaving the choice between the three types of responses already met.

- ◆ The survey in industry bears on production expectations (prices and volume), order books (foreign and domestic) as well as the level of inventories.
- ◆ The survey carried out among consumers asks about the financial situation of households, their assessment of the overall economic climate and risks of unemployment, as well as their big-ticket purchases, current as well as in the next twelve months.

Each confidence index is calculated as a diffusion value. The ESIN composite indicator, for its part, is indexed.

To what extent can the recovery in all these indicators in January point to a similar rebound in German activity?

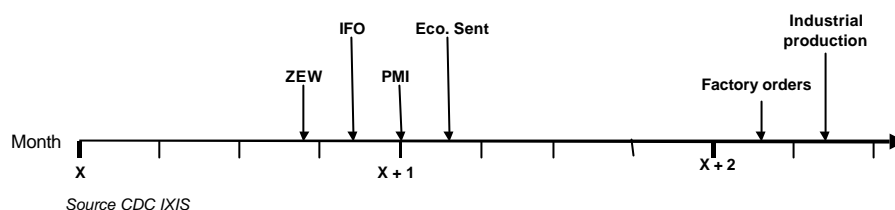
More generally speaking, can we predict changes in GDP from these surveys?

What predictive power?

Economic dynamics is usually measured by the rate of change in GDP. These statistics, however, are updated only every quarter. To monitor more closely fluctuations in the German business cycle, it is then useful to **look at monthly data covering factory orders and industrial production**. In comparison with these statistics, these indicators are interesting from two points of view:

The four indicators provide a monthly estimate of economic sentiment in Germany four to five weeks before the initial official statistics are released. **Table 3 shows that relative to this point the ZEW index posts better performances**

Table 3 : Publication of indices for the month X

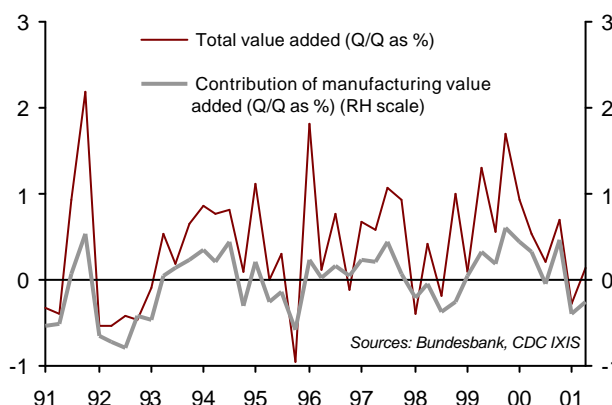


- Statistical analysis proves there is a strong correlation between leading indicators, factory orders and industrial production.

However, these features do not ensure any statistical predictive power with regard to overall economic activity:

- For an indicator to be a leading one, its own fluctuations must occur before those recorded in economic activity.
- The manufacturing sector accounted only for 25% of total value added in Q3 2001. However, we do not consider in this weight services outsourced to companies by industry. Note that their cycle depends closely on industrial activity. Although the economic weight of the manufacturing sector remains more significant than these 25%, it fails to explain trends in GDP on its own (**Chart 3**).

**Chart 3
Contribution of manufacturing activity to activity**



We will now look into the question of **whether these indicators anticipate changes in GDP**, as a measure of overall activity.

Charts 4A to 4D suggest there is a relationship with long-run upturns and downturns in the cycle. This comparison presents nonetheless the drawback of comparing monthly indices with annual changes in GDP, which are furthermore subject to base effects that cannot be eliminated.

Chart 4A
IFO index and GDP

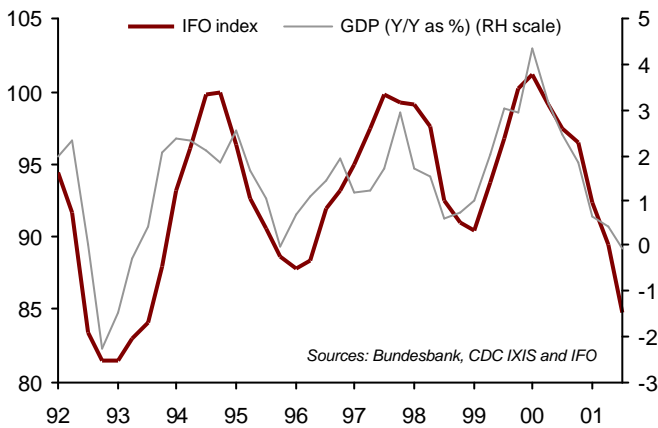


Chart 4B
ZEW index and GDP

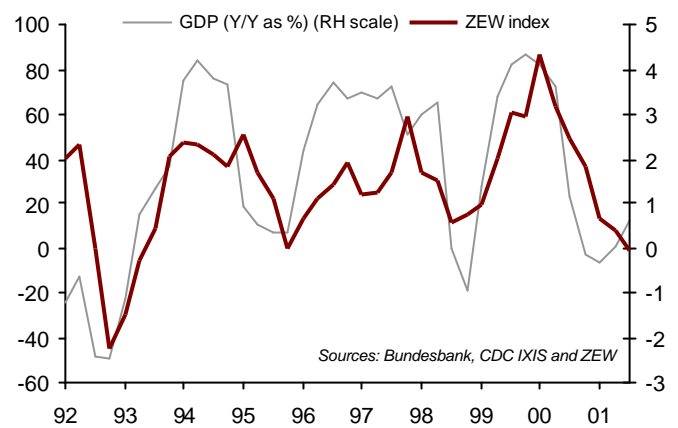


Chart 4C
Business confidence and GDP

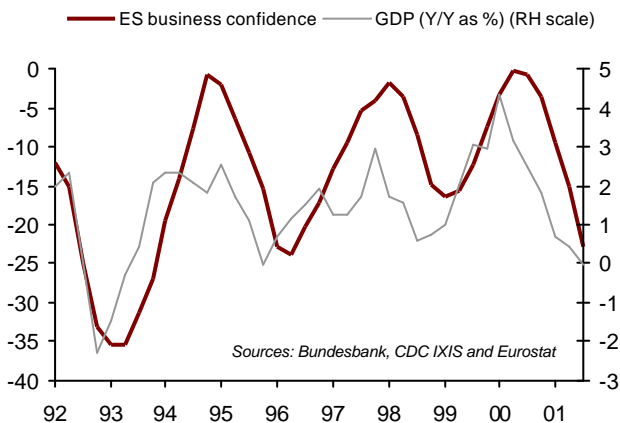
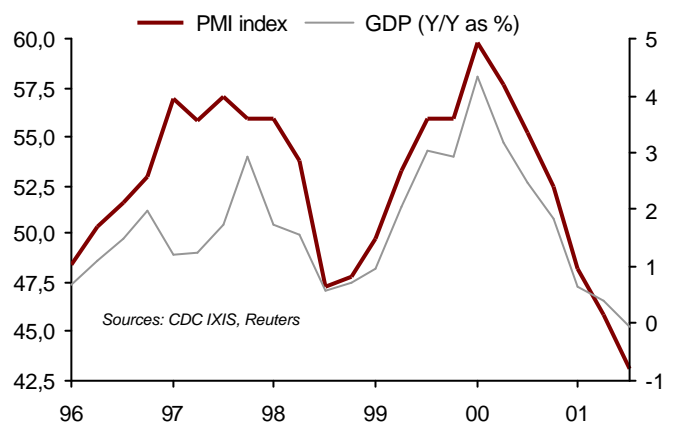


Chart 4D
PMI and GDP



We therefore look into short-term fluctuations, measured by quarter-on-quarter changes in GDP.

To test this relationship, we seek to measure the predictive capacity of indicators, by regressing their three-month average on quarter-on-quarter changes in German GDP.

We denominate “current-period GDP” relationship (1), in which the change in GDP recorded in quarter t is explained by the average value taken by the leading indicator in t:

$$\Delta \% GDP_t = a_1 I_t + b_1 + m_{1t} \quad (1)$$

This relationship provides us with information about the capacity of indicators to monitor the cycle. By introducing a lag, we measure their capacity to anticipate it: “future GDP”. Relationship (2) is then written:

$$\Delta \% GDP_{t+1} = a_2 I_t + b_2 + m_{2t+1} \quad (2)$$

The results summarised in **Table 4**, show that:

- With regard to estimates of current-period GDP, only the ZEW index and, to a lesser extent, the IFO expectations component are reliable indicators of quarter-on-quarter changes in GDP.
- The predictive power of these indicators is seen to be weak. No one is able to anticipate correctly short-term fluctuations in the cycle. **Among the indices we have tested, the ZEW and the IFO expectations post the best performances.**

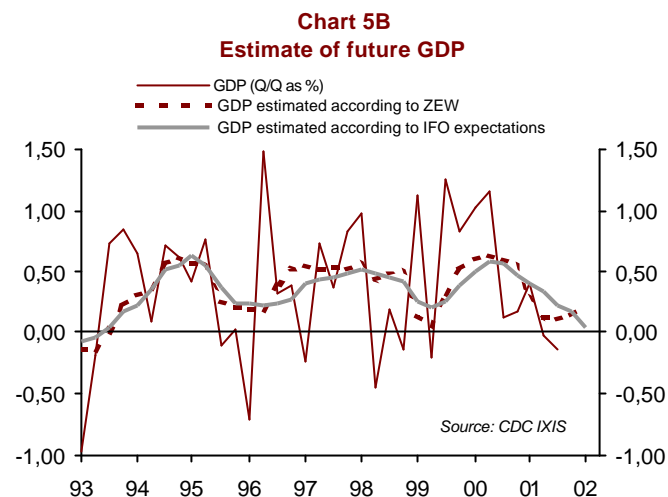
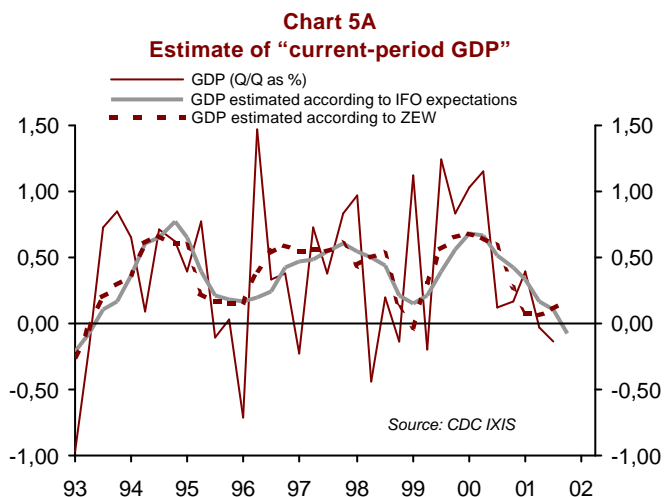
Table 4: Regression of GDP (Q/Q as %)

Explanatory variable	R ²	
	Current-period GDP	Future GDP
GDP		0,10
IFO	0,13	0,11
Current-period IFO	0,13	0,08
IFO expectations	0,43	0,31
IFO situation in 6 months' time	0,41	0,31
ES production in 3 months' time	0,21	0,05
ZEW	0,47	0,40

Source: CDC IXIS

Let us compare the results drawn from the above relationships with our own growth forecasts:

- According to the current-period GDP model, the ZEW index and the IFO expectations component estimate respectively a change in German GDP of +0.2% Q/Q and –0.1% Q/Q in Q4 2001. Our forecast is –0.3% Q/Q (**Chart 5A**).
- According to the future GDP model, the ZEW index forecasts growth of +0.2% Q/Q in Q1 2002 after +0.1% Q/Q in Q4 2001. The IFO prospects component shows zero growth in Q1 2002 after a 0.2% rise in Q4 2001. We forecast 0.2% Q/Q growth in the first quarter of 2002. (**Chart 5B**).



Does the efficiency of indicators vary according to sector?

The results obtained by quantitative analysis are disappointing. We will seek the reasons why in the very composition of the indicators.

The description of surveys has shown us that each one echoes one or several groups of specific agents of the economic circuit. Their capacity to ascertain the economic situation as a whole is not guaranteed.

From this observation, we draw the hypothesis that the indicators should better replicate activity within the branches that their surveys cover.

We test this hypothesis by using the previous model. To do so, **we discard GDP and choose as an explained variable the breakdown of value added by sector.**

Our conclusions (Tables 5 to 6) lead to the following results:

- Indicators explain better trends in the manufacturing sector than in GDP.
- The IFO expectations and the ZEW are once again the indicators that post the best performances.
- The ZEW displays a satisfactory capacity to forecast manufacturing activity.

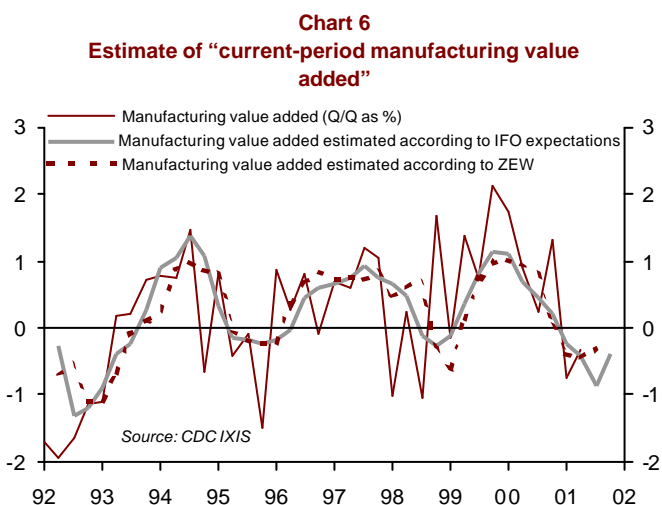


Table 5: Regression of manufacturing value added (Q/Q as %)

Explanatory variable	R ²	
	Current-period manufacturing value added	Future manufacturing value added
Value added		0,35
IFO	0,50	0,20
Current-period IFO	0,30	0,03
IFO expectations	0,64	0,41
IFO situation in 6 months' time	0,61	0,40
Manufacturing IFO	0,48	0,20
ES production in 3 months' time	0,37	0,16
ZEW	0,61	0,55

Source: CDC IXIS

- **No index is able to replicate correctly trends in the service sector (Table 6).** The latter, when retail and administrative services are stripped out, contribute however nearly 31% of total value added. By definition, the leading indicators therefore can hardly measure the overall cycle.

No index retrace correctly the activity in the construction sector, not even the IFO construction (Student's t is not significant).

Table 6: Regression of value added in services (Q/Q as %)

Explanatory variable	R ²	
	Current-period value added in services	Future value added in services
Value added		0,06
IFO	0,24	0,18
Current-period IFO	0,23	0,21
IFO expectations	0,20	0,22
IFO situation in 6 months' time	0,22	0,24
ES production in 3 months' time	0,24	0,18
ZEW	0,23	0,18

Source: CDC IXIS

All in all, the predictive power of the various German indicators seems valid, as many of them are more efficient than the simple autoregressive model. **The fact that their panel focuses more on the manufacturing sector explains to a large extent why trends in GDP that aggregates all sectors, remain more difficult to ascertain.**

With regard to forecasting, we would choose more precisely the ZEW and the IFO expectations index. The PMI surveys and ESIN are useful for international comparisons, but they offer no real advantage when the task at hand consists in monitoring Germany alone (Table 7).

Table 7 : Summary

	IFO	ZEW	PMI	ESIN
Sentiment in	Business without finance sector	Finance sector	Purchasing managers	All sectors
Strengths	Broad panel Predictive quality (IFO Expectations)	First to be released Predictive quality	Similar to ISM	overall sentiment
Weaknesses	West-German sentiment	Volatile	Index ist still too young	Last to be released Predictive quality

Source: CDC IXIS