Methodology of Correcting Non-response Bias: Introducing Another Bias? The Case of the Swiss Innovation Survey 2002

the case of the Swiss innovation survey 2002

Working Paper

Author(s):
Sydow, Nora

Publication date:
2006-10

Permanent link:
https://doi.org/10.3929/ethz-a-005277177

Originally published in:
KOF Working Papers 152

KOF Konjunkturforschungsstelle
Swiss Institute for
Business Cycle Research

Arbeitspapiere/ Working Papers

Nora Sydow

Methodology of Correcting Non-response Bias: Introducing Another Bias?

The Case of the Swiss Innovation Survey 2002

No. 152, October 2006

ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich

Methodology of correcting non-response bias: introducing another bias ?

The case of the Swiss Innovation Survey 2002

Nora Sydow

KOF - Swiss Institute for Business Cycle Research,
ETH Zurich, Switzerland
sydow@kof.ethz.ch

Abstract

The non-response in a survey can lead to severe bias. In order to manage this problem, it is usual to make a second survey by a sample of non-respondent. This allows us to test if there is a significant difference in the key variables of the survey between respondents and non-respondents and, if yes, to take it into account. But, the risk is great to introduce another bias depending on the mode (mail vs phone) of survey.

The KOF industrial economics group is exploring for many years the innovation behaviour of Swiss firms using a mail survey addressed to almost 6600 panel firms of the industrial, construction and service sector. We use since some years the data of a second survey by non-respondents to correct non-response bias. Contrarily to the first survey, this one is made by phone. One can suspect that the personal interaction with the person(s) calling may be introducing another bias. In order to investigate this question, in the case of the ETH Zurich's innovation 2002 survey, we decided next to the regular non-respondent-phone-survey, to conduct a similar phone survey by a subsample of the respondent-group. Thus, we dispose of data for the same variables coming from the two modes of survey and allowing us to show if there is a difference or not in the response behaviour. We use different statistical approaches to investigate this issue, considering χ^2-test and Logit models. Our results show that data collection method may influence the response.

Key Words: survey mode, non-response bias, non-response analysis

JEL Classification: C0,C13

Acknowledgements: The author thanks Laurent Donzé and the participants of the 28th CIRET Conference Rome, September 2006 for valuable comments.

1. Introduction

Mixed-mode designs are often used in surveys to lower non-response. Nevertheless different modes can bias the results. The comparability of data collected with different modes is not automatically given. Reliability of data has to be analysed.

Most evaluations of mode effects focus on the issue of response rates. Relatively few studies whether respondents provide different answers with different modes of questionnaires. Probably due to the fact that this kind of test-retest methods is expensive and not in the main interest of survey conducting institutes. The issue of data reliability due to mixed-mode surveys has become only recently a research topic.

Studies that shows mode effects can be found in Silberstein and Scott (1991), Scherpenzeel (1995), Biemer (2001), De Leeuw et al. (1996), Saris and Hagenaars (1997) and Schwartz et al. (1991). Studies with no mode effects are De Leeuw and Van der Zouwen (1988), De Leeuw (1992), Gallobardes et al. (1998) etc.

Focus of this paper is the methodology used to correct non-response bias in the case of the Swiss Innovation Survey 2002. While the main survey is conducted by self-administered questionnaires, the non-response analysis is made by phone. If a mode effect exists, it might be expected that the responses given in a context of a self-administered questionnaire would differ from those given by phone for the same unit.[1] In order to explore this issue a test-retest design was used: a sample of respondents of the main survey was re-interviewed by phone.

2. The Swiss Innovation Survey 2002

2.1 Characteristics of the surveys

The Swiss Innovation Survey 2002 was based on the KOF ETH Zurich business panel. The sample (stratified sample with simple random sampling) is drawn out of the official enterprise register and contains around 6600 firms in the manufacturing, construction and services sectors. The sample is stratified by 28 economic activities (industries) and three firm classes, defined by optimal stratification, separately for each industry.

The main survey was conducted by self-administered questionnaires in autumn 2002. In the follow-up phase we contacted by phone the non-responding firms to increase the initial response rate. After this intensive callback the global response-rate approached roughly 40%. Table A.1 in the appendix shows the response rate by stratum after follow-up activities. As it varied from stratum to stratum, a non-response bias was suspected. A second survey by the non-respondents helped to elucidate this question. This survey took place in the begin of the year 2003.

2.2 Methodology of Non-response Analysis

To reduce burden a shortened questionnaire is used for collecting data of non-respondents. This second survey is done by phone containing the core questions of the main survey. The methodology used to correct non-response bias is furnished in Donzé (2002). It consists of adjusting weighting factors. The marginal totals are computed, i.e. the number of firms answering yes or no to the core

[1] Cf. Descombe (2006)

questions, per industry (or firm class). The initial weights (from the specific design plan) are then calibrated[2] with these marginal factors.[3]

In order to enhance comparability the non-response survey was conducted with identical design factors such as same wording and same order of questions as in the self-administered questionnaires. Nevertheless the personal interaction between the interviewer and the interviewee can not be neglected. The role of the interviewer is quite important: he has to persuade a sample of non-respondents to participate. The data collector of the phone surveys are instructed to adhere to protocols in order to standardise measurement as much as possible. As the interviewer's behaviour may affect the answers given, the non-response calls are done by one person to avoid the introduction of an additional source of error.[4]

Our methodology has been criticised on the ground that we are using a different mode to analyse an eventual bias: there is a potential for measurement error as the modes used may cause measurement differences, i.e. we don't know whether the same answer is provided regardless of which method is used.

3. Mode effects

Our survey design consists of a mixed-mode data collection procedure. After sending the self-administered questionnaire, a telephone follow-up is very effective to raise response rate. Telephone calls help to improve the quality of the contact information and the attention paid to the enquiry. The appropriate contact person in the company can easily be determined, so that the questionnaire can be re-send to the right person. No measurement error is to be worried about this kind of mode change as no survey data are collected with the follow-up mode.[5]

Mixing up modes in the main and the complement survey by non-respondents may introduce an additional source of error. In fact, mode effects can be the outcome of a selection or a transformation process.[6] If the response probability differs among modes, the mode effect is the result of a selection process. Mode effect as the result of transformation process exist, when the probability to report the true value differs among different modes for the same interviewee.

In our case a mode effect due to transformation process can be suspected as the telephone interview mode itself may have been influencing the respondents' answers. In order to explore this issue a specific investigation was conducted for a sample of respondents.

4. Data collection

Figure 1 summarizes the different steps for data collection. In a first step self-administered questionnaires were send to all firms. After the intensive callback we received 2584 completed questionnaires. Our non-response analysis was based on a phone survey by a subsample of the non-respondents. In order to explore a potential mode effect this phone survey was even extended to a sample of respondents.

---

2 Calibration is done by the SAS procedure CALMAR, developed by Deville and Sautory from INSEE (Cf. Sautory (1993))

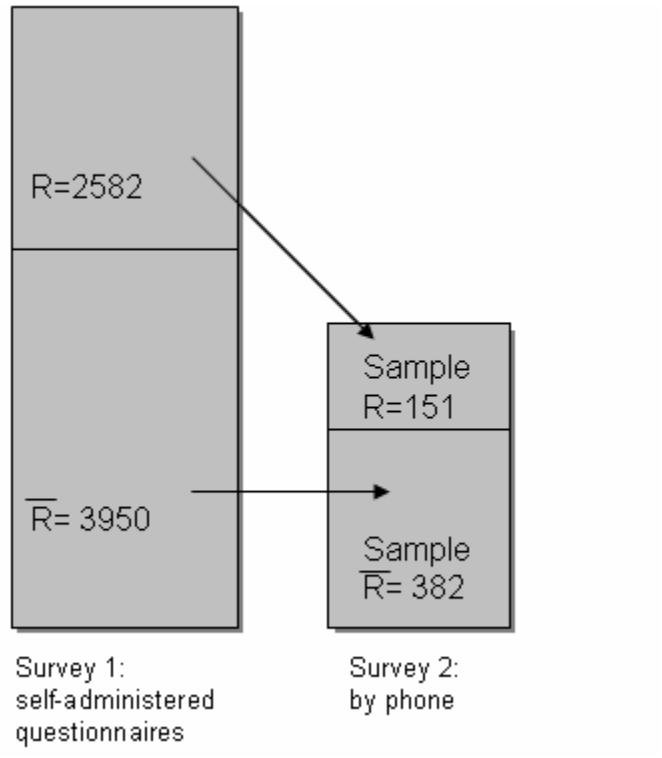
3 Cf. Deville et al. (1993)

4 Cf. Pannekoek (1988) or Stokes and Yeh (1988)

5 Cf. De Leeuw (2005)

6 Cf. Saris (1997), Saris an Hagenaars (1997) or Voogt and Saris (2005)

Figure 1: Overview - Data collection



R: Respondents

$\overline{R}$: Non-respondents

Therefore a random sample over the whole set of respondents was used. 151 firms (5.8% of the respondents) were asked to answer the same core questions used for the non-response survey by phone.

To gather the data 151 contact persons who had already filled in our self-administered questionnaire were recalled. To obtain a dataset containing responses given by mail as well as responses given by phone of the same unit, a learn effect that could disturb comparability cannot be excluded. In fact the 151 interviewees by phone are not completely comparable to the interviewees of the non-response survey as they previously filled-in the self-administered questionnaire and have read all explanations given. The non-respondents though were only provided with an oral explication of the question. Nevertheless there was an important time slice between survey 1 by self-administered questionnaire and survey 2 by phone. Due to forgetting effects this aspect can be neglected in our approach.

In a first step we deducted the phone sample R from the respondents of survey 1 to obtain disjoint datasets. Table 1 shows the structure of the respondents of survey 1 and survey 2.

Table 1 Responding firms Swiss Innovation Survey 2002

Economic activity	Self administered question-naire (R)	Self administered question-naire (R less sample R)	Non-respondents by phone survey (sample $\overline{R}$)	Respondents by phone survey (Sample R)
Food / Beverage	108	103	6	5
Textile	42	41	0	1
Clothing / Leather	17	16	1	1
Wood processing	58	58	0	0
Paper	37	37	0	0
Publishing	88	82	5	6
Petroleum and Chemicals	84	78	3	6
Rubber and plastic products	72	70	3	2
Other non metallic mineral products	56	55	5	1
Metal	27	27	0	0
Metalworking	195	186	8	9
Machinery	221	208	3	13
Electrical machinery	55	48	15	7
Electronic / Instruments	131	123	28	8
Watches	42	41	6	1
Vehicles	24	22	7	2
Other Manufacturing	57	55	1	2
Energy / Water	48	45	0	3
Construction	221	203	65	18
Wholesale	216	205	38	11
Retail trade	181	174	30	7
Hotels and restaurants	103	98	22	5
Transport / Telecommunication	139	129	36	10
Banking / Insurance	118	111	38	7
Real estate / Renting	19	19	2	0
Computer services	44	40	11	4
Business services	154	135	48	19
Personal services	27	24	1	3
Total	2584	2433	382	151

5 Methodology and results

The main key variable of our both surveys is INNO[7]. The methodology used to measure the influence of the survey mode is based on this single variable. In a first step we will explore if the same answer is provided regardless of which method is used, employing "sample R" with phone mode and self-completion mode. In a second step we will compare the answers given by "R less sample R" in self-completion mode to "sample R" and "sample $\overline{R}$" in phone mode. To explore this issue we will use the following approaches:

- χ^2-test and Mc Nemar's test
- Logit model for estimating probabilities for "sample R"
- Logit model using "R less sample R", "sample R" and "sample $\overline{R}$"

Table 2 shows the number of innovative firms (i.e. firms that introduced a product and or a process innovation in the period 2000-2002) in the different modes with the different samples.

Table 2 Number of innovative firms in the different modes

INNO	Yes	No
R	59.50	40.50
N	2584	
R less sample R by mail	59.6	40.40
N	2433	
Sample $\overline{R}$ by phone	62.27	37.73
N	379	
Sample R by phone	60.93	39.07
N	151	
Sample R by mail	58.28	41.72
N	151	
Notes:	The variables are not weighted	

First, it will be analysed whether there are significant differences in number of innovative firms between the different modes. We use a chi-squared test for detecting differences in answer distributions.

For "sample R" we have answers given by self-administered questionnaire and answers given by phone. Mc Nemar's test is used to explore the significance of change of answers in both modes. Table 3 shows the results. There is no significance of change between both modes. Different modes don't seem to influence the answers.

[7] Innovation activities in the period 2000-2002 (yes=1; no=0)

Table 3 Contingency table for "sample R"

INNO	**Yes**	**No**
Sample R by phone	60.93	39.07
N	151	
Sample R by mail	58.28	41.72
N	151	
Notes:	The variables are not weighted	
Mc Nemar's Statistic	0.381	
df	1	
Pr	0.537	

Table 4 to 7 show the different contingency tables for the different groups of firms. All χ^2-tests show no significant difference using different modes, i.e. using different modes do not lead to a different number of innovative firms in the different datasets.

The influence of the mode effect is only considered for dataset "sample R", only for these data the response under both modes is observable. For the remaining datasets only responses under one mode is observable, i.e. the response of "sample $\overline{R}$" under self-administered questionnaire is not available. Even if Mc Nemar's test were not significant, table 3 shows a slight positive influence of the phone mode on the innovation response. We will explore this issue more thoroughly by using a more sophisticated method.

Table 4 Contingency table for "R" and "sample $\overline{R}$"

INNO	**Yes**	**No**
R	59.50	40.50
N	2584	
Sample $\overline{R}$ by phone	62.27	37.73
N	379	
Notes:	The variables are not weighted	
χ^2	1.069	
df	1	
Pr	0.301	

Table 5 Contingency table for "R less sample R" and "sample R"

INNO	**Yes**	**No**
R less sample R by mail	59.6	40.40
N	2433	
Sample R by phone	60.93	39.07
N	151	
Notes:	The variables are not weighted	
χ^2	0.103	
df	1	
Pr	0.749	

Table 6 Contingency table for "sample $\overline{R}$" and "sample R"

INNO	**Yes**	**No**
sample $\overline{R}$ by phone	62.27	37.73
N	379	
Sample R by phone	60.93	39.07
N	151	
Notes:	The variables are not weighted	
χ^2	0.0824	
df	1	
Pr	0.774	

Table 7 Contingency table for "R less sample R" and "sample $\overline{R}$"

INNO	**Yes**	**No**
R less sample R by mail	59.6	40.40
N	2433	
Sample $\overline{R}$ by phone	62.27	37.73
N	379	
Notes:	The variables are not weighted	
χ^2	0.777	
df	1	
Pr	0.378	

The next steps of our approach consist in analysing the influence of the mode effect on the response behaviour. Therefore we estimate the probabilities of being an innovative firm. We assume that a transformation process takes place and lead to a mode effect, i.e. the probability to give the "true" value is varying for the different modes.

First we model the innovation probability for "R less sample R" by a Logit model with backward selection. For reasons of full information we choose structural variables available for all units as explanatory variables. This background information is provided in the official firm register. Table 8 shows the parameters of the estimated model. See table A.2. in the appendix for the model specifications.

Table 8 Logit Modelling of Innovation Probability (R less sample R)

Variable	Coeff.	S. E.
Constant	-1.2763	0.1733
IND_1	1.9482	0.2208
IND_2	2.0119	0.2046
IND_3	2.0901	0.1963
IND_4	2.4962	0.2302
IND_5	1.4176	0.2617
DL_1	0.7480	0.1832
DL_2	1.3660	0.1920
GR_M	0.4632	0.0960
GR_G	1.0000	0.1577
SP_F	-0.3987	0.1123
N	2433	
R2 Mc Fadden	0.0969	
% Concordance	68.5	
Mean Prob. Inno	0.595972	0.00353528

Notes:
- Variable description in table A.2
- Reference group for economic activity: construction
- Reference group for firm size: small firms
- Reference group for language: Italian
- Regional dummies as REG_1 to REG_6 as well as language dummy SP_D were removed by backward selection
- Significance level 1%

"sample R" was drawn by simple random sampling over the whole set of respondents of survey 1. Therefore we can easily estimate the probability of innovation PROB_Innog for "sample R" using the coefficients of the model estimated for the firms responding to survey 1.

$$PROB\_INNO_g = 1/(1+\exp(-Q)) \quad (1)$$

with

$$Q=-1.2763+1.9482*IND\_1+2.0119*IND\_2+2.0901*IND\_3+2.4962*IND\_4+1.4176*IND\_5+ 0.7480*DL\_1+1.3660*DL\_2+0.4632*GR\_M+1.0000*GR\_G - 0.3987*SP\_F \quad (2)$$

By inserting (2) in (1) we obtain $PROB\_INNO_g$ for "sample R" (see table 9). In a further step we investigated if there are any differences in response behaviour as measured by the estimated probability of innovation. To this end we estimated separately a Logit model for the innovative behaviour of "sample R". Again we choose structural variables as explanatory variables. Table 10 shows the results for this model. Based on the parameter of this model we calculated PROB_INNO (see table 10).

Table 9 Estimating probability of innovation for "sample R" with model from "R less sample R"

N	151	S.E.
Mean Prob. $INNO_g$	0.575727	0.01420888

Table 10 Logit Modelling of Innovation Probability (Sample R)

Variable	Coeff.	S. E.
Constant	0.5213	0.1973
IND_4	2.9470	1.0813
SP_F	-1.4893	0.4849
N	151	
R2 Mc Fadden	0.1121	
% Concordance	39.7	
Mean Prob. Inno	0.609272	0.01450461

Notes:
- Variable description in table A2, all remaining variables were removed by backward selection
- Reference group for economic activity: construction
- Reference group for firm size: small firms
- Reference group for language: Italian
- Significance level 1%

To determine whether there is a significant difference between the two estimated probabilities we used a paired sample t-test. Therefore we test the null hypothesis: H0: di= Prob_INNO - Prob_INNOg=0. (i.e. 0.609272-0.575727). Table 11 shows the results of this test.

Table 11 Paired sample t-test for estimated probabilities

$\overline{d} = \frac{1}{n-1}\sum_{i=1}^{n} di_i$	0.0337683995
$Var = \frac{1}{n-1}\sum_{i=1}^{n}(di_i - \overline{d})^2$	0.0315841003
$std = \sqrt{Var}$	0.1777191614
$t = \frac{\overline{d}}{\frac{std}{\sqrt{n}}}$	2.3348806982
α	0.05
Df	150
t_c	1.645

H0 had to be rejected as $t>t_c$. This means that the probability of being innovative reported by phone is significantly higher than for the self-administered mode.

Last step of our analysis is computing a Logit model for the innovative behaviour of all firms, i.e. creating a dummy variable for mode effect in addition to the structural variables. Table 12 summarizes the results obtained.

Table 12 Logit Modelling of innovation behaviour for all data

Variable	Coeff.	S. E.
Constant	-1.1865	0.1453
IND_1	1.8015	0.1983
IND_2	1.8305	0.1795
IND_3	1.9435	0.1719
IND_4	2.1414	0.1925
IND_5	1.2970	0.2429
DL_1	0.7532	0.1549
DL_2	1.1727	0.1583
GR_M	0.3855	0.0924
GR_G	0.9356	0.1525
SP_F	-1.5089	0.4275
mode	0.6023	0.1152
N	2873[8]	
R2 Mc Fadden	0.0775	
% Concordance	66.3	
Notes:	Variable description in table A.2, all remaining variables were removed by backward selection	
	Reference group for economic activity: construction	
	Reference group for firm size: small firms	
	Reference group for language: Italian	
	Significance level 1%	

Again the results suggest that the method of data collection by phone is more susceptible to positive answer, as mode effect is influencing the innovation behaviour in a positive way.

6. Discussion

The different approaches to analyse the influence of the mode effect show different results. On the one hand the χ^2-test show no significant differences among the different datasets, i.e the number of innovative firms is not differing using the self-administered or the phone mode. But this kind of test is not taking the influence of the mode into consideration, as "sample $\overline{R}$" might have reported less innovative firms than under self-administered questionnaire. With the last two approaches we try to model this influence. The results shows that data collection by phone may influence positively the answer. Different reasons may be responsible for this effect.

On the one hand the interviewee may clarify some factual issues, give additional explanations compared to the self-administered questionnaire and influence the answer given. On the other hand

[8] Some firms participating to non-response survey and responding later on to the main survey were excluded from the model.

the interviewer may suggest a socially desirable answer, as the self-administered questionnaire is more anonymous than the telephone interview.

Beside the interaction by communication the pace of the interview can not be neglected. In case of self-administered questionnaires the respondent can consider the questions and answers as long as he needs, a telephone interview however induces a pace of response that might lead to hurried or less thoughtful answers.

There is a slight time bias conducting the main survey in autumn and correcting the non-response bias by a second survey a few months later. Even disregarding this fact, the core question about innovation activities considers the bygone period 2000-2002. Remembering a time period is furthermore more complicated in situation like phone interviews and might amplify less thoughtful answers.

In conclusion our method to analyse non-response might have to be rethought as data collected by phone seem to be susceptible to more positive answers.

Appendix

Table A.1 Response rate Innovation Survey 2002

Economic activity / Sector	Small	Medium	Big	Total	Small	Medium	Big
	Number of firms				Percentage of respondents		
Industry	*679*	*523*	*159*	*1361*	*42.89*	*45.16*	*51.13*
Food / Beverage	53	46	9	108	41.41	42.99	50.00
Textile	15	19	8	42	46.88	55.88	53.33
Clothing / Leather	9	7	1	17	36.00	41.13	33.33
Wood processing	24	21	12	57	44.44	55.26	48.00
Paper	15	8	14	37	65.22	32.78	70.00
Publishing	45	38	5	88	47.87	36.54	33.33
Petroleum and Chemicals	61	18	5	84	39.61	34.62	62.50
Rubber and plastic products	31	35	7	73	57.41	53.85	41.18
Other non metallic mineral products	17	26	13	56	40.48	49.06	50.00
Metal	13	10	4	27	33.33	43.48	66.67
Metalworking	75	87	33	195	42.61	49.71	55.93
Machinery	114	86	21	221	40.71	45.74	60.00
Electrical machinery	31	20	4	55	35.23	41.67	50.00
Electronic / Instruments	76	46	9	131	42.94	47.42	39.13
Watches	29	12	1	42	38.16	26.67	33.33
Vehicles	17	6	1	24	41.46	35.29	25.00
Other Manufacturing	29	20	7	56	52.73	43.48	43.75
Energy / Water	25	18	5	48	55.55	69.23	50.00
Construction	*77*	*91*	*53*	*221*	*31.82*	*41.36*	*37.06*

Services	*553*	*362*	*86*	*1001*	*35.17*	*35.04*	*33.08*
Wholesale	103	85	28	216	37.32	34.96	31.11
Retail trade	97	74	10	181	34.77	37.56	40.00
Hotels and restaurants	40	48	15	103	21.51	28.07	29.41
Transport / Telecommunication	113	24	2	139	35.09	32.43	50.00
Banking / Insurance	82	34	2	118	42.05	39.53	33.33
Real estate / Renting	6	6	7	19	66.67	50.00	46.67
Computer services	21	17	6	44	35.59	48.57	37.50
Business services	79	69	6	154	33.91	33.82	26.09
Personal services	12	5	10	27	80.00	50.00	33.33
Total	1309	976	298	2584	38.52	40.47	41.74

Table A.2 Description of variables

Variable	Description
INNO	Innovation in the period 2000-2002 (1=yes; 0= no)
IND_1	Dummy variable for Manufacturing
IND_2	Dummy variable for Manufacturing (Paper, Publishing, Petroleum and chemicals, Rubber and plastic products, other non metallic mineral products)
IND_3	Dummy variable for Manufacturing (Metal, Metalworking, Machinery)
IND_4	Dummy variable for Manufacturing (Electrical Machinery, Electronic Instruments, Watches, Vehicles)
IND_5	Dummy variable for Manufacturing (Other Manufacturing, Energy/Water)
DL_1	Dummy variable for Services (Wholesale, Retail Trade, Hotels and Restaurants, Real estate/Renting, Personal Services)
DL_2	Dummy variable for Services (Transports/Telecommunications, Banking/Insurance, Computer Services, Business Services)
GR_M	Dummy variable for firm size (Medium)
GR_G	Dummy variable for firm size (Large)
SP_F	Dummy variable for language (French)
SP_D	Dummy variable for language (German)
REG_1	Dummy variable for Swiss region
REG_2	Dummy variable for Swiss region
REG_3	Dummy variable for Swiss region
REG_4	Dummy variable for Swiss region
REG_5	Dummy variable for Swiss region
REG_6	Dummy variable for Swiss region
REG_7	Dummy variable for Swiss region
mode	Survey 1 (self-administered): mode=0; survey 2 (phone): mode=1

References

Biemer, Paul P. (2001): *"Nonresponse Bias and Measurement Bias in a Comparison of Face to Face and Telephone Interviewing"*, Journal of Official Statistics, Vol. 17, No. 2, pp.295-320

De Leeuw, Edith D. (1992): *"Data Quality in Mail, Telephone, and Face-to-face Surveys"*, Amsterdam: TT-Publicaties

De Leeuw, Edith D. (2005): *"To Mix or Not to Mix Data Collection Modes in Surveys"*, Journal of Official Statistics, Vol. 21, No. 2, pp.233-255

De Leeuw, Edith D.; Mellenbergh, Gideon J. and Hox, Joop J. (1996): *"The Influence of Data Collection Method and Structural Models: A Comparison of a Mail, a Telephone and a Face-to-Face Survey"*, Sociological Methods and Research, 24, pp. 443-472

De Leeuw, Edith E. and Van der Zouwen, Johannes (1988): *"Data Quality in Telephone and Face to Face Surveys: A Comparative Meta-Analysis"*, in Telephone Survey Methodology, Eds: Groves, Biemer, Lyberg, Massey, Nicholls, Waksberg; New York: Wiley & Sons, pp. 283-299

Descombe, Martyn (2006): *"Web-Based Questionnaires and the Mode Effect - An Evaluation Based on Completion Rates and Data Contents of Near-Identical Questionnaires Delivered in Different Modes"*, Social Science Computer Review, Volume 24, Number 2, pp.246-254

Deville, Jean-Claude; Särndal, Carl-Erik and Sautory, Olivier (1993): *"Generalized Raking Procedures in Survey Sampling"*, Journal of the American Statistical Association, 88 (423), Theory and Methods, pp. 1013-1020

Donzé, Laurent (2002): *"Methodology to Correct the Unit Non-response Bias in the Case of the KOF ETH Survey 2000 on Organization and Information Technologies"*, KOF ETH Zurich, Arbeitspapier/Working papers, N° 67, August 2002

Galobardes, Bruna; Sunyer, Jordi; Anto, Josep M.; Castellsague, Jordi; Soriano, Joan B. and Tobias, Aurelio (1998): *"Effect of the Method of Administration, Mail or Telephone, on the Validity and Reliability of a Respiratory Health Questionnaire"*, The Spanish Centers of the European Astma Study, Journal of Clinical Epidemiology, 51, pp. 875-881

Pannekoek, Jeroen (1988): *"Interviewer Variance in a Telephone Survey"*, Journal of Official Statistics, Vol. 4, No. 4, pp.375-384

Saris, Willem E. (1997): *"Adjustment for Differences between Face to Face and Telephone Interviews"*, in Eurobarometer. Measurement Instruments for opinions in Europe, Eds: Saris, Willem E. / Kaase, Max, ZUMA Spezialband 2, Mannheim, pp.126-142

Saris, Willem E. and Hagenaars, Jacques A. (1997): *"Mode Effects in the Standard Eurobarometer Questions"*, in Eurobarometer. Measurement Instruments for opinions in Europe, Eds: Saris, Willem E. / Kaase, Max, ZUMA Spezialband 2, Mannheim, pp.126-142

Sautory, Olivier (1993): *"La macro CALMAR. Redressement d'un échantillon par calage sur marges"*, série des documents de travail de la Direction des Statistiques Démographiques et Sociales, INSEE, Paris, 55

Scherpenzeel, A.C. (1995): *"Meta Analysis of a European Comparative Study"*, in The Multitrait-Multimethod Approach to evaluate Measurement Instruments, Eds: Saris, Münnich; Budapest: Eötvös, University Press

Schwartz, Norbert; Strack, Fritz, Hippler, Hans-Jürgen and Bishop, George (1991): *„The Impact of Administration Mode on Response Effects in Survey Measurement"*, Applied Cognitive Psychology, Vol. 5, pp. 193-212

Silberstein, Adriana R. and Scott, Stuart (1991): *"Expenditure Diary Surveys and Their Associated Errors"*, in Measurement Errors in Surveys, Eds: Biemer, Groves, Lyberg, Mathiowetz, Sudman; New York: Wiley & Sons, pp. 309-326

Stokes, Lynne and Yeh Ming-Yih (1988): *"Searching for causes of interviewer Effects in Telephone Surveys"*, in Telephone Survey Methodology, Eds: Groves, Biemer, Lyberg, Massey, Nicholls, Waksberg; New York: Wiley & Sons, pp. 357-373

Voogt, Robert J.J. and Saris, Willem E. (2005): *"Mixed Mode Designs: Finding the Balance Between Nonresponse Bias and Mode Effects"*, Journal of Official Statistics, Vol. 21, No. 3, 2005, pp.367-387