The relaunch of aeronautics and the depressed energy-intensive industries account for the exceptional divergence in short-term situations within industry

At the start of 2024, the short-term situations in the different industrial sectors, as measured by the composite business climate indicators, were unusually varied. All the balances of opinion on which business climate is based contribute to this wide diversity but the main contributor is currently that relating to the state of company order books. In sectoral terms, the strong heterogeneity that can be seen at present results both from particular short-term positions of sectors that are usually poorly correlated to the overall cycle, such as aeronautics, but also from a misalignment of sectors that are usually very close to the main cycle, especially branches that consume high levels of energy (wood, paper products and printing industries, chemical industry, rubber/plastic products and metallurgy), which have suffered a specific supply shock with the increase in commodity prices, independently of the behaviour demand for capital goods which traditionally accounts for cyclical variations.

In Europe, both Germany and Spain are also still experiencing episodes of high sectoral volatility, whereas in Italy these were limited to the health crisis. The main sectors responsible for this dispersion in Germany are generally the same as in France, in particular energy-intensive industries and other transport equipment. In Spain too, energy-intensive industries have contributed to the dispersion of industrial sectors, but the automotive sector, where the confidence indicator improved in 2022, contributed more than elsewhere in Europe.

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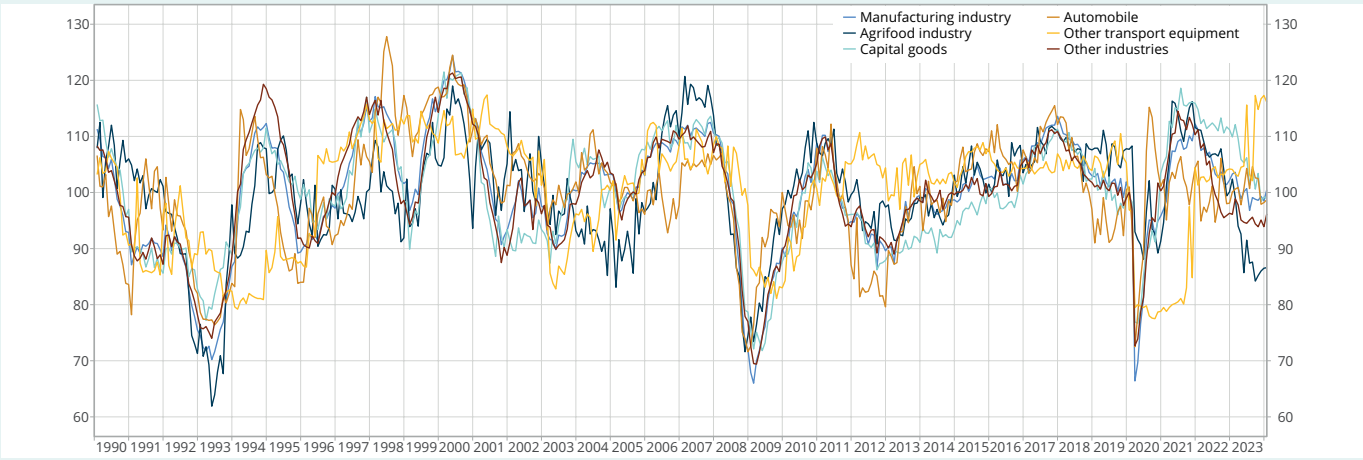
At the start of 2024, short-term situations were particularly contrasted in the different manufacturing industry sub-sectors

The composite business climate indicators summarise the short-term information collected in the monthly business tendency surveys of companies. They are constructed at both sector level and sub-sector level, allowing for a detailed analysis of cyclical changes in economic activity.

At the start of 2024, although the climate was close to its long-term average on the scale of the manufacturing industry, the business climate indicators in the different branches of activity showed an unprecedented dispersion (►**Figure 1**). For example, the business climate was at its highest level historically in January 2024 in the manufacture of "other transport equipment" (excluding automobiles, i.e. mainly aeronautics), but at the same time remained very degraded in the agrifood industry.

A statistical measurement of the dispersion of climate indicators, corresponding to the variance of sub-sector climates at a detailed level (level A38 in the classification) confirms this qualitative diagnosis (►**Methodology box**). Between the mid-1990s and the health crisis, this dispersion remained contained and relatively stable (►**Figure 2** – blue line), including during the financial crisis and the Eurozone sovereign debt crisis. Variance then reached its lowest level historically at the end of the 2010s. It began to grow again in H2 2019 then increased sharply at the time of the health crisis, reflecting differences in exposure to the consequences of the pandemic (no travel, increased food consumption, etc.). While the dispersion appeared to have declined at the start of 2022 and to be getting closer to its long-term

►1. Business climate in the main sub-sectors of industry
(standardised to mean 100 and standard deviation 10)



Note: February 2024.
How to read it: in February 2024, the business climate in the agrifood industry was 87 points, below its long-term average (100).
Source: INSEE, Monthly tendency survey in industry.

average, the invasion of Ukraine by Russia and the imported inflation shock which followed it triggered a new increase in this dispersion indicator that was particularly pronounced. At the start of 2024, business climates in different industries reached a level of dispersion not seen for nearly 30 years outside of a health crisis, and were even approaching the levels seen in 2020.

The method of constructing business climate indicators is not the reason behind these exceptional divergences

Climate indicators in industry are constructed from balances of opinion in business tendency surveys of recent and future changes in production, general and foreign order books, level of inventory of finished products and general expectations for activity in the sector: the selected balances are the same for all industrial branches, as well as for the entire manufacturing industry (►**Focus** "New sub-sector business climate indicators to improve economic outlook analysis", *Economic outlook*, June 2016). For each sector, the indicator is constructed from a linear combination of these balances of opinion. However, the coefficients are derived from correlations observed historically for this sector, and are therefore specific to it.

The relative importance of each balance may therefore differ somewhat for each sector. For example, the balance of opinion on export order books is much more important for the manufacture of "other transport equipment" (which notably includes aeronautics) than for other sectors, thus reflecting the importance of foreign customers for this sector. These specific features in constructing indicators could theoretically explain part of the divergence: for example, a drop in a given balance of opinion that is common to all sectors may be reflected differently in the business climate indicators and penalise the sectors where the weight of this balance in the climate is important.

This effect can be neutralised, however, by standardising the weightings of the different balances in the business climate between sectors (for example, by retaining for each sector the weights that the different balances have in the business climate at the scale of the entire manufacturing industry) and using this new weighting to recalculate an alternative business climate for each sector: in doing so, the observed dispersion remains (►**Figure 2** – red line – and ►**Figure 3**). Thus the method used to construct the indicators can only account for a minor part of the dispersion currently observed: it is therefore the result of different short-term situations between sub-sectors.

As in the mid-1990s, the balance of opinion on overall order books is the primary contributor to the sub-sector divergence currently observed in industry

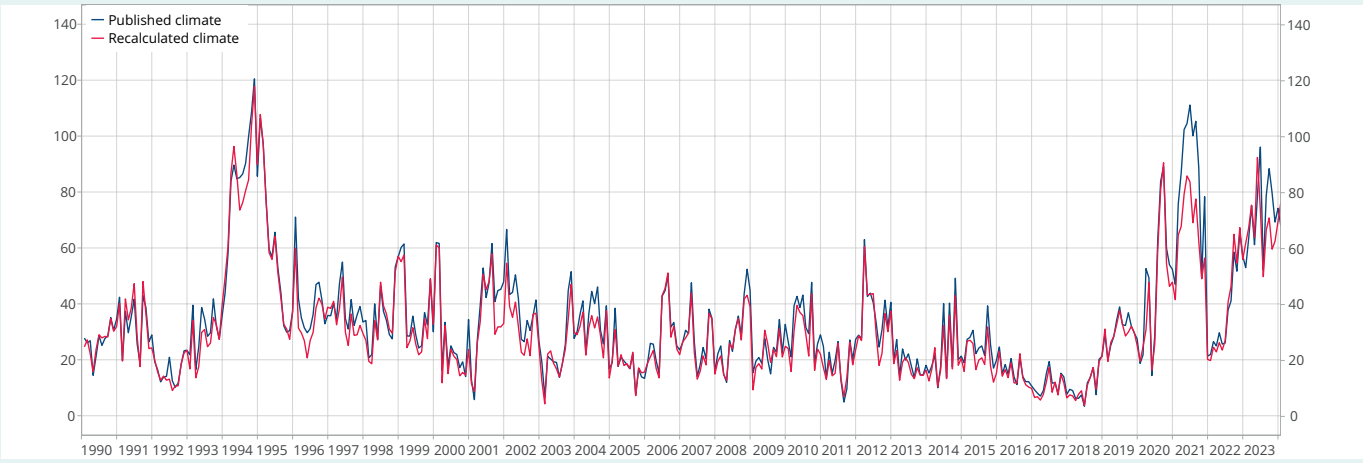
The wide variety of business climates in industry sub-sectors can be broken down by studying the contribution of sectoral divergences observed for each balance (previously centred and reduced to be able to compare them with each other) involved in calculating the business climate (►**Figure 4**).

Over the recent period, variances in the different balances of opinion have all reached high levels, apart from level of inventory of finished products, which returned to levels close to its historic average. This observation can be made, in particular, on the balance of opinion concerning order books.

By taking into account the weight of each balance in the business climate, the weighted variance of each balance can be monitored over time (►**Figure 5**): this quantitative approach ensures that the main balances contributing to volatility overall can be identified more precisely (►**Methodology box**).

►2. Dispersion of sub-sector climates in the manufacturing industry

(level variance)

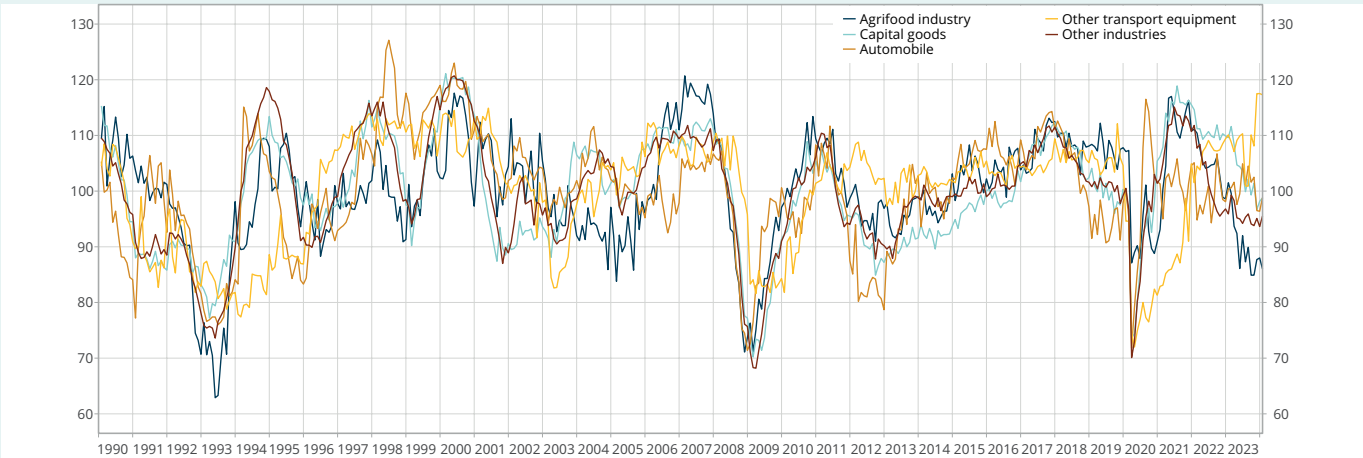


Last point: February 2024.
Note: the recalculated climate takes into account the standardised weightings for balances of opinion between sectors.
Source: INSEE.

Thus, during the health crisis, balances of opinion on recent production and personal expectations for production contributed significantly to the overall variance in the business climate: it is therefore these balances that are best able to explain the strong divergence between sub-sector climates during the pandemic. On the other hand, during the recent period, as in the mid-1990s, the balance of opinion on overall order books was the primary contributor to the divergence of climates between sub-sectors. Conversely, over a long period, general production prospects almost never contribute to variance.

►3. Recalculated climates, keeping the same weights for balances of opinion in all sub-sectors

(standardised to mean 100 and standard deviation 10)

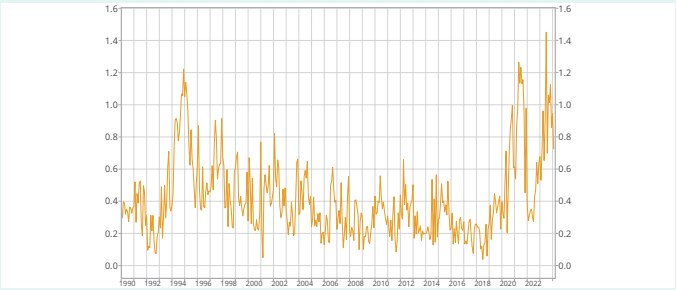


Last point: February 2024.
Source: INSEE.

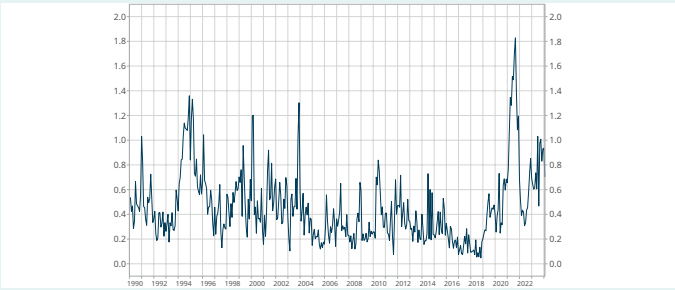
►4. Change in variance over time of the six balances used to calculate the climate in industry

(variance between sectors, by level, from centred and reduced balances)

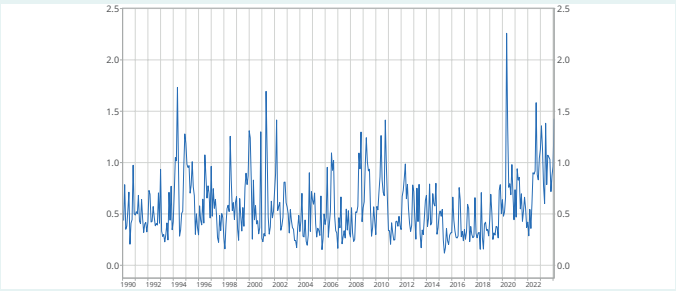
Overall order books



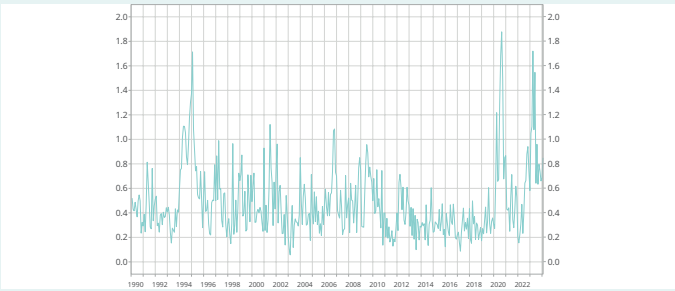
Foreign order books



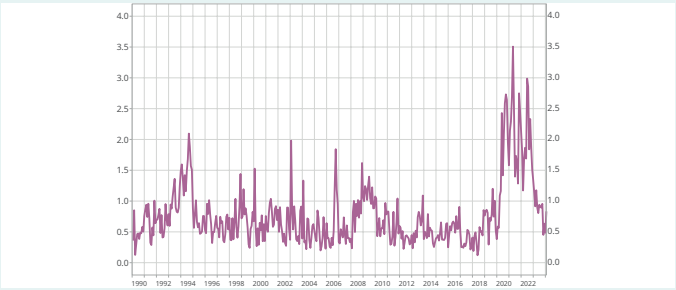
Personal expectations for production



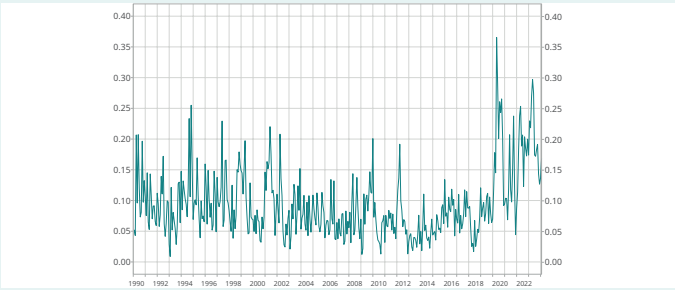
Recent production



Inventory of finished products



General expectations for production



Last point: February 2024.
Source: INSEE.

Manufacture of "other transport equipment" and the energy-intensive branches mainly account for the recent divergence in sub-sector climates

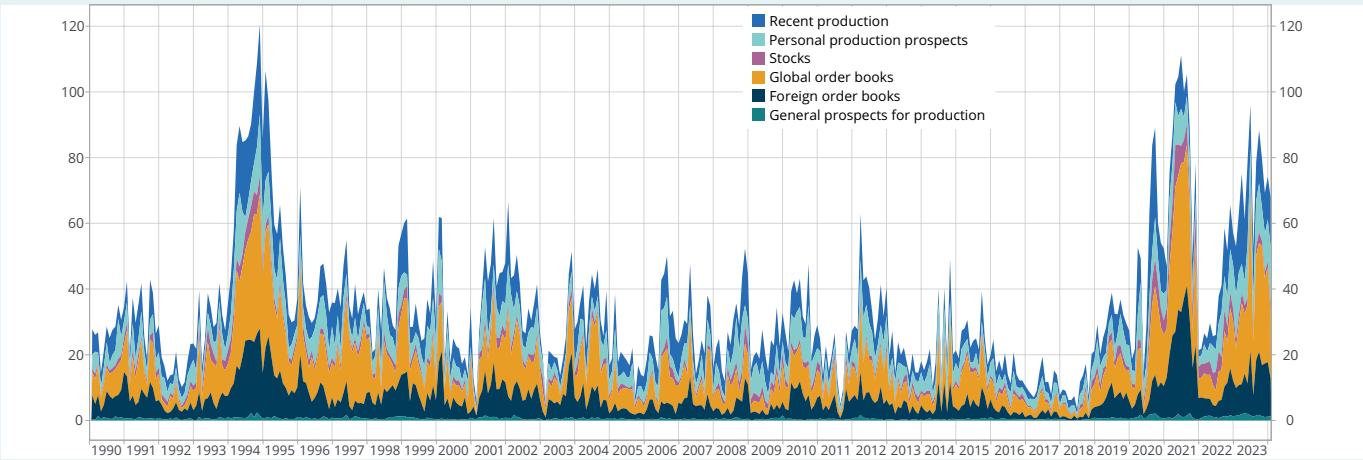
Divergence can also be analysed with regard to the contribution of each sub-sector to the overall dispersion. On average, some sectors contribute more than others to the overall variance in the business climate because they are less correlated with the main cycle. Over the long term, the rubber and metallurgy sub-sectors (and to a lesser extent chemicals and wood) are closest to the main industry cycle (►**Figure 6**). These are products that are highly mobilised in various downstream production cycles (transport equipment or capital goods) and fluctuations in demand for investment goods have a strong knock-on effect on these branches. The manufacture of capital goods is highly correlated with investment and is also very close to the main cycle. Conversely, the manufacture of "other transport equipment" and to a lesser extent the agrifood industry, follow a specific cycle with little correlation with the rest of industry.

In addition to these average correlations, the contribution of each sub-sector to the overall dispersion can be calculated each month (►**Methodology box** and ►**Figure 7**). Thus the manufacture of "other transport equipment" makes a recurring contribution to sub-sector divergences: this was particularly the case from mid-2020 when this sector was slow to restart, unlike the rest of industry. During peak volatility in the mid-1990s, agrifood and the energy-intensive branches (rubber/plastic products, chemicals, wood/paper/printing, metallurgy) were also major contributors to the divergence observed between the different sub-sectors of industry.

The current unprecedented situation is due to different cyclical dynamics inherited either from the consequences of the health crisis or from those of the war in Ukraine. The electronic goods and computers sector continues

►5. Change in weighted variance of each balance over time

(level variance)



Last point: February 2024.
Source: INSEE.

►6. Correlation coefficients of the different industrial climates to the manufacturing industry climate

(correlations)

Sector (A17)	Sector (A38)	Weight (in %)	Correlation
Agrifood (C1)	Agrifood (C1)	20	0.76
Capital goods (C3)	Computer, electronic, optical equipment (CI)	4	0.77
	Electrical equipment (CJ)	3	0.82
	Machinery and equipment (CK)	5	0.86
Transport equipment (C4)	Automobile (CL1)	9	0.79
	Other transport equipment (CL2)	10	0.51
Other manufacturing industries (C5)	Textile products (CB)	2	0.80
	Wood, paper products, printing (CC)	4	0.83
	Chemical products (CE)	8	0.85
	Rubber (CG)	7	0.92
	Metallurgy (CH)	11	0.91
	Other industries (CM)	10	0.80

Note: correlations, calculated over the period February 1990-February 2024.
Source: INSEE.

to be stimulated by robust demand, with the health crisis resulting in more electronic communication, thus reinforcing the need for equipment. Aeronautics has still not returned to its pre-health crisis level and is experiencing steady growth (►**Focus** aeronautic). The war in Ukraine has caused sharp increases in commodity prices, with the various sub-sectors of activity exposed differently. On the one hand, energy-intensive branches faced a very negative supply shock with rising electricity and gas prices. On the other hand, food inflation peaked at more than 15% in France at the start of 2023, leading to an unprecedented peacetime decline in the consumption of food products (in France, as in the other Eurozone countries) and a significant decline in the business climate in the agrifood industry.

In Europe, Germany and Spain are also experiencing a strong divergence in short-term situations in the different industrial sectors

Using the tendency surveys in industry collected in all Member States by the European Commission, it is possible to study whether this dispersion phenomenon is specific to France or common to all European countries. From the balances collected, the European Commission constructs a composite indicator ("confidence indicator") by weighting balances of opinion on order book levels (1/3), inventory of finished products (-1/3) and expected change in production over the coming months (1/3). This indicator is therefore slightly different from that calculated by INSEE.

Thus it is possible to calculate the sectoral dispersion of the European Commission's confidence indicator in a similar way to that for the business climate in industry in INSEE's survey (►**Methodology box**): for France in particular, the dispersion indicator in industry calculated from the European Commission's confidence indicator is very similar to that calculated from INSEEs business climate (►**Figure 8**).

As in the case of France, the period following the start of the health crisis was characterised in Germany, Italy and Spain by a strong dispersion in short-term situations between the different sub-sectors of industry (►**Figure 9**). This divergence is particularly remarkable in Germany for two reasons: first, the dispersion has been very contained since the early 1990s; second, sectoral volatility appeared, even more so than in France, a little before the pandemic. The divergence was less atypical for Spain, where similar episodes have often been observed, although on a smaller scale, since the beginning of the 2000s. As the health crisis came to an end in autumn 2021, divergence was very much reduced in France and Italy, but remained high in Germany and Spain. It began to increase again in France at the start of 2022 following Russia's invasion of Ukraine, reflecting the situation in Germany and Spain, whereas it remained relatively contained in Italy.

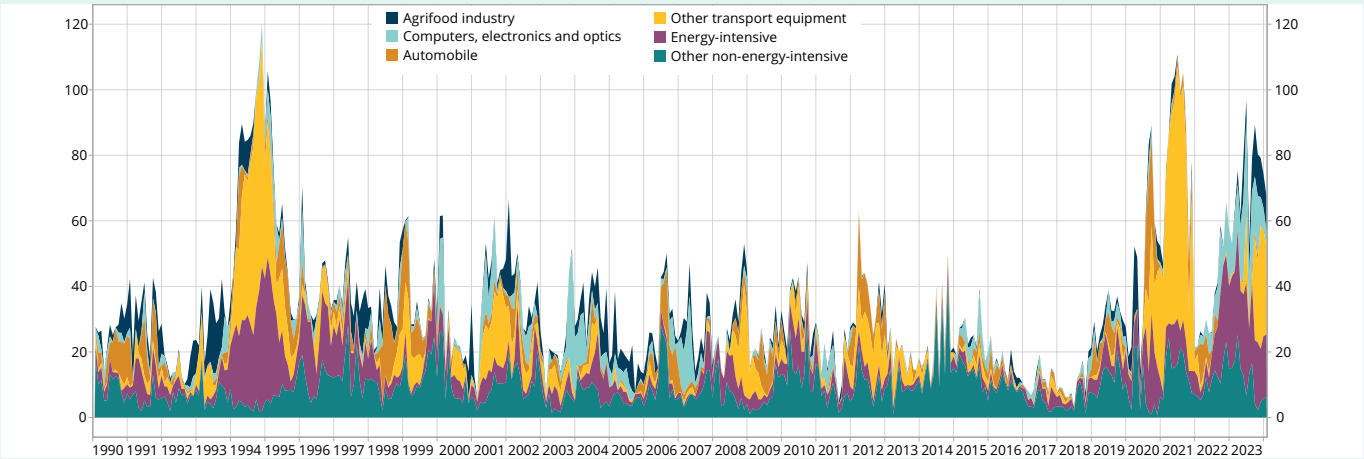
With a similar technique to that used for the business climate in industry for France, the volatility observed in the confidence indicator for the four main Eurozone economies can be broken down by sector (►**Figure 10**).

In Germany, different sectors in turn have contributed to the dispersion of the confidence indicator since the start of the decade: this volatility was first driven by the agrifood industry during the health crisis and even a little before, then by "other transport equipment" (mainly aeronautics) during the post-pandemic recovery. Since the Russian invasion of Ukraine, it has been the energy-intensive branches that have been sources of volatility, then, more recently, "other transport equipment" once again.

In Spain, volatility has been driven since the start of the health crisis by the energy-intensive and agrifood industries. More recently, it is mainly the automotive industry that has contributed to the sectoral divergence in industry, as its confidence indicator increased at the start of 2022.

►7. Contribution of different sub-sectors to climate variance

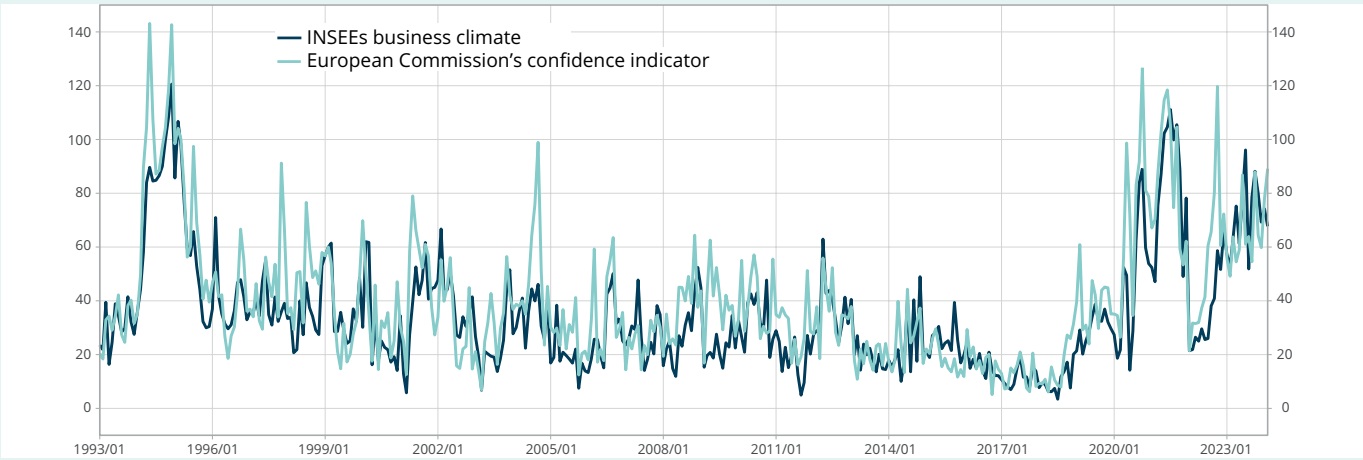
(variance by level)



Source: INSEE.

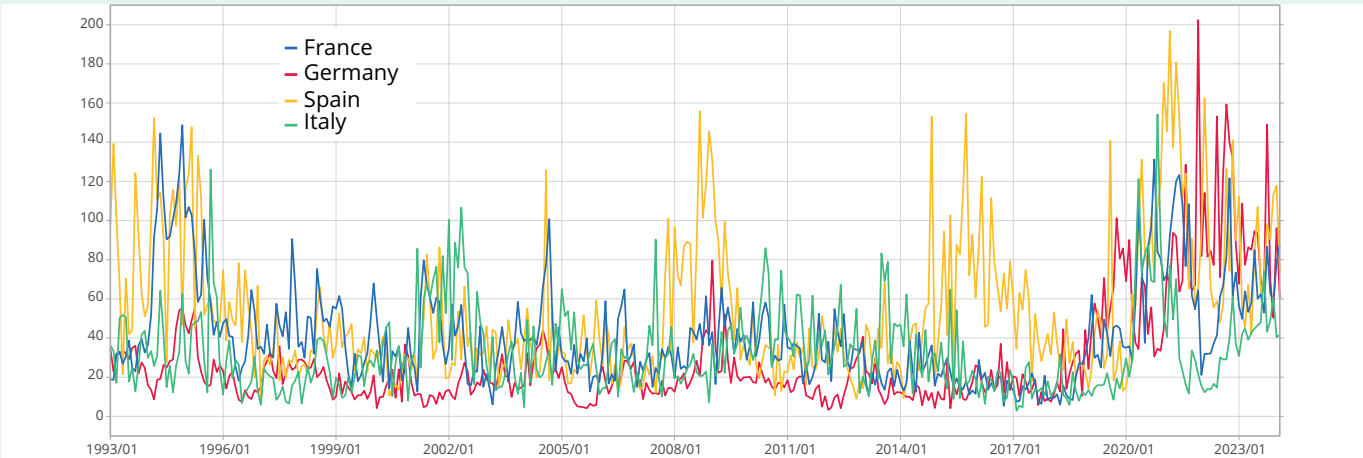
Finally, in Italy, the same branches as mentioned for the other European countries have also contributed to the sectoral volatility of the confidence indicator (especially agrifood, automobiles, "other transport equipment" and energy-intensive industries) but to a less pronounced degree, with the overall dispersion remaining contained in any case. ●

►8. Comparison of INSEEs business climate dispersions with the European Commission's confidence indicator
(level variance)



Last point: February 2024.
Source: INSEE, DG ECFIN, INSEE calculations.

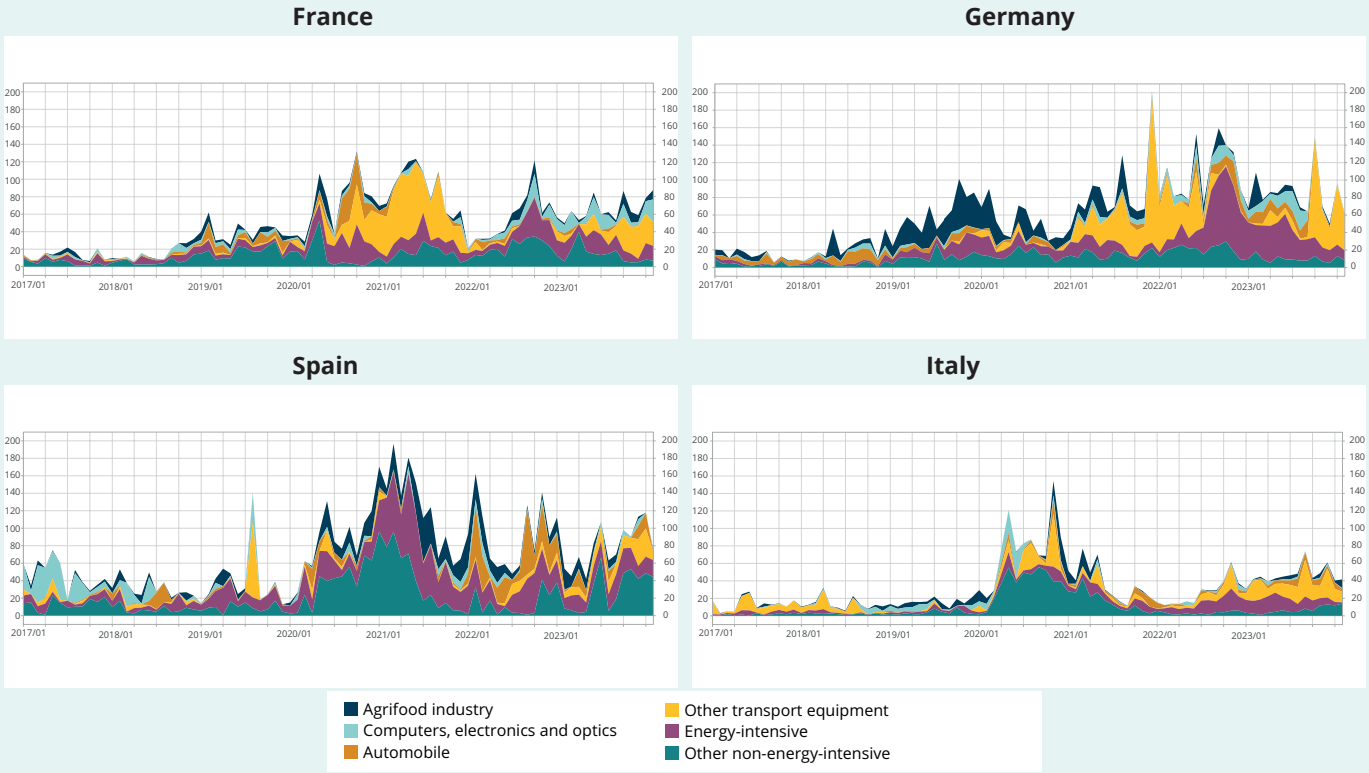
►9. Dispersion of the European Commission's confidence indicator in the main Eurozone economies
(level variance)



Last point: February 2024.
Source: INSEE, DG ECFIN, INSEE calculations.

►10. Contributions of the different branches to variance in the DG ECFIN confidence indicator for the main Eurozone economies

(level variance, contributions in point)



Last point: February 2024.
Source: INSEE, DG ECFIN, INSEE calculations.

Methodology

Measuring sectoral dispersion from climate variance

Dispersion in the business climate in industry is calculated from business climate indicators at a detailed sub-sector level (level A38 in the French classification of activities). Within the manufacturing industry, this corresponds to the twelve sectors presented in ►**Figure 6**. Manufacture of coke and refined petroleum products (C2) and pharmaceuticals (CF) are excluded from the analysis, in the former for reasons of sample size, and in the latter due to the monthly volatility of the series. For each month from February 1990 to February 2024, the dispersion of the climates is defined as their variance:

$$V = \frac{1}{12}\sum_{i=1}^{12}(x_i - \bar{x})^2$$

x_i corresponds to the climate indicator for sub-sector i
$\bar{x}$ corresponds to the average for the climates of the 12 sub-sectors.

For this definition, the choice was made to give uniform importance to each sector, without weighting them according to their weight within the manufacturing industry: for consistency, x corresponds to an unweighted average of the sectoral climates and not to the business climate in industry, which would be closer to a weighted average of the different sectors. Thus the calculated indicator is an indicator of pure dispersion, where all industrial sectors have the same importance.

To ensure readability, some branches were grouped together to study the contribution of the branches to overall dispersion

This formula includes 12 terms, each corresponding to the specific contribution of a sub-sector. For reasons of readability, certain groupings were made for the purpose of analysing the contribution of the different sectors to overall dispersion (example **Figure 7**). In fact, some sub-sectors never exceed 10% of the total variance over the entire period selected. These sub-sectors that contribute little to the total dispersion are grouped by adding them together: manufacture of electrical equipment (CJ), machinery and equipment (CK), manufacture of textile products, clothing and leather products (CB) and "other manufacturing industries" (CM). Similarly, the sub-sectors known as "energy-intensive" are grouped together: wood, paper products and printing (CC), chemicals (CE), rubber and plastics industry (CG), and metallurgy (CH).

In this way, industry was divided into 6 classes: agrifood (C1), manufacture of electronic, computer and optical products (CI), automobiles (CL1), manufacture of "other transport equipment" (CL2), "energy-intensive" sectors and "other non-energy-intensive". The change in sub-sectoral dispersion of climates over time can thus be monitored with the specific contribution of each of these 6 classes.

The contribution of balances may be approached via the weighted sum of their variance between sectors

While the contribution of the sectors to overall dispersion can be derived directly from the formula for the variance of the climate indicators, the contribution to the dispersion indicator of each of the six balances of opinion used to calculate the business climates can only be approximated.

To do this, a variance between sectors is calculated each month for each of these six balances of opinion, which have been previously centred and reduced. These variances are then added together, weighting them according to the weights of the balances used when constructing the business climate indicator in the entire industry. Finally, each of these terms is modified homothetically, so that the sum of the terms corresponds to the total variance of the indicator calculated in the same month. Using this approach it is thus possible to reconstruct overall variance and from this deduce approximately the contribution of each balance.

A similar methodology was used for each of the four main Eurozone economies on the confidence indicator in industry published by the European Commission

The methodology devised for INSEE's business climate in industry can be replicated on the confidence indicator in industry, published by the European Commission, for the four main Eurozone economies. As the sub-sectors published by the European Commission are more detailed than those published by INSEE for their business climate, they have been grouped together into twelve branches corresponding to INSEE's analysis of the business climate, using a weighting based on the turnover of these different branches.