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**Adjusting for non-response: constant-sample method in the French
business surveys**

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ADJUSTING FOR NON-RESPONSE: CONSTANT-SAMPLE METHOD IN THE FRENCH BUSINESS SURVEYS

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Abstract

The constant sample method aims at partially correcting for non-response.

It is usual to comment on the results of a survey conducted at a given date in comparison to the results of previous surveys. Therefore, the fact that enterprises do not systematically answer each survey gives rise to a difficulty. Indeed, taking into account only answers from businesses responding to a particular monthly cycle of a survey can lead to a false diagnosis of changes in the climate if this is due only to a change in structure of the respondents. To tackle this difficulty, one solution is to affect plausible answers to some of the non responding enterprises. They are built from answers known for these enterprises from previous monthly cycles of the survey.

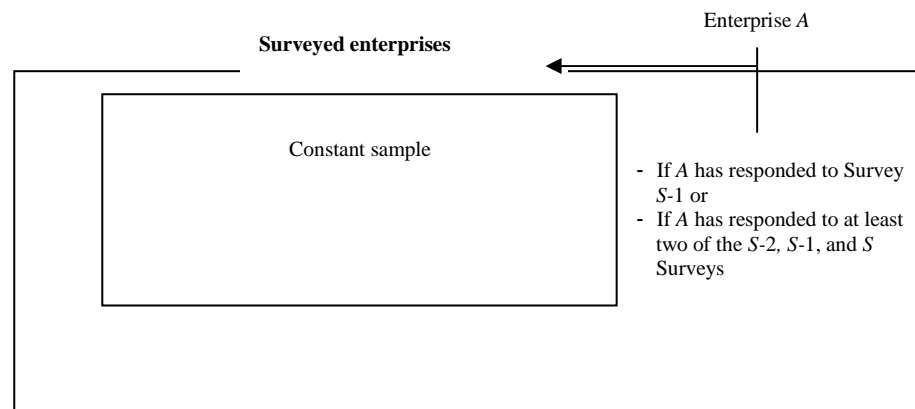
1. - General principles for determining constant sample

The constant-sample method is a fairly simple way to process non-response, based on a set of rules for “carrying forward” the earlier responses of non-respondent enterprises. Changes in results can thus be explained solely as the consequence of a shift in enterprise opinion. For a given question, the responses taken into account in the results are those of the enterprises in the constant sample.

The general principles of the constant-sample method are as follows:

- The constant sample deals with individual questions.
- The constant-sample method is applied only to qualitative questions with three multiple choices.
- The method is applied only on monthly asked and two-monthly asked questions.
- For each question processed with the constant-sample method, an enterprise is included in the constant sample if it has responded to that particular question in at least two of the last three surveys or if it has responded to the intermediate survey. For the monthly asked questions, the surveys comprise those of the current month m and of the two preceding months $m-1$ and $m-2$. For the two-monthly asked questions, the surveys comprise those of the current month m and of the months $m-2$ and $m-4$. In the discussion below, the dates of the three involved surveys will be noted S , $S-1$, and $S-2$, regardless the periodicity of the questions. The procedures are summarised in the following diagram.

Question Q ,
Survey S



2. - Details on method for completion of partial responses

The two tables below describe the specific procedure applied under the constant-sample method.

Table 1: Decision to include an enterprise in the constant sample and procedure for completing partial responses to a given question Q

Enterprise A has responded (R) or not (NR) to question Q in the 3 last surveys			Formation of constant sample for question Q in survey S : Procedures for enterprise A	
Survey $S-2$	Survey $S-1$	Survey S	Enterprise A included constant sample?	Processing of enterprise A 's responses and procedure for completing its non-responses
R	R	R	YES	Surveys $S-1$ and S : enterprise A 's responses are included in results.
R	R	NR	YES	Survey $S-1$: enterprise A 's response is included in results. Completion of response to question in Survey S : enterprise A 's response to Survey $S-1$ is copied to Survey S .
R	NR	R	YES	Survey $S-1$: specific procedure applied is described in Table 2 below. Survey S : enterprise A 's response is included in results.
R	NR	NR	NO	Surveys $S-1$ and S : enterprise A is excluded from constant sample.
NR	R	R	YES	Surveys $S-1$ and S : enterprise A 's responses to both Surveys are included in results.
NR	R	NR	YES	Survey $S-1$: enterprise A 's response is included in results. Completion of response to question in Survey S : enterprise A 's response to Survey $S-1$ is copied to Survey S .
NR	NR	R	NO	Surveys $S-1$ and S : enterprise A is excluded from constant sample.
NR	NR	NR	NO	Surveys $S-1$ and S : enterprise A is excluded from constant sample.

An enterprise may therefore be excluded from the constant sample for a question to which it has responded in the current survey S (this is the next-to-last configuration in the Table 1). In this case, its response to the question is not included in the processing of preliminary results, i.e., for the publication of the current survey S . However, under the rules set out in Table 1, this response is added back in the processing of final results, i.e., for the publication of the next survey, $S+1$.

Table 2: Procedure for completion of partial responses by enterprise A in (R, NR, R) configuration

In Survey S-2, the enterprise A responded:	In Survey S-1, enterprise A did not respond:	In Survey S, enterprise A responded:	In Survey S-1, the following response (“interpolated” between responses to Surveys S-2 and S) is recorded for enterprise A:
(+)	NR	(+) or (=)	(+)
(+)	NR	(-)	(=)
(=)	NR	(+), (=) or (-)	(=)
(-)	NR	(+)	(=)
(-)	NR	(=) or (-)	(-)

Key:

(+) = “increasing”, “above normal” response

(=) = “unchanged”, “normal” response

(-) = “decreasing”, “below normal” response.

An enterprise that has not responded to a question, but whose response is completed using one of the procedures described in the preceding tables, is said to be “interpolated” for this question.

In the end, all the questions of a survey are processed twice: once for the publication of the current survey S and again for the publication of the next survey S+1. There are two basic reasons for this procedure:

- as seen above, it is needed for applying the constant-sample method to particular questions;
- in addition, it allows the inclusion of data from late-responding enterprises.

In practice, for the industry survey for example, the constant sample is realized on approximately 15% of the weights in the date n and 4% for n-1.

To understand even better this method, let us take the fictitious example of a company exhibiting the following answers record.

Table 3: Monthly answer of an enterprise

January	February	March	April	May	June	July	September	October	November	December
(+)	(=)	(+)	No answer	No answer	(=)	(-)	No answer	(+)	Late answer (-)	(=)

According to the procedures of the constant sample method, the company which did not answer the September survey will be interpolated in September and credited with the answer of the previous month that is (-). The month after, as the company answered, the answer for the previous month will again be interpolated but this time credited with the value (=) (see table 4).

Table 4: Treatment applied (for every survey, calculation of the last two months)

Survey\Month	January	February	March	April	May	June	July	September	October	November	December
February	(+)	(=)									
March		(=)	(+)								
April			(+)	Interpolated (+)							
May				Not used	Not used						
June					Not used	Not used					
July						(=)	(-)				
September							(-)	Interpolated (-)			
October								Interpolated (=)	(+)		
November									(+)	Interpolated (+)	
December										(-)	(=)

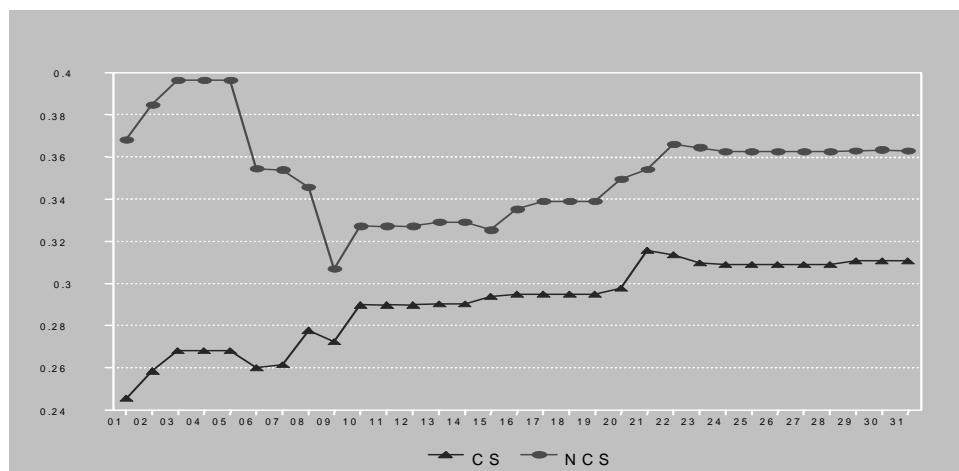
3. - Some use of the constant sample method

3.a. - Allowing an advanced exploitation of the survey

Aside from being a method to treat non-response, the technique of the constant sample can be useful in processing the survey before having obtained the entire set of questionnaires which will be effectively sent by the enterprises. During the later process of the same survey, the answers which will have a real influence on the balance of opinion will be only those for whom enterprises modified their answer between two successive surveys.

In view of the graph 1 below, one can see that the evolution of the profile of the balance of opinion during the month may not be the same depending on whether or not we use the method of the constant sample.

Graph 1 : Advanced exploitation for past production in industry survey



Reading: evolution during the month of the balance of opinion following the method of process.
 Key: CS = “with constant sample” ; NCS = “no constant sample”.

3.b. - The general use

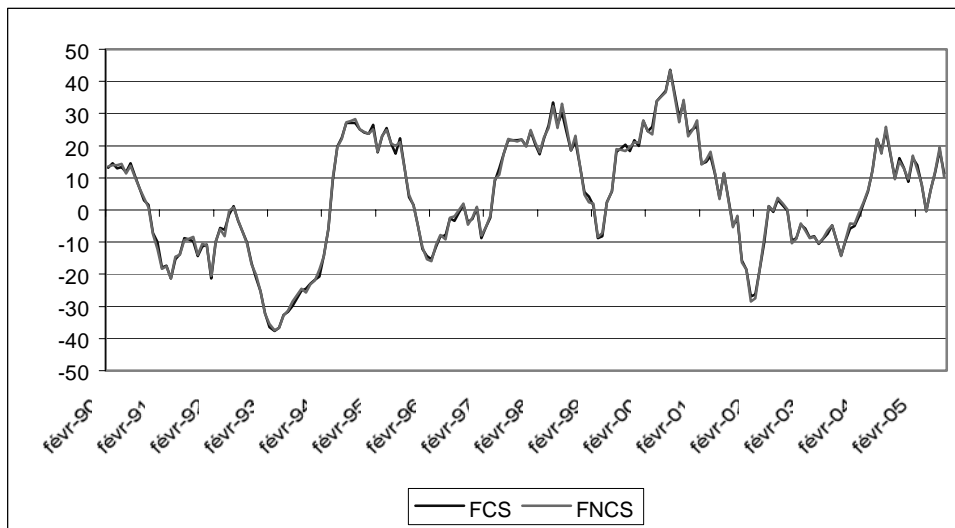
As explained, the constant sample method is used especially to partially correct for non-response. The following elements show the impact of this method on the results.

Several series corresponding to the history of the balance of opinion can be calculated to measure the real impact of the procedure of the constant sample on the published results:

- The balance of the final survey results (after having obtained all the questionnaires) which corresponds to the process without particular treatment of the answers obtained by the survey,
- The balance of the final survey results (after having obtained all the questionnaires) which corresponds to the process with constant sample (as described),
- The balance of the preliminary results (for the current month) which corresponds to the process without particular treatment of the answers obtained by the survey,
- The balance of the preliminary results (for the current month) which corresponds to the process with constant sample survey (as described).

The following graph shows the impact of the constant sample on the balance of opinion for the variable Tendency of past production in the Industry survey. It seems that altogether the procedure of constant sample marginally affects the history of the balance of opinion for the whole industry.

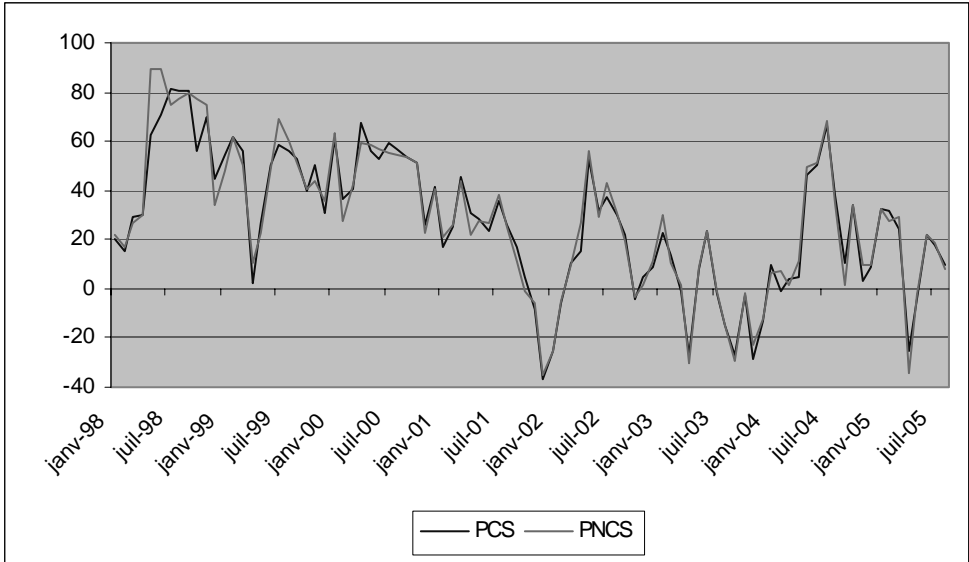
Graph 2 : Tendency of past production in industry survey



Key: FCS = “final results with constant sample”, FNCS = “final results without constant sample”.

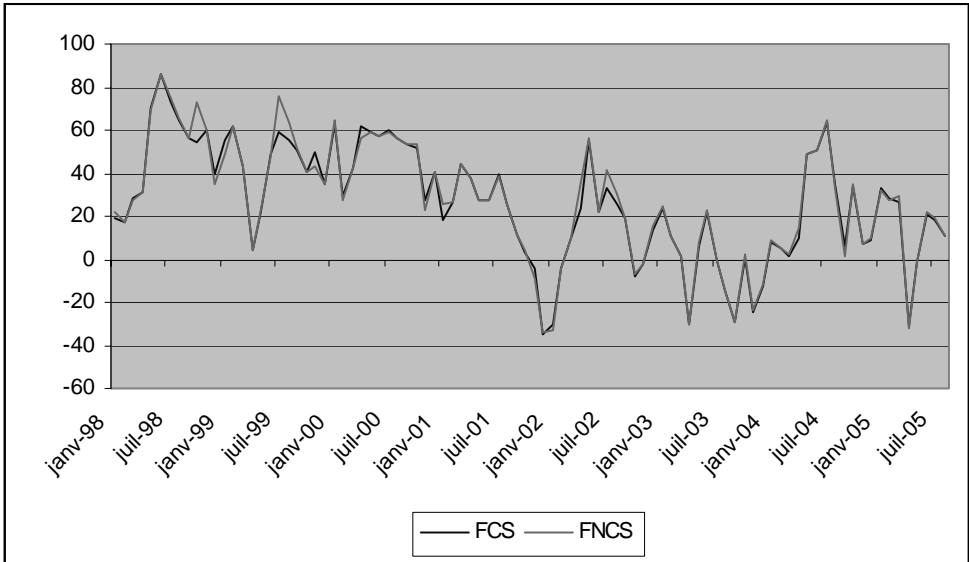
The next graphs shows the impact of the constant sample on a more concentrated sector as for example that of the car industry. In general the differences between “with constant sample” and “without constant sample” are rather weak. Some months however, the differences turn out more marked. This is explained by the fact that the car industry sector is a relatively concentrated sector and that the absence of one or another big enterprise can modify the balance of opinion. The evolutions of the balance “with constant sample” are mostly more smoothed with regard to the balance “without constant sample”, which presents a more struck evolution. According to any evidence, the non-consideration of the constant sample method can lead to evolutions of the balance manifestly too much pronounced, both for the “preliminary results” and for the “final results”.

Graph 3 : Tendency of past production for car industry in industry survey - preliminary results



Key: PCS = “preliminary results with constant sample”, PNCS = “preliminary results without constant sample”.

Graph 4 : Tendency of past production for car industry in industry survey - final results



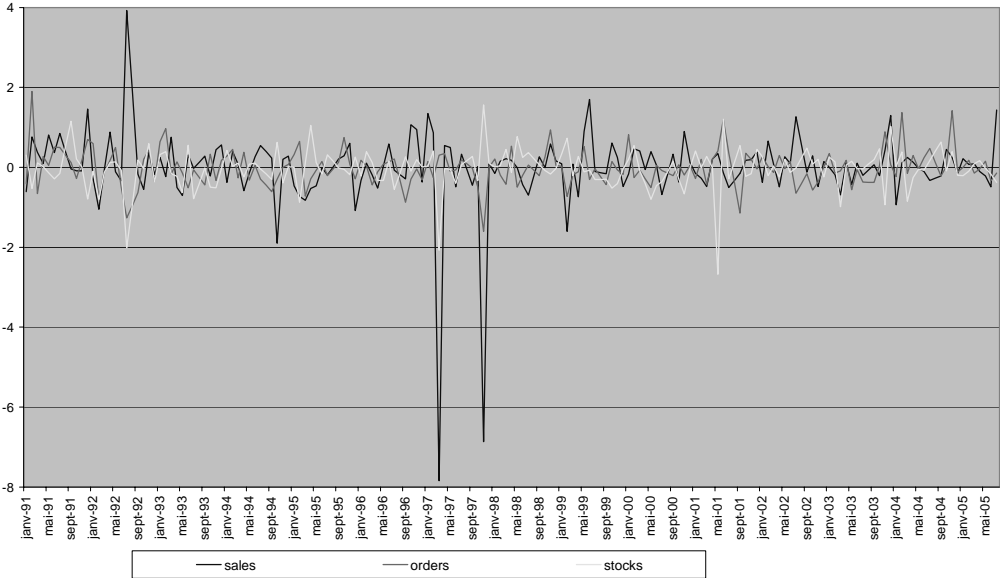
Key: FCS = “final results with constant sample”, FNCS = “final results without constant sample”.

At a fine level or for concentrated sectors, non response, if it is not handled, can amplify movements and introduce noise due only to a change in structure of the respondents, noise who will after impact the more aggregated level.

The same conclusions can be formulated for all other surveys ; for example for the retail trade survey.

The next graph shows the impact of the constant sample on several balance of opinion for the retail trade survey. The differences between “with constant sample” and “without constant sample” are negligible in most months but can have a more important impact in some months. The retail trade sector contains several major companies, thus the absence of one or another of them can modify the balance of opinion.

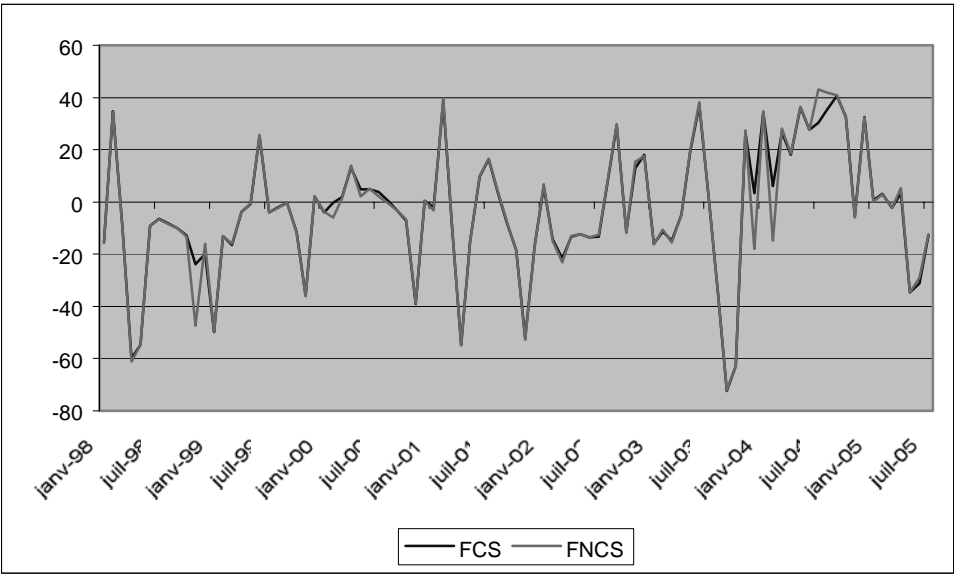
Graph 5 : Impact on several balance of opinion for the retail trade survey



Key: For each series, difference between “final results with constant sample” and “final results without constant sample”.

Always for retail trade survey, focussing on a fine sector as for example that of “do-it-yourself” sector, the evolutions seem also more marked without use of the constant sample method.

Graph6 : Tendency of past sales for “do-it-yourself” in retail trade survey



Key: FCS = “final results with constant sample”, FNCS = “final results without constant sample”.

Conclusion

The constant-sample method is a fairly simple way to process non-response which aims to impute plausible answers to some of the non responding enterprises. It ensures that the same sample of respondents contributes to estimates for surveys S and $S+I$. Changes in results can thus be explained solely as the consequence of a shift in enterprise opinion.

All the questions of a survey are processed twice: once for the publication of the current survey S and again for the publication of the next survey $S+1$. The “preliminary results” of the current survey S can therefore be revised during the final process of the next survey $S+1$.

The procedure of constant sample marginally affects the history of the different balance of opinion. At a fine level or for concentrated sectors, non response, if it is not handled, can amplify movements and introduce noise due only to a change in structure of the respondents, noise who will after impact the more aggregated level and lead to an inadequate reading of the economic situation.