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Social Statistics: The Interplay among Censuses, Surveys and Administrative Data

Using complete administration data for nonresponse analysis: The PASS survey of low-income households in Germany

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Abstract

In this study, nonresponse in a large survey of welfare receiving households in German is studied using complete administrative data of the German social security system on the individual level for both, respondents and nonrespondents. Despite the low response rate, only small differences between participating and nonresponding households and individuals could be found. A comparison of the estimates of different statistical nonresponse procedures with known values yield biased estimates for weighting and multiple imputation.

Keywords: refusal, non-contact, nonresponse, administrative data, weighting, imputation, propensity score weighting

1. Introduction

Nonresponse poses severe problems to all surveys when there are systematic differences between responding and nonresponding units. However, since nonresponse bias is a function of the response rate and the differences between responding and nonresponding units, a low response rate does not necessarily result in a large nonresponse bias (Groves, 2006; Groves and Peytcheva, 2008). For an assessment of nonresponse bias, therefore data on respondents and nonrespondents is needed. Detailed data on different nonresponse mechanisms is rarely available. Typically, there is only little information from the sampling frame, para data (e.g. the number and time of the contact attempts) or interviewer observations of the neighbourhood. In the case of the German household panel survey PASS rich information is available for analysis of nonresponse to the initial wave of the panel. For the first time, linkage of administration data of the German social security system was possible. These data provide detailed information on demographic characteristics and on variables related to the topic of the PASS survey.²

2. Nonresponse and low income samples

Surveys of low income populations suffer more than general population surveys from cooperation problems and increased non-contact rates. Low-income households are often more hard to find. Some factors are related to a lower level of education which strongly is related to low income and which may cause low literacy, a lower sympathy or understanding for the survey request, shame or fear of consequences when participating. Low educational status also is related to higher fear of crime and lower social trust in strangers (i.e. the interviewer). Due to a lack of social integration or increased alienation, a sense of civic duty or norm of reciprocity may be decreased, leading to lower survey cooperation.

Surveys on low income populations have to deal with the increased nonresponse problems (e.g. Gibson et al., 1999; Frederickson et al., 2005; and especially the book edited by Verploeg et al., 2001). Typically, these surveys achieve lower (compared to general population surveys) response rates. For example, Gallagher et al. (2005, p.7) report typical response rates in Medicaid surveys down to 25% (depending on complexity and mode); Hernandez (1999)

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² Due to legal constraints only administrative data and response status could be used for the analysis. With the exception of para data, no survey data has been used.

reports response rates to the initial wave of the low-income sample ('SEO'-sample) of the PSID of about 51% (compared to the 'SRC' part of the PSID with an initial response rate of about 77%).

3. Data

3.1 PASS Survey

The PASS panel survey (Promberger 2007; Trappmann et al., 2009) focuses on households of welfare recipients and the low income population in general. PASS consists of two subsamples. Sample I is a household sample of persons drawing social security benefits. It has been selected directly from the registry of welfare receivers at the German Federal Employment Agency. For these households administration data is available also on nonrespondents to the initial wave of PASS. Sample II is a stratified address sample of the general population with focus on low socioeconomic status households. We report here only on the sample of welfare recipients (PASS subsample I).

The survey was conducted in mixed mode. In principle, all households should be contacted and interviewed by phone (CATI). In cases no telephone number was available interviewers tried to contact the households in person at the sampled addresses (CAPI). Households contacted by telephone could switch to a personal interview if desired.

23812 households have been sampled for the initial wave of the PASS survey. Table 3.1-1 shows the use of the different modes in sample I: in many cases telephone numbers were available for households of the receivers registry sample, therefore 86% percent of all households could be contacted by telephone (with 11% of all households switching mode to CAPI), only 14% of all sample I households were contacted and interviewed only by CAPI.

Table 3.1-1 Household numbers by sample and mode, PASS sample I

Mode	Count	%
CATI	17828	75
CAPI	3320	14
CATI/CAPI	2664	11
Total	23812	100

Nonresponse in PASS

Overall response rates to the first wave are low: only slightly more than one in four households has been contacted successfully and at least on interview within this household could be conducted: In sample I, overall response rate is 28.7%. Table 3.1-2 shows the condensed and combined response codes from the contact reports of the interviewers. The largest subgroup of nonrespondents are refusals, followed by non-contacts. About 4% of all households moved since the date of sampling. In 2% interviewers reported language problems.

Table 3.1-2 Final response codes of households, PASS sample I

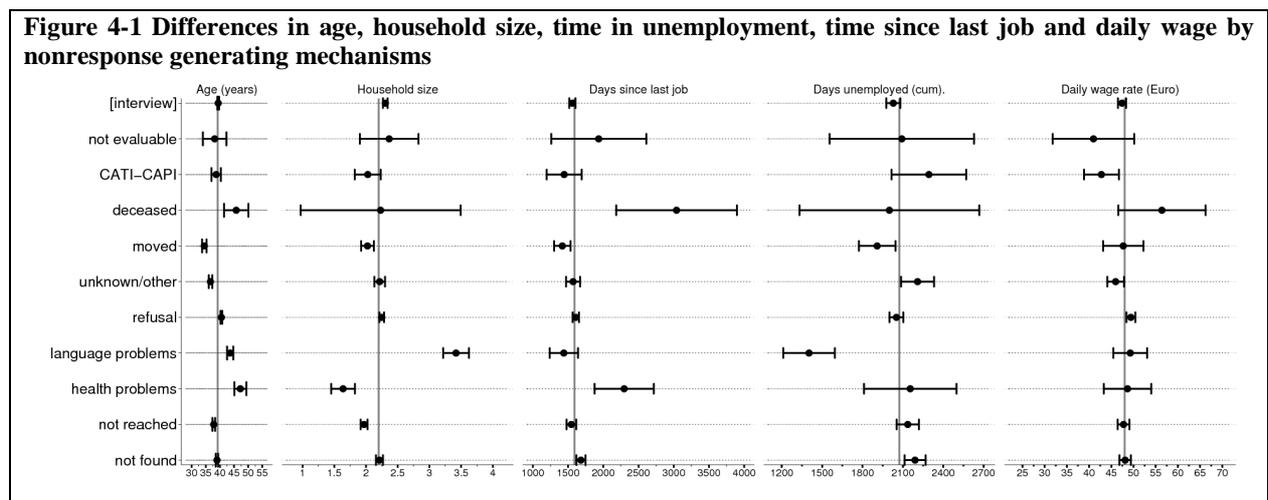
Response Code	Count	%
Interview	6844	28.7
Address not found	3486	14.6
No contact	3091	13.0
Phys. or mental problems	146	0.6
Language problems	469	2.0
Refused	7006	29.4
Unknown/other	1544	6.5
Hh moved/dissolved	915	3.8
Deceased	45	0.2
Mode switch to CAPI	206	0.9
Not evaluable	60	0.3
Total	23812	100

3.2 Administrative data

Complete administration data also for nonrespondents are available for the sample of benefit receiving households. Administration data was linked to response code only and not to survey data. We used social security administration data coming from the German Federal Employment Agency prepared by the Institute for Employment Research (IAB)³, provided by their research data centre⁴. The database provide spell data on persons receiving social security benefits. It includes sex, age, nationality, marital status, type and size of household and information on sanctions against the household when offending against terms and conditions. Additionally, we used spell data from a database on working histories of all persons ever employed. It contained information on education and vocational training, job position, working time, wages, unemployment episodes.⁵

4. Nonresponse analysis using process data

We used administrative data in order to check for nonresponse bias in sample I of welfare receiver households. Figure 4-1 shows the head of household's mean age, the household's size, days since the last job, the cumulative time of unemployment, and the daily wage or benefit rate for the different response outcomes from the overall sample-I mean assuming no nonresponse. All comparisons show no or only small differences between respondents and the full sample. There are also no or only small differences for refusals. Most notably are differences for nonrespondents with language problems (on average, they are older and especially have larger household sizes and less days in unemployment) or who moved shortly before the survey (younger, smaller household sizes, less days since the last job, days in unemployment), as well as ill nonrespondents (older, smaller household size, more days since the last job).



Figures 4-2 and 4-3 show the hazard rates of welfare termination for relocated households and for households where no one was able to participate. Clearly, these are (rather small but) problematic groups, especially with relocated households and ill nonrespondents leaving welfare receipt significantly earlier and faster.

³ www.iab.de/en

⁴ <http://fdz.iab.de/en.aspx>

⁵ See Jacobebbinghaus and Seth (2007) for a description of administrative data prepared and provided by the research data centre.

Figure 4-2 Hazard rates of welfare termination for relocated households

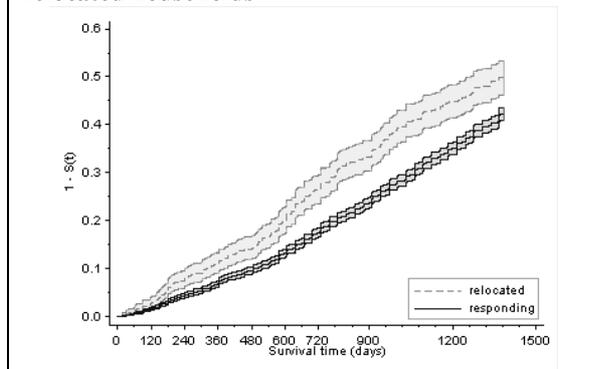
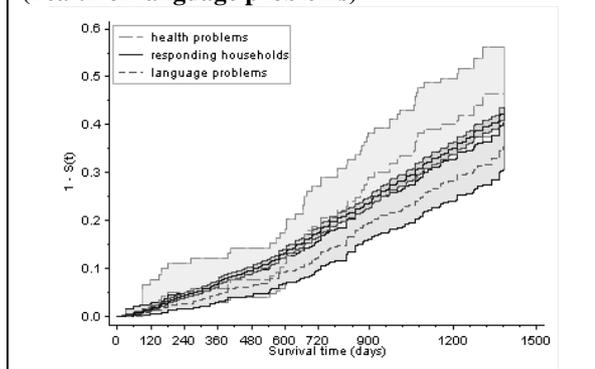


Figure 4-3 Hazard rates of welfare termination (health or language problems)



5. Nonresponse correction

We compared 5 different techniques (e.g. see Sikkel at al., 2009; or Bethlehem, 2009). As a baseline we simply ignored nonresponse and didn't adjust the estimates at all. For raking we used PSU, age and sex as control variables. The same variables were used for post-stratification. For propensity weighting we used mode, sex, age, nationality, household composition, education, changes in marital and employment status, categorized time since last job, changes in household size, and details on welfare receipt (administration type, sanctions and end of receipt) as predictors. For multiple hotdeck imputation PSU, age and sex were used with $m=10$ imputations.⁶

Table 5-1 Results of different nonresponse correction techniques

Method	Time since last job (days)	Household size (persons)	Transitions out (%)
Raking (psu x age x sex)	1541.7	2.24	15.3
Post-stratification (psu x age x sex)	1548.4	2.23	14.6
Propensity weights (13 variables)	1555.8	2.20	17.7
Multiple imputation (psu x age x sex), $m=10$	1524.1	2.24	14.6
Respondents (no adjustment)	1560.8	2.26	14.8
Full sample (no nonresponse)	1592.4	2.19	17.8

All but propensity weights underestimate transitions out of welfare receipt, as well as all but propensity weights overestimate the household size. All of the corrections in our example perform poor in adjusting the time since the last job.

Figures 5-1 and 5-2 show the cumulative hazard rates adjusted for nonresponse. Post-stratification and rake weights both underestimate hazard rates of welfare termination, propensity weighting on the other side, overestimates hazard rates.

⁶ Using the stata 'hotdeck' ado by Adrian Mander and David Clayton, and the 'survwtg' ado by Nick Winter.

Figure 5-1 Adjusted hazard rates of welfare termination (post-stratification, raking)

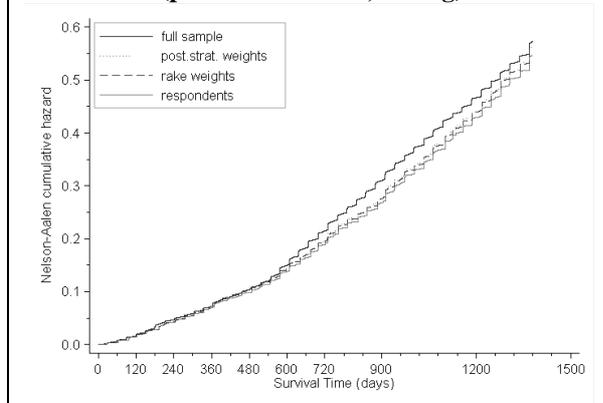
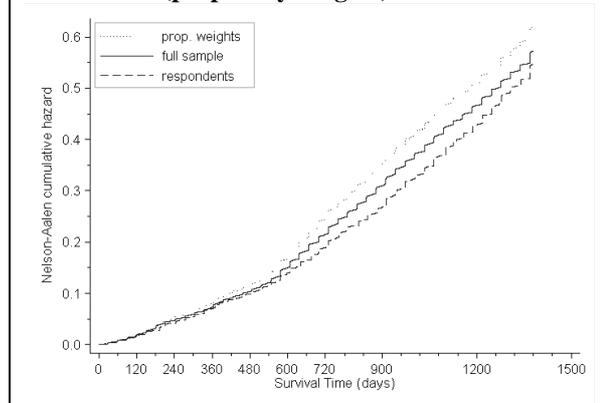


Figure 5-2 Adjusted hazard rates of welfare termination (propensity weights)



6. Results and Discussion

Despite the low response rate of less than 29% of all sample I households, overall nonresponse bias in PASS is small. This even is true for refusals. Furthermore, bias is specific to some variables. Of all examined variables (age, time since last job, cumulated time in unemployment, wage household size, sex marital status, number of children) only household size and cumulated time unemployed show significant although small overall nonresponse effects. Nevertheless, for some nonresponse generating mechanisms we observe differences between respondents and nonrespondents. The largest differences can be shown for relocated households, ill nonrespondents, and for households for which the interviewers reported language problems. Fieldwork procedures should concentrate more on these groups than on refusals alone.

In our analyses of different nonresponse compensating techniques, propensity weighting performed best. Like all other techniques, propensity weighting underestimates time since last job. Simple weighting schemes and multiple imputations resulted in biased estimates.

Based on this limited example we would conclude that nonresponse compensating techniques perform better when more and detailed data on nonresponse generating mechanisms can be used.

7. Literature

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