A new business climate in the building construction industry

Alongside the results of the tendency surveys, INSEE publishes composite business climate indicators each month to summarise the opinions of businesses, as expressed in the business tendency surveys. Since October 2021, the business climate indicator for the building construction industry has been modified to capture variations in the outlook in the sector more effectively. This change was made necessary in particular by gaps that appeared during the health crisis between output in construction and the view that might be provided by the former version of the composite indicator. The new indicator gives more importance than its predecessor to balances of opinion for the near future and would appear to me more closely in line with output in building over the longer term.

During the first lockdown in spring 2021, the business climate in the building construction industry only partly conveyed the fall in activity in the sector.

In April 2020, the generalised fall in activity linked to the implementation of the first lockdown was translated in the business tendency surveys by a sudden slide in business climates in industry and in services (► **Figure 1**). The climates in building construction all declined, but much more moderately than in other sectors, at a time when most construction sites were almost at a standstill and the construction sector was posting a fall of over 60% in its activity (compared to Q4 2019[1]). This singular feature caused INSEE to look into the method used for the business climate in building construction.

The purpose of this composite indicator, like the other sectoral business climates drawn from the business tendency surveys, is to summarise the opinion of the businesses that are surveyed in a single indicator. The calculation method is based on factor analysis, a technique that allows concurrent trends in several variables whose movements are closely correlated to be extracted (► **Box**). With this method, the business climate in the building construction industry was constructed as a linear combination of five variables drawn from the business tendency surveys in the building industry: balances of opinion on past and forecast activity, the balance of opinion on order book levels, the balance of opinion on past workforce and an indirect estimation of production capacity utilisation rates. The respective weights of these different variables are updated each year and it is preferable that they should be relatively well balanced, which was no longer the case in 2020.

The moderate fall in the business climate in building construction in April 2020 can be explained by inertia in three of the five variables making up the climate indicator:

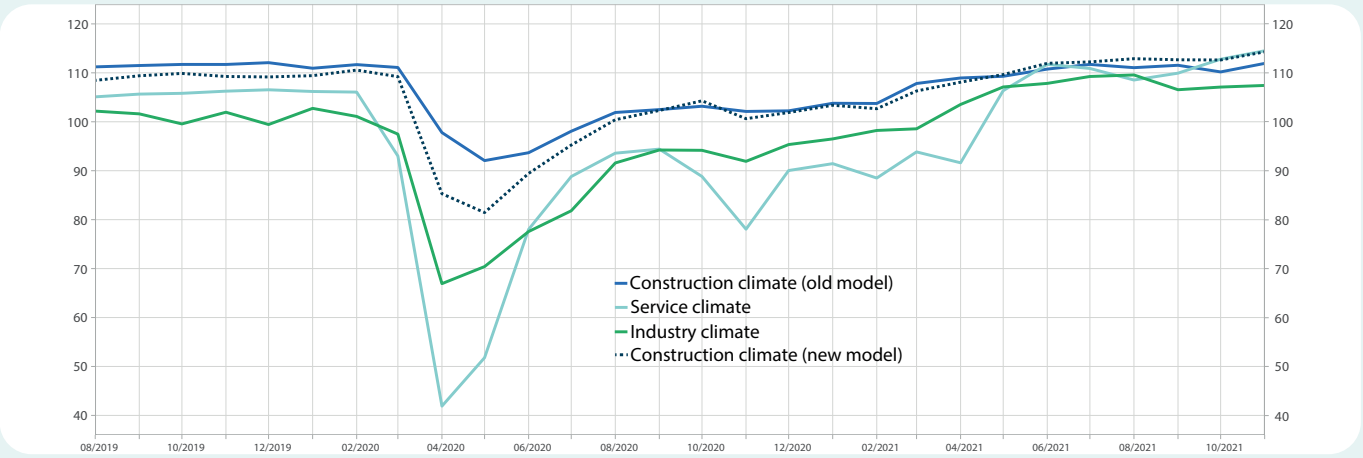
• the balance of opinion on the levels of order books fell significantly in April 2020, but less than in other sectors (balance of opinion of –26 in April 2020, down 26 points on the previous month, against a balance of –52 in manufacturing industry, down 36 points on March, for instance);

• the high weighting of the balance on past trends in the workforce resulted in too much importance being given to the past short-term situation;

• the indirect estimate of the production capacity utilisation rate (TUC) remained relatively high in spring 2020, despite many construction sites having been halted. In this very particular context, this estimation of TUC drawn indirectly from a question about the margins for increasing production if any additional orders should

1 Estimation based on quarterly accounts.

► 1. Business climates in services, industry and the building construction industry (before and after the change of method)



Source: INSEE, business surveys

be received[2] was certainly less relevant than in times of normal activity. In spring 2020, the building businesses that responded to the survey declared that their current order books continued to represent 7 to 8 months of work, on average.

A new model for the business climate in building construction has been estimated to capture short-term variations in the sector, in particular in times of crisis.

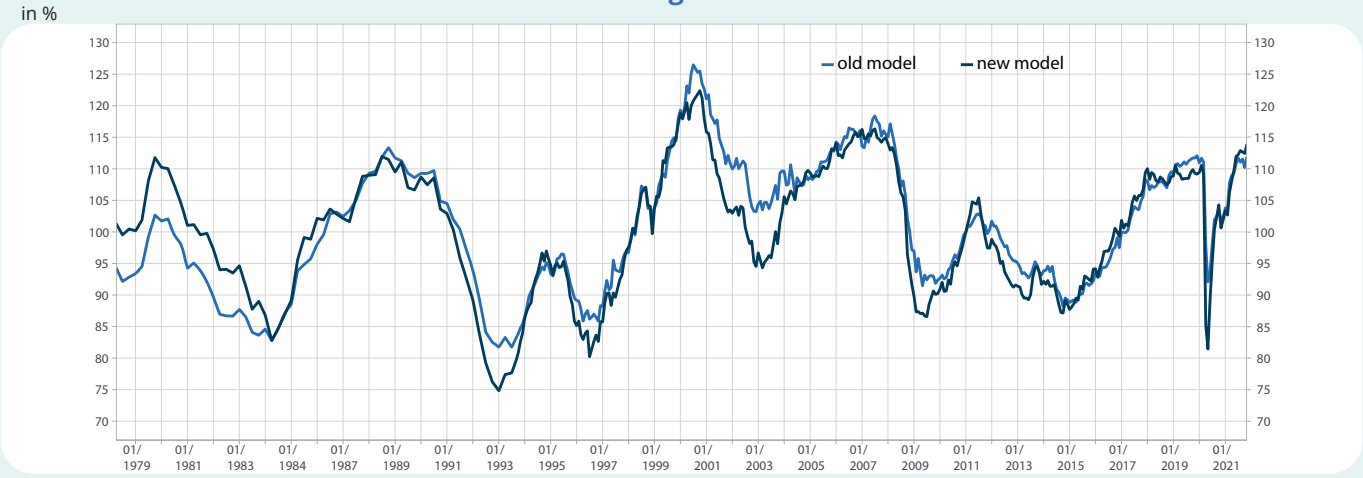
Further to the overhaul of the business climate in building construction, the model that is now used is based on four balances of opinion. Two of them were already present in the former model, which is to say the balances of opinion on forecast activity and past activity. The other two are new and concern the expected variation in the workforce and the expected variation in prices for contracts negotiated in the coming three months. They therefore replace the balances of opinion on order book levels and on the past variation in the workforce, and also the indirect estimation of production capacity utilisation rates. More particularly, the new climate would appear to be more homogeneous than the former one, with the weights allocated to the variables that compose it being more balanced (► **Box**).

In addition, the new climate in building construction captures the sudden fall that occurred in spring 2020 more effectively (► **Figure 2**). Over the longer term, it shows slightly larger variations than the former climate, with more pronounced dips in 2003-2004 and at the time of the 2008-2009 financial crisis. The new indicator also seems to capture variations in output in the building construction industry more effectively, as it has a profile that is closer to the year-on-year change in that output (► **Figure 3**). The correlation between year-on-year change in output in the sector and the new business climate (0.80, calculated over the period 1978 – 2019) is also a little higher than for the former climate (0.77). ●

2 The question asked is as follows: "If you did receive more orders, with your current resources, could you increase your production? If you answered yes, by how much?" The answer to this question is noted PCAUG and is then used to calculate the capacity utilisation rate as follows: $TUC = \frac{100}{1 + \frac{PCAUG}{100}}$

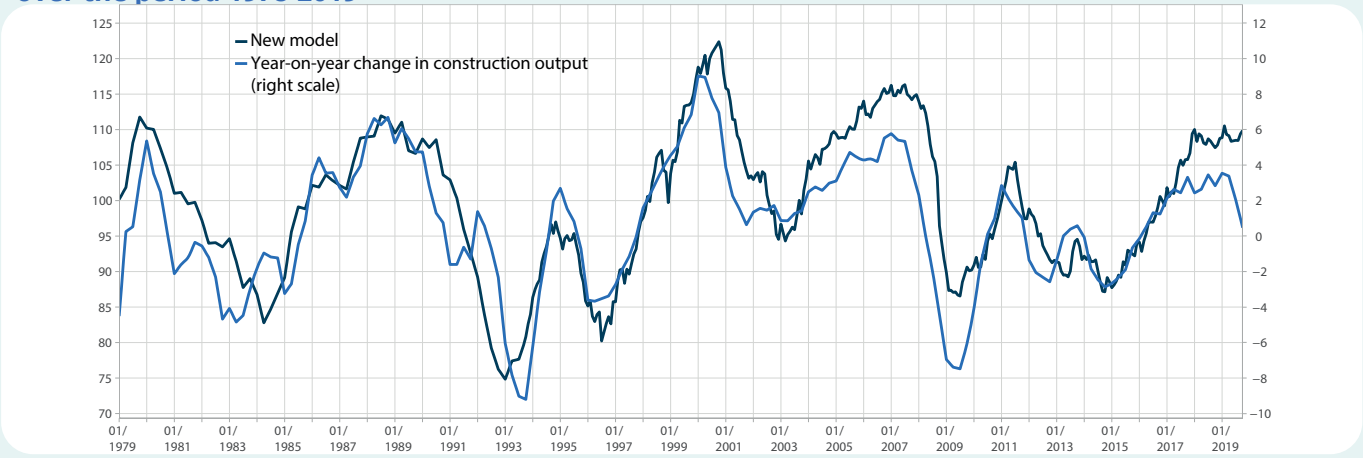
Tanguy Barthélémy

► 2. Former and new business climates in building construction



Source: INSEE, business surveys

► 3. Comparison between the proposed new model and year-on-year change in output in building over the period 1978-2019



Source: INSEE, business surveys

Calculation method for the business climate in the building construction sector

The method for calculating the business climate in the building construction industry is based on factor analysis (Doz C. et Lenglart F., 1999), a statistical method for dimensionality reduction. The objective is to reduce a certain number of variables that are correlated with each other to a small number of independent and unobserved variables, referred to as latent factors, by writing the observed variables as linear combinations on the unobserved latent factors. In the case of tendency surveys, and notably that in the building construction industry, the observed variables are a selection of balances of opinion and other elementary indicators drawn from the surveys.
The factor analysis model is in matrix form and is written::

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

where:

- y_{it} the observed variables i (balances of opinion, etc.) for the period
- F the unobserved latent factor
- λ_i the coefficients or loadings
- u_i the residuals of the model

The *loadings* λ_i are estimated by maximum likelihood. For simplicity's sake, the composite indicators of sectoral business climates are constructed by static factor analysis, limited to a single factor. This is the case of the new indicator of the business climate in building construction.

Ultimately, the common factor is written as a linear combination of the observed variables. The choice of these variables and the model itself are selected on the basis of the following five criteria:

- the survey must be representative of the building sector: presence of the "flagship" variables from the survey (balances of opinion on forecast and past activity, for instance);
- simplicity of the model: a limited number of observed variables, between 3 and six in practice;
- homogeneity: one variable must not be over-represented (or under-represented) in the definition of the common factor. In addition, the weights of the different ob served variables must be relatively well balanced;
- good relationship between the factor and the series: variations in the common factor explain a large part of the variations in the series;
- acceptance of a model with a single factor: single factor hypothesis accepted at a threshold of 5%.

Concerning the business climate in building construction, the former model used until March 2020 and the new one further to the change in methodology are the following:

$$F_{2019} = 0{,}09\ APR + 0{,}12\ APA + 0{,}42\ JCC + 0{,}26\ EPA + 0{,}14\ TUC$$

$$F_{2021} = 0{,}22\ APR + 0{,}31\ APA + 0{,}21\ EPR + 0{,}28\ PRIX$$

with:

- APR (APA resp.): balance of opinion on forecast activity (past activity, resp.);
- EPR (EPA resp.): balance of opinion on forecast workforce (past workforce, resp.);
- JCC: balance of opinion on judgement of order books;
- TUC: production capacity utilisation rate;
- PRIX: balance of opinion on future variation in prices. ●

Bibliography

Doz C. et Lenglart F. (1999), Analyse factorielle dynamique : test du nombre de facteurs, estimation et application à l'enquête de conjoncture dans l'industrie, *Annales d'Économie et Statistiques*, n°54, pp. 91-127. ●