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Nonresponse Bias and Fieldwork Efforts.
An analysis of fieldwork efforts and nonresponse bias in the European Social Survey from 2002 to 2010

Investments into fieldwork processes are generally considered as an asset to data quality. It is assumed that the higher the efforts that are put into fieldwork, the higher the response rate and the lower the nonresponse bias. Empirical analyses usually focus on the link between response rate and nonresponse bias (Groves, 2006; Groves & Peytcheva, 2008). Data on fieldwork efforts are typically not included in these analyses. Therefore, it is an open question whether fieldwork efforts have direct effects on nonresponse biases, independently of the response rate. It might well be that in certain instances, for example if enough efforts are put into fieldwork, surveys with low response rates can have low nonresponse bias, too. Using data from the European Social Survey (ESS) this paper investigates the effects of fieldwork efforts (such as the use of incentives, interviewer briefings, the selection of experienced interviewers, refusal conversion training for interviewers, use of advance letters or brochures) on nonresponse bias for a large set of socio-demographic variables. Thus, this paper provides novel empirical evidence on the effects of fieldwork efforts on data quality (measured by nonresponse bias). The findings of this research are particularly relevant for survey practitioners since fieldwork efforts can be actively influenced.

Hypothesis

The higher the fieldwork effort, the lower is the nonresponse bias.

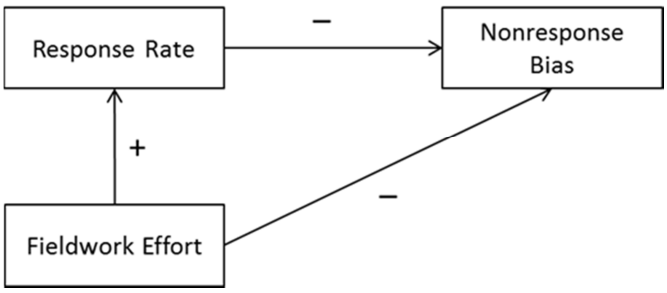

Figure 1: Hypotheses response rate, fieldwork effort and nonresponse bias

Data

The European Social Survey (ESS) provides detailed information on response rate and fieldwork efforts for a large number of countries. This information is collected in a standardized and cross-national as well as cross-time comparable way since 2002. Thus the ESS offers the chance for analyzing in a longitudinal perspective the relation of central quality indicators, such as the response rate, fieldwork efforts, and nonresponse bias in various European countries.

I use the data from the ESS from Round 1 in 2002 to Round 5 in 2010. The analysis is limited to countries that have participated in all rounds or the ESS. These are Belgium, Denmark, Finland, France, Germany, Hungary, Ireland, Netherlands, Norway, Poland, Portugal, Slovenia, Spain, Sweden, Switzerland and the United Kingdom.

Methods

Measurement of fieldwork effort

Stoop, Billiet, Koch, and Fitzgerald (2010, p. 103) suggest constructing a compound index drawing on several dimensions of fieldwork procedures and fieldwork effort.[1] The aim of this index is to consider the impact of several factors simultaneously and examine the combined effect on response rate. The use of an index has three positive aspects. Firstly, the reason for using an index is that in between rounds multiple fieldwork efforts are changed. As described in Stoop et al. (2010, p. 106) these individual factors that contribute to fieldwork effort cannot be analyzed separately because all other factors would need to be constant. Due to the observational nature of the study, this is not possible. Therefore, it seems appropriate to take several fieldwork factors into consideration simultaneously and evaluate their combined effect on the response rate. Secondly, the use of an index makes the interpretation easier and more accessible. And thirdly, in most countries the fieldwork effort changes between the rounds, meaning that the overall fieldwork effort stays constant but different fieldwork measures are used. These aspects are alleviated by using the index.

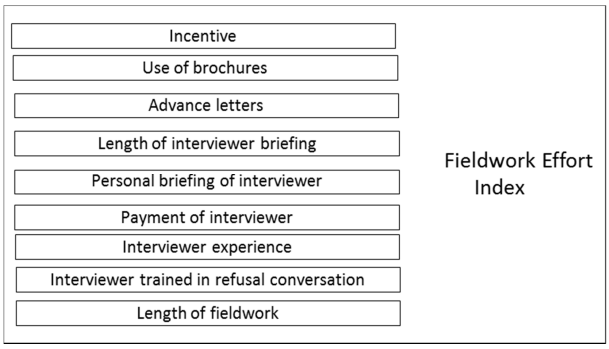

Figure 2: Factors included in the fieldwork effort index

Measurement of nonresponse bias

The nonresponse bias is calculated by comparing data from the European Social Survey (ESS) with the Labour Force Survey (LFS) as "gold standard". Deviations from the LFS are defined as nonresponse bias. The absolute value of the relative bias is used for following analysis.

$$Relative\ Bias = \frac{\text{ESS}\ (\%) - \text{LFS}(\%)}{LFS\ (\%)}$$

[1] The factors included in the index are: Experience of interviewer (90% or more of all interviewers experienced vs. less than 90% experienced); Payment of interviewer (paid per hour/ per interview and bonus vs. paid per interview only), Personal briefing of interviewers (90% or more of all interviewers personally briefed vs. less than 90% personally briefed), Length of personal briefing sessions (more than half a day vs. half a day or less) Interviewer trained in refusal conversion (yes vs. no), Contact to respondent (use of advance letter: yes vs. no), use of brochure (yes vs. no), use of respondent incentive (yes vs. no). The high efforts are mentioned first, the low efforts are mentioned second. For example, one indicator of fieldwork effort is the number of experienced interviewers working on the survey. The high fieldwork effort within a country would be that 90% or more of all interviewers have previous experience in interviewing (measured by length of time they work for the survey company). The low fieldwork effort would be that less than 90% have worked experience in interviewer briefing. First, each of the different aspects is dichotomized (high efforts = 1, low efforts = 0), and then an additive index is built.

Analysis

Socio-demographic variables

The level of nonresponse bias varies over the variables (see Figure 3 to Figure 10). For some variables, the nonresponse bias is bigger for others smaller. This supports previous finding in literature which states that nonresponse bias is variable specific. The analysis of various socio-demographic variables in the ESS adds to the findings in the existing literature. The can be seen that nonresponse bias differs between countries. Thus nonresponse bias is not only variable-specific, but also country-specific. Further the analysis in the figures below shows nonresponse bias is not survey specific but varies over time and country with the same survey.

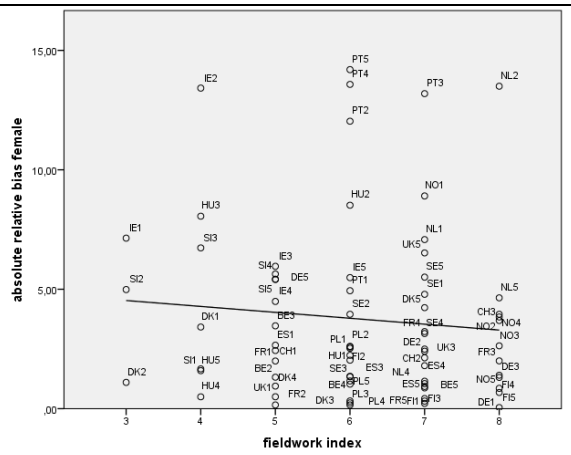

Figure 3: Females (r =- 0.093; p=0.429; n =74)[2]

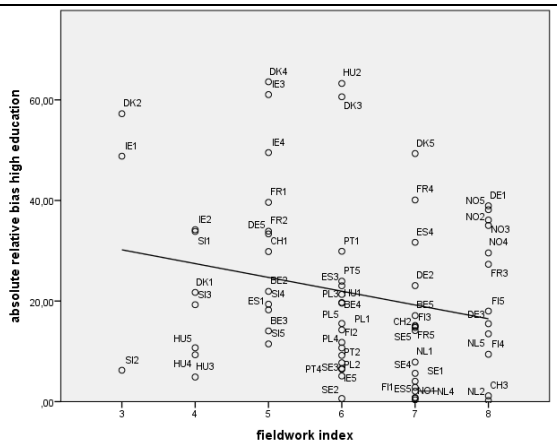

Figure 4: High education (r=-0.224; p = 0.064; n = 69)

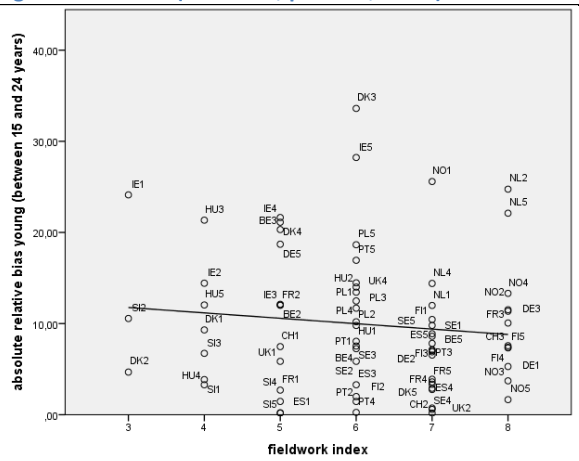

Figure 5: Young population (age between 15 and 24 years) (r=-0.109; p = 0.356; n=74)

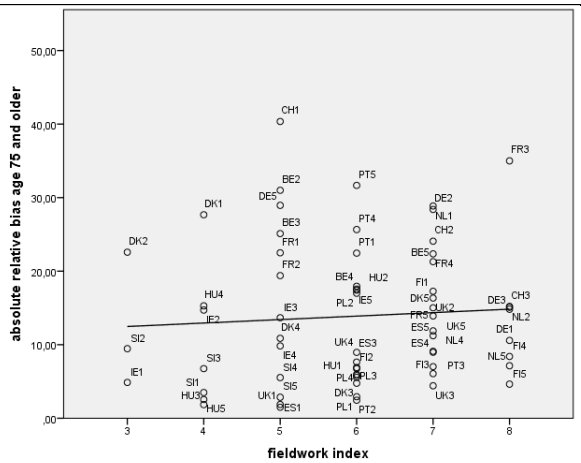

Figure 6: Older persons (age 75 years and older) (r=-0.068; p = 0.595; n = 64)

[2] The labels in the graph show the country and the round of the ESS. For example, UK3 means United Kingdom in Round 3 of the ESS, DE5 is Germany in Round 5.

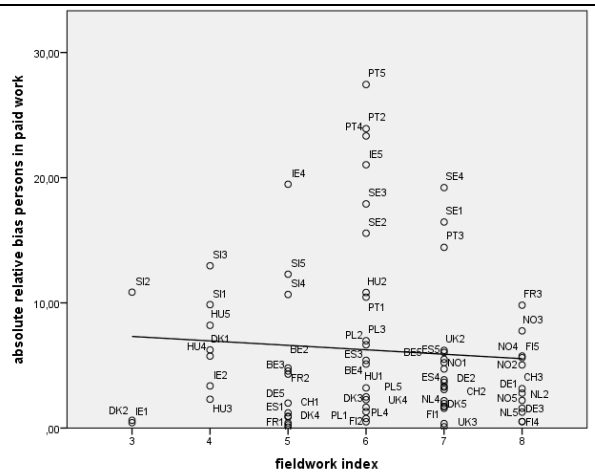

Figure 7: Absolute relative Bias of persons in paid work and fieldwork index (r=-0.075; p = 0.525; n = 74)

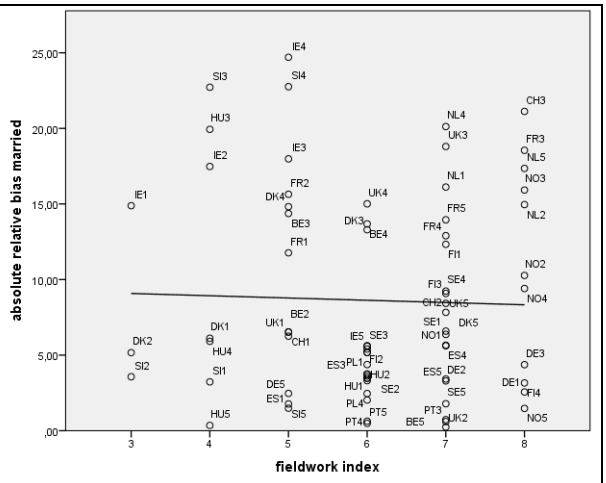

Figure 8: Absolute relative Bias of persons married and fieldwork index (r = -0.030; p= 0.798; n = 73)

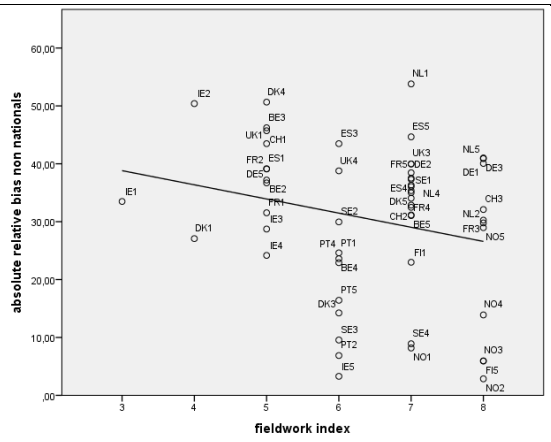

Figure 9: Non-nationals (r =-0.231; p= 0.090; n = 55)

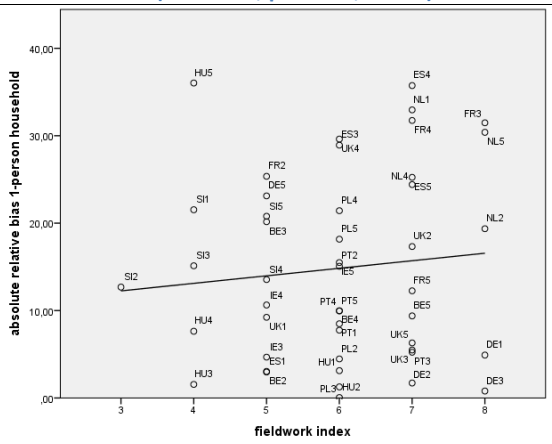

Figure 10: One-pers. households (r =0.101; p= 0.501; n = 47)

Additive index of nonresponse bias

To further refine the analysis of the effect of fieldwork effort on nonresponse bias an additive index of nonresponse bias is constructed. The index includes the sum of the absolute value of the relative bias for the variables gender, education, occupation, marital status, nationality and household size.[3] [4] The analysis of fieldwork effort and the fieldwork effort index is visualized in Figure 11. It can be seen that the higher the fieldwork effort index, the lower the additive index of nonresponse bias. This supports the general assumption, that the higher the effort that is put in fieldwork of a survey, the lower the nonresponse bias.

The Pearson correlation coefficient is calculated to measure the linear correlation between the variable fieldwork effort index and the additive index of nonresponse bias. Regression analysis with the dependent variable index of nonresponse bias and fieldwork effort as independent variable was performed. The model summary provides a correlation of r = 0.138, which is low. The p-value of 0.242 is well above the 0.05 significance level. Even though the p-value is not significant, a negative trend can be detected: The higher the fieldwork effort, the lower is the nonresponse bias.

[3] The bias of these six variables is added up and divided by six. In case of missing values the index is the sum of valid answers divided by the sum of valid variables.

[4] For the variable “education” only “high education” is included, low and middle education are not included. The same applies for household size, where only “one-person households” are included. In case of age the older (75 years and older) as well as the younger respondents are included since these groups do not overlap.

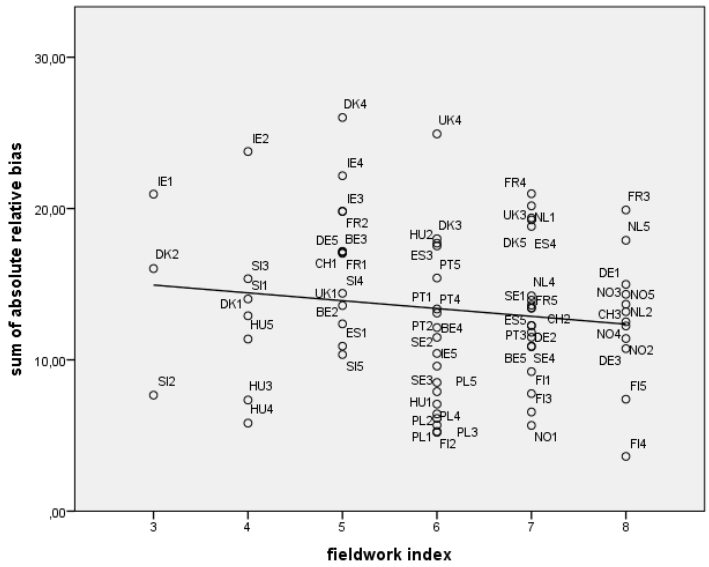

Figure 11: Fieldwork effort and nonresponse bias (fieldwork effort index and additive index of absolute relative nonresponse bias) (r = -0.138; p=0.242; n = 74)

Result

The link between fieldwork efforts and nonresponse bias has not been analyzed before. Therefore, it is an open question whether fieldwork efforts (such as interviewer briefings, advance letters, use of incentives, etc.) have direct effects on nonresponse bias, independently of the response rate. It might well be that in certain instances, for example, if enough efforts are put into fieldwork, surveys with low response rate can have low nonresponse bias (contrary to the general assumption). I hypothesize that more efforts in fieldwork might produce data with lower nonresponse bias. The analysis showed that nonresponse bias varies largely over countries, variables and time (see Figure 3 to Figure 10, Figure 11). In general, more fieldwork effort leads to lower nonresponse bias. However, fieldwork effect does affect the variables differently. More efforts in fieldwork decrease the nonresponse bias for some variables, but other variables are not affected. This allows to conclude that nonresponse bias is not only survey and variable specific (see previous analysis for example from Groves and Peytcheva (2008)), but also country and time specific. Keeping the survey set-up and the topic constant (by using the data from the ESS 2002 to 2010) it can be seen that nonresponse bias differs within the same survey between time, countries and variables. Thus in cross-country comparable survey, nonresponse bias analysis needs to done on an overall level as well as on a country specific level.

Points for discussion

- How can the result be further analyzed? Significance level does not seem appropriate due the fact that no conclusion is drawn from a sample to the population. The analysis is a description of a selected number of countries. Not sure what analysis would be appropriate beside visualization of trends? Please note, that the number of cases is rather low (n =74) and the analysis is done for 16 countries in 5 rounds.
- I could not find literature on the correlation between nonresponse bias and fieldwork effort. Does anyone know previous research on that?

Literature

Groves, R. M. (2006). Nonresponse rates and nonresponse bias in household surveys. *Public Opinion Quarterly, 70*(5), 646-675. doi: 10.1093/poq/nfl033

Groves, R. M., & Peytcheva, E. (2008). The impact of nonresponse rates on nonresponse bias - A meta-analysis. *Public Opinion Quarterly, 72*(2), 167-189. doi: 10.1093/poq/nfn011

Stoop, I., Billiet, J., Koch, A., & Fitzgerald, R. (2010). *Improving Survey Response. Lessons learned form the European Social Survey*. Hoboken, NJ: John Wiley & Sons.