

Composite indicators: the INSEE's experience

Application to the business climate indicator

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Business surveys: an essential tool for forecasters

- Every quarter, INSEE prepares a short-term economic scenario
 - for the 6 to 9 months ahead
 - focused on France
 - but also the Euro zone, the UK, the US, Japan and the emerging economies
- Business tendency surveys (BTS) help forecasters
 - to assess the current position of the economy in a cycle
 - to make quick estimates of the major macroeconomic indicators
- Techniques have been developed since the late 1980s
 - bridge models techniques
 - business climate indicators, turning point indicators, surprise indicators...

The INSEE business tendency surveys

- 10 surveys:
 - Industry (3), construction (4), services (1), trade (2)
 - Average response rate : 70% (2/3 by internet)
- A very narrow timetable
 - Questionnaires are sent to enterprises around the 29th of month M-1
 - Results are published around the 25th of month M
- Questions are mainly qualitative

QUESTIONS ON YOUR ENTERPRISE'S ACTIVITY			
1. YOUR PRODUCTION			
a.	Change in past 3 months.....	↗	⇒ ⇓
b.	Likely change in next 3 months.....	↗	⇒ ⇓
2. TOTAL ORDERS (OR DEMAND)			
For the season, do you consider your current order books (or demand) to be		above average ↗	average below average ⇒ ⇓

Businesses provide objective, well-founded responses

- Businesses use numerical information to respond to the BTS
 - recent variations of activity
 - quantities produced,
 - amounts invoiced,
 - hours worked.
 - expected activity
 - subjective judgement,
 - current state of their order books.
- Responses are consistent with the quantitative indicators
- The answers on past and predicted activity are consistent
 - 60% of businesses predict the future variations in their output correctly
 - Businesses rarely get it wrong twice in a row

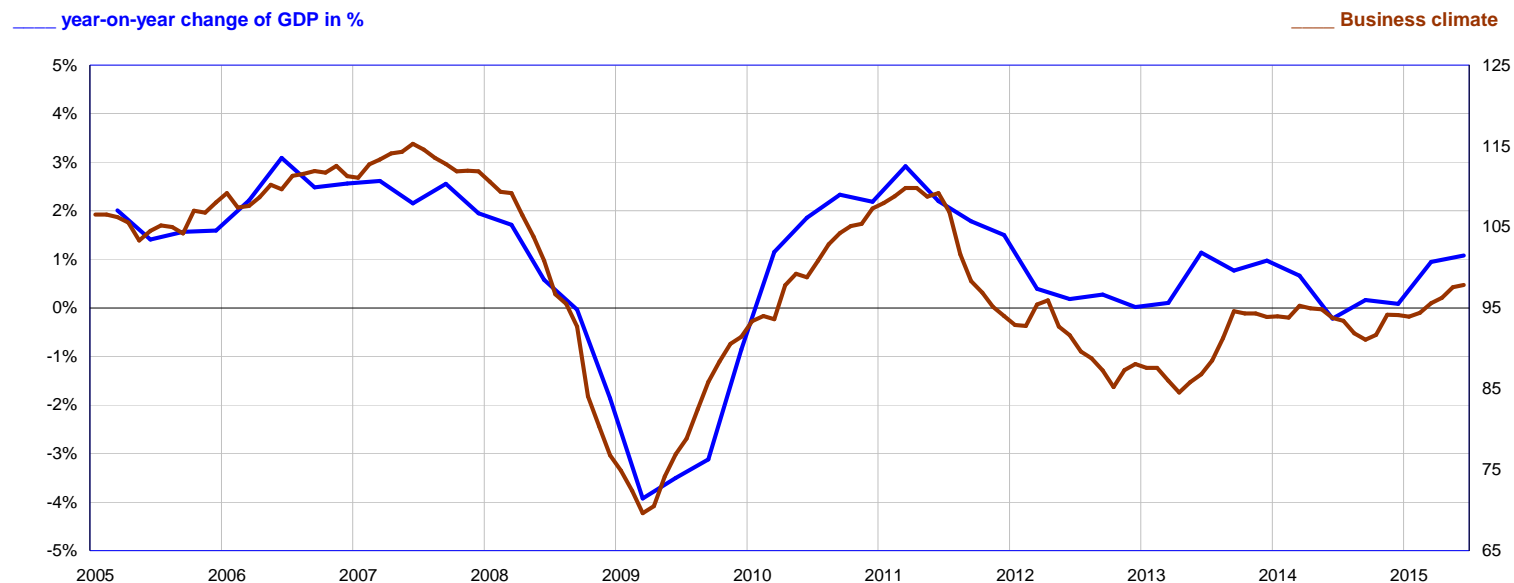
Balances of opinion, to summarise the responses

- They are considered as the most efficient way to quantify and combine responses of individual firms
- They are very simple to construct
- Their usefulness has been demonstrated both theoretically and empirically.
- They usually present a close correlation with the corresponding macro-economic variables, and thus yield good results when used in forecasts.

Balance of opinion= (% responses ) - (% responses )

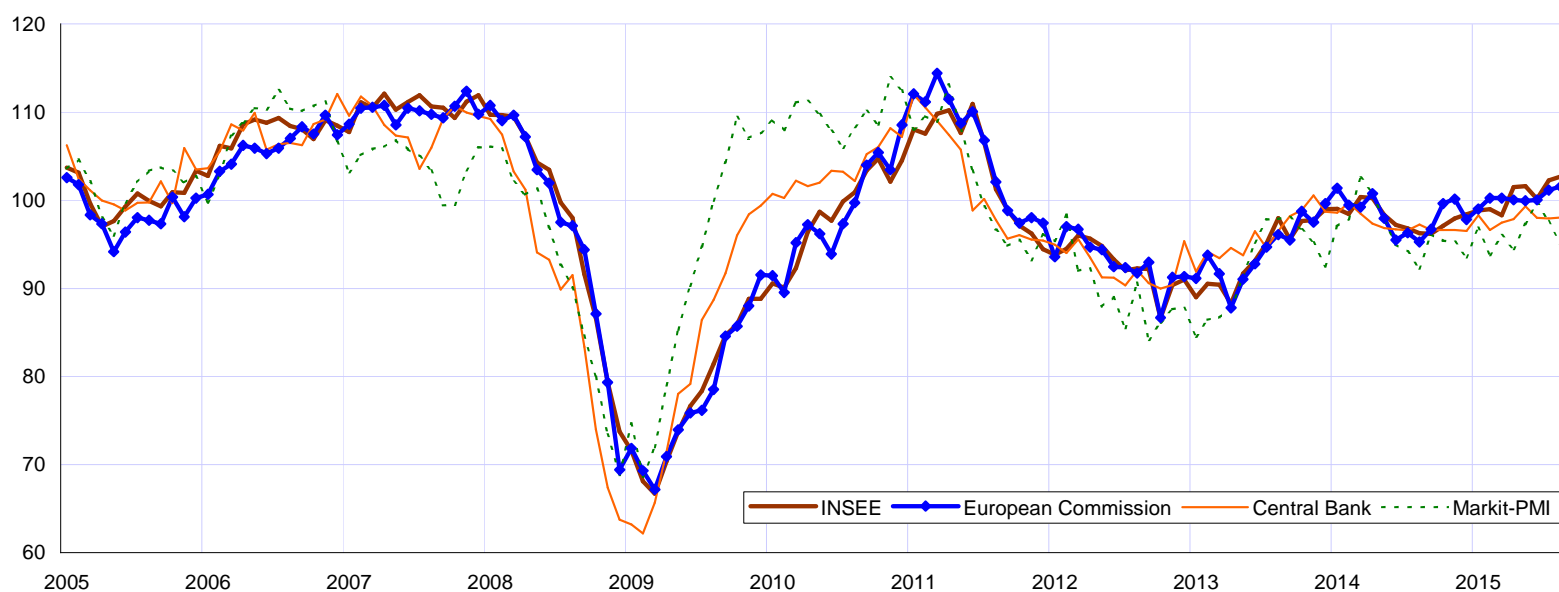
A composite indicator, to summarise the different questions

- INSEE publishes six business climate indicators
 - One for each of the five major sector
 - An overall indicator for the economy as a whole
- Since 2008 the business climate indicator for France has correctly reflected the growth of the French economy



Alternative business climate indicators

Survey	Reference month	Period of data collection	Publication	Data collected
INSEE	m	The first 3 weeks of m	Around the 25 th of month m	<ul style="list-style-type: none"> Change in past 3 months Likely change in next 3 months
National Bank	m	The first week of m+1	Around the 10 th of month m+1	<ul style="list-style-type: none"> Change in m compared to m-1 Likely change in m+1 compared to m
Markit	m	The last 2 weeks of m	Before the 5 th of month m+1	<ul style="list-style-type: none"> Change in m compared to m-1



A composite indicator for which purpose?

- To summarise the information contained in the different questions...
 - Simple average
 - very simple
 - the choice of the retained questions and the weightings seem to be arbitrary
 - Principle component analysis
 - the first principal component is reputed to be the ‘best’ average of the balances
 - Factor analysis
 - the assumption is made that each balance can be broken down into two
- ... and to reflect the main short-term economic movements
 - Selection of the balances
 - Constraints put on the weightings

Application to the industry with 3 methods

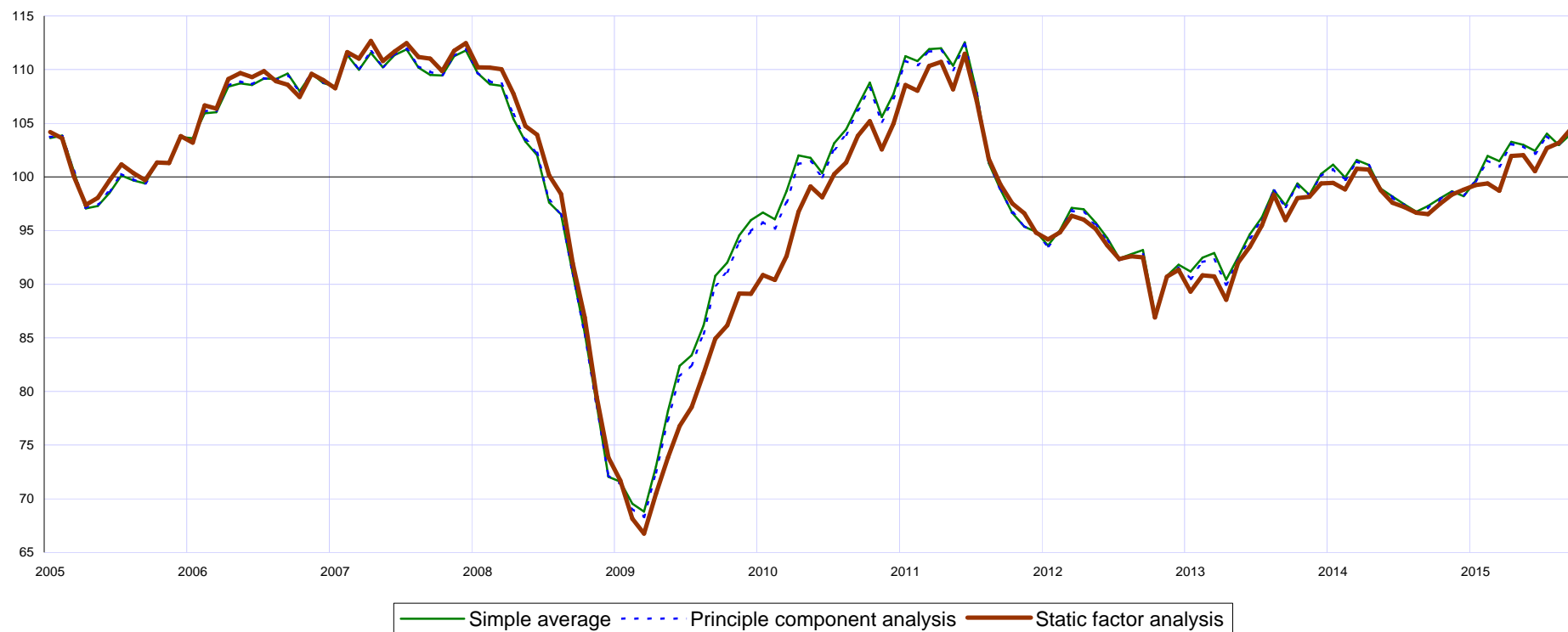
Correlations between monthly questions and the manufacturing output

	Past activity	Personal production expectations	General production expectations	Order books	Export order books	Stocks	Personal prices expectations
Output (y-o-y)	0.77	0.69	0.74	0.77	0.79	-0.32	0.26
Output (q-o-q)	0.54	0.61	0.61	0.45	0.48	-0.44	0.06

Weightings attributed to balances in the different composite indicators

	Past activity	Personal production expectations	General production expectations	Order books	Export order books	Stocks
Simple average	0.167	0.167	0.167	0.167	0.167	0.167
Principle component analysis	0.177	0.175	0.167	0.175	0.169	0.137
Static factor analysis	0.221	0.155	0.092	0.298	0.198	0.035

The three composite indicators



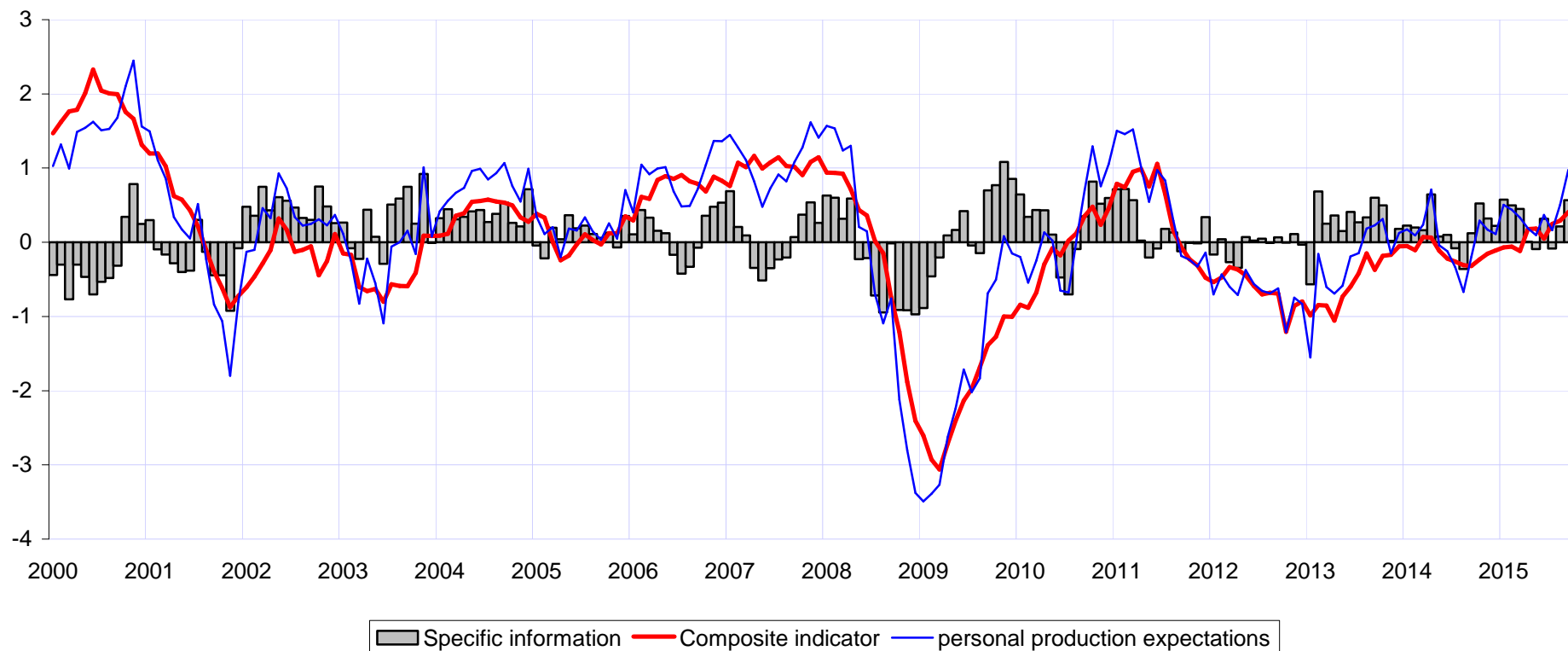
The way we build composite indicators in INSEE

- First step : the construction of the indicator
 - Standardisation of the balances B_i to a mean of 0 and a standard deviation of 1
 - Estimation of the composite indicator F
 - $B_i = \lambda_i \times F + n_i$ λ_i is called the loading of the balance B_i
 - $F = \sum_i w_i \times B_i$ w_i is the weighting of the balance B_i
 - Standardisation of the composite indicator to a mean of 100 and a standard deviation of 10

The way we build composite indicators in INSEE

- Second step : how to assess the quality of the indicator?
 - The relevance of the balance B_i in the composite indicator F
 - $\lambda_i = \frac{\text{covariance}(B_i, F)}{\text{variance}(F)}$
 - The loading can be interpreted as the contribution of the balance to the variability of the composite indicator
 - The efficiency of the composite indicator F
 - $\text{Efficiency} = \frac{1}{I} \times \sum_{i=1}^I \lambda_i^2$
 - The ability of the composite indicator to give a good idea of the main short-term economic movements
 - Correlation of the composite indicator with a reference variable

The composite indicator gives an additional information to the specific information of the balances



Thank you for your attention !

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