Methodological aspects of the *SAVE* data set

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Abstract: This paper describes the general design of the *SAVE* survey: the design of the questionnaire, inter-viewer and interviewee motivation, and the sampling designs of the various subsamples collected in 2001 and 2003. It discusses the representativeness of the data, explains the construction of weights, and provides probit regressions to analyze potential selectivity problems. The paper finishes by discussing implications for the use of the *SAVE* data in various estimation procedures.

Keywords: household surveys; response behavior

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1 Introduction

The data situation for the savings analysis is limited in Germany. Weaknesses of existing data material can only be rectified by new surveys. It is important to record variables which can also describe psychologically determined behavioral phenomena for a better understanding of actual savings behavior. Taking as a basis the examples of the Dutch CentER Panels, the US Health and Retirement Surveys, and the Bank of Italy's Survey on Household Income and Wealth (SHIW), the Mannheim Research Institute on the Economics of Aging (MEA) has cooperated with the Mannheim Center for Surveys, Methods and Analyses (ZUMA), NFO Infratest (Munich), and Psychonomics (Cologne) to produce a questionnaire consisting of six sections. The questionnaire has been designed in such a way that the interview should not exceed 45 minutes.

The *SAVE* panel attempts to collect a large set of variables shedding light on many household characteristics. The *SAVE* data were so far collected in 2001 and 2003. In the year 2001, one of the tense aspects of the survey was to check whether a major survey can be established in Germany which directly asks so called 'hard' financial, and, therefore, most private questions. The 2001 wave consisted of two parts. The first one was a computer-assisted personal interview (CAPI) quota sample which was itself divided into four different interview modes. For an analysis of potential interview mode effects, see Essig and Winter (2003). The second part was a paper & pencil (P&P) interview which drew households from a standing German access panel. In 2003, the survey again consisted of two parts. The first one assembled the recontacted households from the 2001 CAPI samples, while the second one was a new 'refreshment' sample constructed as a random ('Random Route') sample.

The plan of this paper is as follows. In Section 2, I briefly review the general design of the *SAVE* survey and the sampling differences between the four embedded subsamples. In Section 3, I discuss problems and opportunities of the sampling design considering the income question as an example. Section 4 discusses the representativeness of the data; probit regressions with nonresponse dummies for income and two key assets as dependent variables show potential subsample differences. Section 4 also shows the weights constructions to rectify potential deviations of representative population values. Section 5 summarizes the results and discusses implications for the use of the *SAVE* data material in estimation procedures.

2 SAVE

This section describes the general design of the *SAVE* survey: the design of the questionnaire, interviewer and interviewee motivation, and sampling differences between the two subsamples

conducted in 2001 (Section 2.2) and 2003 (Section 2.3). Contributions in Gabler *et al.* (1997) discuss different sampling procedures and their experiences for German data.

2.1 General design of the *SAVE* survey

The *SAVE* survey seeks to achieve several goals. The most important one is to shed more light on households' saving behavior. This substantive goal can certainly only be accomplished if severe threats to the data validity are excluded or reduced as far as possible.[1] Research perspectives from six different groups are worth to be taken into account when designing surveys and evaluating survey data: statisticians, psychologists, sociologists, anthropologists, political scientists, and economists.

Groves (1989) classifies three major languages of error which are applied to survey data, associated with three different disciplines: (i) statistics (mostly sampling theory) (ii) psychology (psychometric test and measurement theory) and (iii) economics (mostly econometrics). The other three disciplines mentioned above employ in Grove's view similar languages to these three. Andersen *et al.* (1979) depict a conceptual structure of error sources in surveys, accumulating in the total mean square error. Variance and bias, the two components of the mean square error criterion, are split up into errors of *nonobservation* and *observational errors*. Errors of nonobservations are due to three sources, *coverage*, *nonresponse* (if not located or refusals), and *sampling error* (depending on the subset of the population). Observational errors can be due to *interviewer errors* (wrong [manipulative or ignorable] guidance through the interview process), *instrument errors* (stemming from the wording of the question, a large field in social psychology; see, e.g., Schwarz (1999)), *respondent errors* (arising from different cognitive abilities or motivation to answer questions), and the *mode of data collection* (different effects of CAPI vs. P&P or CATI[2] interview modes).

In addition to the potential errors leading to errors in survey data, it is possible that errors would be made after receiving answers from the respondent: interviewers could enter wrong values, variables can be wrongfully matched to respondents, skip patterns might be erroneous; in general, other procedures proceeding and following the data collection phase.

Apart from these more or less 'trivial' technical errors, the questionnaire might be designed in a way not suited or incomplete for the topic of interest. For example, if one is interested in studying saving behavior, wealth variables are a necessary list of variables which are even theoretically hard to assess and disentangle.

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[1] Statistical and econometric models, e.g., try to minimize sampling errors but are generally not tailored for nonsampling errors.

The Mannheim Research Institute for the Economics of Aging (MEA) has cooperated with the Mannheim Center for Surveys, Methods and Analyses (ZUMA), TNS Infratest (Munich), Psychonomics (Cologne) and members of the Sonderforschungsbereich 504 at the University of Mannheim to design a questionnaire which reduces the extend of instrument and respondent errors. In addition, experiences with other surveys, especially with the U.S. Health and Retirement Study *(HRS)* and the Bank of Italy Survey of Household Income and Wealth *(SHIW)* data sets inspired certain wordings of questions and their associated answering scale.

The task to reduce interviewer errors was undergone by the survey agency, TNS Infratest, by intensive interviewer training and motivation for the subject.[3]

To check the influence of interview modes on nonobservations (unit and item nonresponse) and on respondent errors, the first *SAVE* wave additionally included an experimental component. The CAPI part was divided into four subsamples, differing in interview mode and questionnaire design in the central part, see below. Dillman (2000) discusses extensively issues on questionnaire construction, survey implementation and mixed-mode surveys. Many issues implemented in the *SAVE* design are discussed in that survey.

So far, the arguments for data quality and error minimization neglected a non-trivial component: survey costs.[4] Surveys are very expensive; and some interview modes are much more expensive than others, e.g., CAPI interviews are more expensive than CATI or P&P interviews. Obviously, there are trade-offs between the modes' results; if not, the cheapest interview mode would be the only one available at the market. The question is whether survey results justify the cost differences. Given budget constraints, the first *SAVE* wave included P&P interviews from a standing access panel. This opens the opportunity to check for which variables these much cheaper data work and where they don't.

The questionnaire has been designed in such a way that the interview should not exceed 45 minutes. Table 1 provides an overview of the *SAVE* questionnaire.

The survey's sensitive topic requires careful convincing by the interviewer. A letter which was handed to the interviewees explaining the scientific and political concern about the topic was thought to raise the willingness for participation, see also Dillman (2000).

The brief first section of the questionnaire explains the purpose of the questionnaire and describes the precautions that have been taken with respect to data protection. This introduction

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[2] Computer-assisted telephone interview.
[3] For the Survey on Health, Retirement and Ageing in Europe (SHARE), the principals of the survey personally encountered the interviewers in addition to the survey agency's effort to motivate the topic's importance.
[4] Ignoring legal problems (e.g., holding a gun to uncooperative respondents' heads).

was considered appropriate because the survey particularly deals with the personal affairs of those surveyed. The interviewer then asks to speak to a member of the household who knows about household income and assets. If this person is not at home, the interviewer must make a return visit.

Part 2 lasts about 15 minutes and is the standard initial interview in which questions are asked about the composition and socio-economic structure of the household, including age, education and participation in the labor force of the person surveyed and his or her partner.

The interviewer deals with the key issues in Part 3 of the questionnaire. This part contains qualitative and simple quantitative questions on saving behavior and how households deal with income and assets, such as the type of investment selected for one-off injections of cash, the importance of a series of savings motives, whether there is actually anything left over to save, how regularly savings are made, etc. Questions are also asked about decision processes and possible rules of thumb[5], past patterns of behavior as well as their parents and attitude to money.

Part 4 is the critical part of the questionnaire because this is where a complete "financial review" is made of the household. A detailed survey is made of income according to the types of income, changes in income, the level of assets according to the various kinds of wealth and changes in the types of wealth over the last year. Apart from financial assets, the questions also cover private and company pensions, ownership of property and business assets. Questions are also asked about debt. Part 4 is kept separate from the other parts, see Section 2.2.1.

Part 5 contains questions about psychological and social factors. It includes the social environment, expectations about income, the economic situation, health, life expectancy and general attitudes to life.

Part 6, the final part, ends the interview with the standard questions about the interview situation and leaves both the person surveyed and the interviewer considerable scope for their own comments. Typically, comments about confidentiality, the length and accuracy of the questionnaire are expected. Questions are also asked about Internet access and the possibility of conducting a further survey.

The survey's topic demands careful convincing by the interviewer and, in order to motivate interviewers, by the principal. We did not reward participants by financial incentives, even though there is a huge amount of literature describing possible advantages of monetary incentives,

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[5] See Baumol and Quandt (1964) for a theoretical foundation on the use rules of thumb under uncertainty and Rodepeter and Winter (1999) for the use of rules of thumb in life-cycle savings models.

thereby possibly reducing unit nonresponse.[6] See Brennan *et al.* (1991), Singer (2002), Porst (1996), and Klein and Porst (2000) for surveys of incentives.

2.2 *SAVE* 2001

The surveys took place in early summer 2001 and 2003. In 2001, the fieldwork for the personal interviews took place between May 29 and June 26, 2001, whereas the fieldwork for the Access Panel took place between June 29 and July 24, 2001.

2.2.1 Experimental design of the *SAVE* 2001 survey

The first four versions were computer aided personal interviews (CAPI); they were carried out by NFO Infratest, Munich. In contrast, the fifth version was a conventional paper questionnaire ("paper and pencil", P&P). The CAPI interviews were carried out using quota samples whereas conventional P&P questionnaires were given to a so-called Access Panel operated by the company TPI (Test Panel Institute, Wetzlar).[7]

The only difference in the four versions of the CAPI interview is in the critical part 4 of the questionnaire. In versions 1 and 2, all questions were administered by CAPI in the presence of the interviewer. The difference between these versions is that the questions on asset holdings were presented using an open-ended format with follow-up brackets (range cards) in version 1 and with 'forced' brackets in version 2.[8]

Because many of these questions relate to intensely personal matters of income and wealth, there is another modification in versions 3 and 4. In these two versions, part 4 was not part of the personal CAPI interview, but left as a paper-and-pencil questionnaire by the interviewer (this mode is termed "P&P drop off" in the sequel). In version 3, the interviewer came back personally to collect the drop-off questionnaire; in version 4, the questionnaire had to be returned by mail using a pre-paid envelope. If this was not done within a specified number of days, the respondent was reminded by telephone several times. This helped increase response rates for the drop-off questionnaire, but nevertheless, they were significantly lower in version 4 than in version 3 (90.5% vs. 98.0%).

Both the CAPI (quota sample) and the P&P (TPI Access Panel) segments were targeted at households with head of the household aged between 18 and 69 years. For the CAPI versions, the

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[6] There were mainly two reasons for not paying incentives. The first is that for CAPI interviews, the amount needed to raise interview participation is unclear. The cited literature mainly addresses P&P mail surveys. Second, there were concerns by the survey agency for harming firm policy regulations regarding the treatment of TPI members (by destroying 'market prices').
[7] In other words, a standing panel of households surveyed at regular intervals.

quota performance targets were related to the dimension gender (male respondent ratio of 75 percent) and age (a distribution in age classes under 25, 25-34, 35-50 and 50-70 years) according to the current official population statistics (and, in particular, the 2000 micro census).

For the TPI interviewees, the quota targets were also based on the 2000 micro census and either related to the dimensions gender (male respondent ratio of 75 percent) and age (a distribution in age classes 18-29: 13%; 30-39: 24%; 40-49: 22%; 50-59: 21%; 60-69: 20%), and, additionally, whether the respondent is a wage earner or a salaried employee, and the size of the household.

Table 2 shows the sample sizes for the five survey versions. In total, 1,829 households were surveyed.

Quota sampled surveys are heavily debated concerning their representativeness and arising statistical problems. King (1983) lists four principal sources of bias possibly induced by quota sampling: *Differences in respondent availability, insufficient control strata, interviewer selection bias and incorrect information on stratum sizes.* Even though these arguments are well known and taken into account, there are still arguments in favor of quota sampling. A survey of this is kind is new to Ger-many, and caution with regard to the survey design therefore was a driving force. In a quota sample, interviewers try to contact easily reachable persons which typically are acquainted households. The presumption was that unit and item nonresponse would be significantly lower than in random samples. Or, talking economics, we were seeking output maximization under given budget constraints.[9]

2.3 *SAVE* 2003

The SAVE 2003 wave consisted of two major samples. The first one consisted of the households which already participated in the SAVE 2001 CAPI sample. The second one was a newly added "refreshment"[10] random sample. Interview modes for the two subsamples were identical. They were CAPI interviews except for part 4 (drop-off with mail-back / collection by the interviewer).

2.3.1 Panel CAPI sample

One of the major interests of the *SAVE* study is to analyze behavioral and financial changes over time. Therefore, we tried to re-contact the interviewees from the 2001 personal interviews

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[8] This experimental manipulation of question format is not investigated in this paper; this is part of Essig and Winter (2003).
[9] As will be shown, item and unit nonresponse rates in the quota samples are below those from the Random Route sample.

(N=1169) again in 2003.

The German data protection act prohibits keeping interviewees' addresses when they denied a future follow-up corporation. This has to be checked at the end of an interview. While there is no precise law article, there exists an agreement between the *ADM* (Arbeitskreis Deutscher Markt- und Sozialforschungsinstitute e.V., where Infratest is also a member) and the official data protection agency.[11] As a result of the denials in 2001, only 72% (= 840 households) were available as gross sample in 2003. After different stages of losses (moved away/died, refused, no time, not available) and rejecting some incomplete interviews, only 483 completed interviews were available.[12]

The fieldwork for the 2001 CAPI sample in 2003 took place between June 2 and July 18, 2003.

2.3.2 Random Route sample

The most favorable argument for the quota sample in 2001 was the expectedly lower unit and item nonresponse rates. Since item nonresponse rates were in line with comparable surveys in other countries, and also descriptive statistics compared to other German data sources, the decision was made that the design of the *SAVE 2003* refreshment sample was to be a Random Route sample.

Sample design The data universe for the *SAVE 2003* random sample were all German speaking households in Germany with the households' head being eighteen years and older. Interviewees were selected from a multiply stratified multistage random sample. All communities were segmented into stratifications by regional criteria. Stratification criteria were states (Bundesländer), districts and community types. For further sampling details, see Heien and Kortmann (2003).

Unit response rates Random Route sampling requires more careful planning than quota sampling. In contrast to quota sampling schemes where the interviewer is actually in control of sampling the interviewees as long as they fulfill the quota targets and where no information is available on unit nonresponse, this information is available for the Random Route sampling.[13] The

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[10] The quotation marks indicate that this sample size is actually much larger than the original panel. See section 2.3.2.

[11] The agreement itself is sometimes called "Schweinoch" -agreement since Mr. Schweinoch conducted negotiations on behalf of the official site.

[12] Essig and Winter (2003) analyze both the probability of refusals and the probability of interviewing households another time given that they agreed to in the first place. While in the former case the interview mode in part 4 of the questionnaire played a significant role (see Section 2.2.1), the latter was also influenced by income (pos. influence) and age.

[13] There is an ongoing discussion about the required minimum unit response rate in surveys. Numbers between 50% and 80% were proposed, see Porst (1996) for a review. The assumption that missing values due to unit nonresponse

contract with the field agency *Infratest Sozialforschung* aimed at a net sample of 2,200 households. It turned out that a gross sample of 4,772 addresses was needed to get a net sample of 2,184 interviews. The most important reason for losses was, as expected, refusal (directly indicated or indirectly as "no time") which accounted for 36.7% of the losses.

The fieldwork for the Random Route sample began on May 26 and ended on July 14.

3   Reported income in the *SAVE* survey

This section explains problems and opportunities which arise in P&P interviews / interview parts (part 4 of the *SAVE* questionnaire). In the first part of this section, I will explain how income was asked in the questionnaire, what problems arose, and how they can be dealt with.

3.1   Income questions in *SAVE*

Income was asked in a three-step process. Interviewees were first given a list of 20 types of income from which composes monthly household income. Afterwards, an open-ended question for the amount of monthly net household income followed. In case of nonresponse, a brackets list was presented including 14 income classes.[14] The brackets list was asked as a range card. See, e.g., Juster and Smith (1997) or Hurd *et al.* (2003) for more advanced unfolding brackets methods.

3.2   Imputation of income values

Table 4 shows differences between the different *SAVE* subsamples. An unintended effect of the questionnaire design and interview mode will be used to correct for income outliers. As the fifth line in Table 4 shows, we observe income values for both the open-ended question as well as for the range-card follow-up brackets question in 1,263 cases. This results from the fact that respondents overlooked the filter instructions to skip the follow-up question in case they answered the open-ended question.[15] Further inquiries at the survey agency support the fact that respondents typically have problems following filtering instructions in a P&P questionnaire, even though these instructions were very clearly pronounced. If respondents fully understand the questions and the values being addressed, responses in the open values and in the brackets question should lie in the same brackets class. For a comparison, Table 6 shows the class distances when subtracting actual given classes from class analog values imputed from the open value question. Household income

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are missing at random might be misleading. See Little and Rubin (1987).
[14] Income brackets range from <500, 500-1000, 1000-1500, 1500-2000, 2000-2500, 2500-3000, 3000-3500, 3500-4000, 4000-4500, 4500-5000, 5000-7500, 7500-10000, 10000-15000 and >15000 €.
[15] Table 4 also shows that this did happen significantly less frequently for the 2001 TPI subsample. This most probably stems from the fact that the TPI respondents have some questionnaire experience.

from those data was imputed assuming class means.

Table 6 shows that about 90% of both given income values lie in the same or in an adjacent income class (marked as bold). This shows that for an overwhelming majority of responses, income can be believed as a reliable measure.

Answers for brackets questions[16] were used when no answer was given in the previous question. This was done in 881 cases of *SAVE* 2001 and 2003. One is tempted to claim that large class differences in Table 6 may be due to a misperception of yearly and monthly income. A different possibility might be that errors are simple input errors when the P&P data were electronically transferred. We had this double-checked by the survey agency.

In a second step, we propose the hypothesis that respondents are less likely to mix up monthly with yearly income because brackets induce a re-adaptation due to a cognitive process: relatively more lower income brackets are linking obviously not to yearly but to monthly data.[17] The correction procedure uses the following ideas:

1. If both values available: compare brackets values to open values. If open values between 7 and 17 times the brackets means values: divide open values by 12. This leads to 42 changes.

2. Use panel information: when data differ more than by factor five between two years —> supposedly yearly income —> divide by 12. 13 cases reimputed for the 2003 CAPI sample, 11 for 2001.

These two at least partially hypotheses-driven correction procedures still leave us with 79 observations where the monthly net household income is still at least 10,000 Euro. Even though one might be tempted to divide these remaining large income values by 12, I refrain from this procedure for two reasons. First, this would completely exclude any 'true' measure of high income, which, even though unlikely, is still possible, even in small samples. Second, this is no hypothesis driven procedure. One might, of course, look at different indicators implicitly excluding such high values -- which to pick, however, is rather vague and a matter of ongoing discussions.

4 Representativeness

This section discusses the quality and representativeness of the *SAVE* data. Figure 1 shows the number of observations for each subsample, the refusal rate for future interview participation and the actual loss of observations from the CAPI 2001 subsample to 2003. Panel attrition rates will also decrease over time, which can be seen from the drop of the CAPI 2001 refusal rate of 28.1%

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[16] Class mean values.

to 12.0%, since reluctant respondents already disappeared in the second wave.

Household surveys underlie two major stages. The first one is the design of the study (random route, quota sample etc.), while the second one is the field work itself (systematic and idiosyncratic observation losses). The inclusion probability of a "target person / household" might or might not be equal to its relative population frequency counterpart. The two mentioned stages might influence and bias this inclusion probability; resulting data might therefore be "weighted" relative to its population frequency. So called "weighting procedures", or, correctly spoken, "unweighting[18] procedures", try to reduce or, in best case eliminate these effects.[19] See also Von der Heyde (1994).

Table 13 shows item nonresponse to income, and conditional item nonresponse to savings accounts and stocks for the four different samples. Like the regression results presented in tables 14 - 16, item nonresponse is depending on the sampling method. See the following sections for a discussion.

4.1 Subsample differences: Regression results

This section presents estimation results from probit regressions on income and assets (saving accounts and stocks) with dummies for item nonresponse of each of the three variables as dependent variable and a set of household (and interviewer) characteristics as well as subsample dummies as independent variables as dummies to check whether sampling procedures (access panel, quota, random route) influence response behavior.

4.1.1 Regression results: income

Table 14 shows conditional probit estimates for nonresponse for open-ended question of monthly net household income of the *SAVE* subsamples (four / three). For better comparability and, in order to eliminate mode effects, observations for the non-P&P modes for the *SAVE* 2001 CAPI subsample were discarded. The second two columns show estimates with interviewer variables, ignoring the *SAVE* 2001 TPI subsample.[20] The relative influence of the sample dummies remained nearly completely constant. Table 14 shows that a change from quota samples to a random sample significantly reduces the willingness to reveal sensitive data (raises nonresponse). Thus, the response rates achieved in 2001 with the quota samples could be attained; this supports the hypothesis from Section 2.3 that quota samples promise higher response rates.

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[17] See, e.g., Winter (2002) for an experimental study on bracketing effects in survey questions.
[18] Assuming the total population as being unweighted, a sample not being representative due to different sorts of sample selection is then weighted in that sense.
[19] Indeed, the procedure rather tries to correct presumed survey's biases.
[20] Remember, this was a pure P&P sample.

But another effect is also astonishing. One might wonder whether respondents in a quota sample would react to an interviewer change. This is not supported by the data. Even in a probit regression keeping only households when observed in 2001 and 2003, a dummy variable for interviewer change is not significant. The problem here is that I ignore[21] the effect that an interviewer change could already have affected unit nonresponse which eliminates the item nonresponse effect. Interviewees of the quota sample typically are more likely to collaborate with an interviewer they know and trust. If there was an interviewer change between 2001 and 2003, they might refuse to participate in the 2003 survey if the known interviewer would be replaced by someone unknown to them. Thus, the interviewer change might well lead to unit nonresponse, and does not translate into different item response behavior.

4.1.2 Regression results: assets

Tables 15 and 16 show regression results from probit estimates of conditional[22] item nonresponse to financial variables on a set of respondent characteristics, interviewer characteristics and dummies[23] for each subsample.[24] The results show a strong influence of the sampling design on item nonresponse. Interview 'professionals' like the sampled respondents in the TPI sample prove to have the highest response probability. This result is as expected since they actually have agreed to collaborate with the survey agency on a regular basis.[25] Quota sampled respondents in the 2001 CAPI sample have the second highest response probability. On the other hand, one result is puzzling: respondents in the panel sample 2003 seem to be more reluctant to answer to financial questions. Two hypotheses were tested. First, regressions were run to test for the influence that the willingness to further participation influences the answering probability in the 2001 CAPI sample. Second, it was tested if there is a time effect when only including respondents into the regression when observed in both subsamples.[26] Interestingly, neither dummy variable controlling for each of the two effects is significant. The dummy variable for the 2003 random route sample is soundly significant in any specification and has the expected sign: as hypothesized earlier, respondents in a random route sample typically have lower response rates.

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[21] Since I cannot control for it.

[22] Conditional on the fact that people claimed to own assets of this type (in tables 15 and 16) but gave no actual value to the follow-up questions.

[23] The basic sample is the 2001 TPI, 1 stands for the CAPI 2001, 2 for the panel 2003, and 3 for the new random route 'refreshment' sample.

[24] Observations were excluded from the regressions when the interview mode differed in the corresponding part 4, see Table 2. Moreover, the last two columns in tables 14 - 16 only refer to samples 1-4 since the 2001 TPI sample was a full P&P interview with no interviewers involved.

[25] Still, they have the right to refuse the participation in unpleasant interview topics.

[26] While the results are not shown here, they are available by the author on request.

This brings back the trade-off between costs and errors. Even if item nonresponse is unsystematic, so that values are missing at random and thus ignorable, a larger net sample is needed to produce the same amount of responses than the quota sample.

4.2   Weights constructions

Tables 7 and 8 show how representative the *SAVE* sample is in comparison with the German micro-census of 2000 and 2002, respectively. The figures in this table compare the proportion of households in an age and income class with the comparable proportion of the same type of households in the micro-census. A figure of 1.2 means that the micro-census covers 20% more households of this type than are present in our random sample. If we take the micro-census as the benchmark, a figure of less than 1 indicates underrepresented household types, and figures over 1 indicate overrepresented household types. Tables 7 and 8 were stratified for each subsample and for two variables: income / age and income / household size. The reason for using these two different methods lies in the fact that on the one hand, it is common to use income and age as classical spanning variables, but on the other hand, age itself was used as a quota target variable for the *SAVE* 2001 CAPI subsample. See Gabler *et al.* (1994) for a discussion of weighting criteria. Differentiation by more variables imposes the problem of too small cell sizes. In comparison to the micro-census, the random sample contains considerably more middle-aged households but fewer older households. This applies to both sample groups (CAPI variants and Access Panel). Young households are represented approximately correctly. With regard to income, we can see really pronounced shifts towards richer households. This is particularly pronounced in the Access Panel: here the micro-census indicates four times as many households with a monthly net income of less than DM 2,500 / 1,300 Euros than in our sample group but only half as many households with an income of over DM 5,000 / 2,600 Euros.

Tables 7 and 8 show the importance of using the variable 'subsample type'. This weighting criterion variable was used implicitly by constructing the weight factors separately for each subsample in each year. While especially the 2003 random sample proves to fit the 2002 German micro-census data extremely well (especially regarding the age / household size part of Table 8 where values orbit around 1), we see large deviations in the distribution when comparing the 2001 Access Panel sample to the 2000 micro-census (Table 7); the *SAVE* sample contains considerably more middle-aged households but fewer older households. This applies to both sample groups (CAPI variants and Access Panel). Young households are represented approximately correctly. With regard to income, we can see a really pronounced shift towards richer households. This is particularly salient in the Access Panel: here the micro-census indicates four times as many

households with a monthly net income of less than DM 2,500 / 1,300 Euros than in our sample group but only half as many households with an income of over DM 5,000 / 2,600 Euros.

While the following paragraph will show the influence of the weights used on the distribution of certain key variables, the weights used by Essig (2004) refer to the dimensions subsample type, age, and income. The reason for not using the dimension household size instead of age is a continuity reason, since Börsch-Supan and Essig (2002) used these weights in the first examination of the *SAVE* data.

4.3   Weighting effects

The results of tables 7 and 8 demand a further investigation of the influence of weighting procedures on key variables in the *SAVE* data set. Therefore, income, savings and wealth will be displayed by each subsample with and without the usage of weights. Results are presented in tables 9 and 10. The use of weights shifts the distributions of all presented measures to the left; theses effects are translations from the results of tables 7 and 8: weighing variables have the strongest effect when distributions of income and age (or income and household size) deviate the most from the German microcensus.[27] The higher means of income in the *SAVE* 2003 RR sample are due to remaining high outliers: 52 households (or 2.6%)[28] in this subsample claim to earn more than 10,000 € net each month. Not considering values higher than 15,000 € in this subsample reduces the mean net monthly household income to about 2,100 €.

Similar effects are observed for the *GSOEP* 2000 to 2003 (Table 11) and the *EVS* 1998 and 1998 (Table 12) income measures: in both surveys, richer households seem to be oversampled in comparison to the microcensus (Table 11).

5   Conclusions

This paper briefly surveys the objective and structure of the questionnaire and the sampling methods of the 2001 and 2003 *SAVE* study. Unit and item nonresponse, a measure of acceptance of a survey of this kind, are absolutely in line with surveys in other countries.[29] I also show how representative the data are in comparison to the German microcensus and other comparable data sources. It proves to be the case that the *SAVE* data actually show similar effects as, for example, the *GSOEP* data. The sampled persons are slightly richer (or, biased towards middle classed households; the strength of this bias depends on the sampling criteria for each subsamle). Using

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[27] And this is the reason why the use of weights for the RR 2003 subsample does merely affect the means and medians of the presented variables.
[28] Only about 1.5% in the 2000, 2001 and 2002 GSOEP, and about 0.5% in the 1998 EVS.
[29] Compare the figures for unit and item nonresponse for eight European surveys in Alkemade et al. (2003).

sample weights tailored individually for each subsample, values are obtained that fit the microcensus population means almost perfectly, exemplified using the income measure. Contributions in Gabler *et al.* (1994) discuss the use of weights for different data sources. While weighting might be a probate method for descriptive analysis, it is unclear whether weights should be used for estimation procedures. There is still ongoing research on this topic; see Wooldridge (2001a) / (2001b) for a discussion of the use of weights.

Clearly, data quality could be enhanced by more sophisticated survey methodology in future waves.[30] This, on the other hand, comes at the cost of inconsistencies across time. In such cases, one is tempted to renounce to improved survey methodology to avoid those inconsistencies and simply freeze survey methodology over time, thereby eliminating any quality enhancement. However, as a long run strategy, this is clearly a bad idea - robust empirical findings cannot be obtained from poor data. Juster *et al.* (2002) develop methods of recovering time series consistency in the face of data enhancements. These ideas are beyond the scope of this paper.

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[30] See, for example, Van Soest and Hurd (2004) for a review.

Appendix

A.1   Figures

Figure 1: Sample scheme of the *SAVE* data set

```
┌─────────────────────────┐            ┌─────────────────────────┐
│      Quota Sample        │            │    Access Panel (TPI)   │
│         2001             │            │         2001            │
│       N=1169             │            │        N=660            │
│ (Panelverweigerung: 28.1%)│           │ (Panelverweigerung: 8.2%)│
└─────────────────────────┘            └─────────────────────────┘
            │                                        │
            ▼                                        │
┌──────────────────┐  ┌────────────────────────────┐│
│   Quota Sample   │  │    Random Route Sample      ││
│     2003         │  │         2003                ││
│    N=483         │  │        N=2184               ││
│(Panelverw.: 12.0%)│ │ (Panelverweigerung: 33.4%)  ││
└──────────────────┘  └────────────────────────────┘│
                              │                       ▼
                              │        ┌─────────────────────────┐
                              │        │      Access Panel        │
                              │        │         2004             │
                              │        │        N=487             │
                              │        │(Panelverweigerung: 13.5%)│
                              │        └─────────────────────────┘
                              ▼                       │
┌──────────────────────────────────────┐  ┌──────────────────────┐
│ Random Route Sample (einschl.         │  │    Access Panel      │
│         Refreshment)                   │  │       2005           │
│            2005                        │  │                      │
│         N^erw=2675                     │  │    N^erw=320         │
└──────────────────────────────────────┘  └──────────────────────┘
```
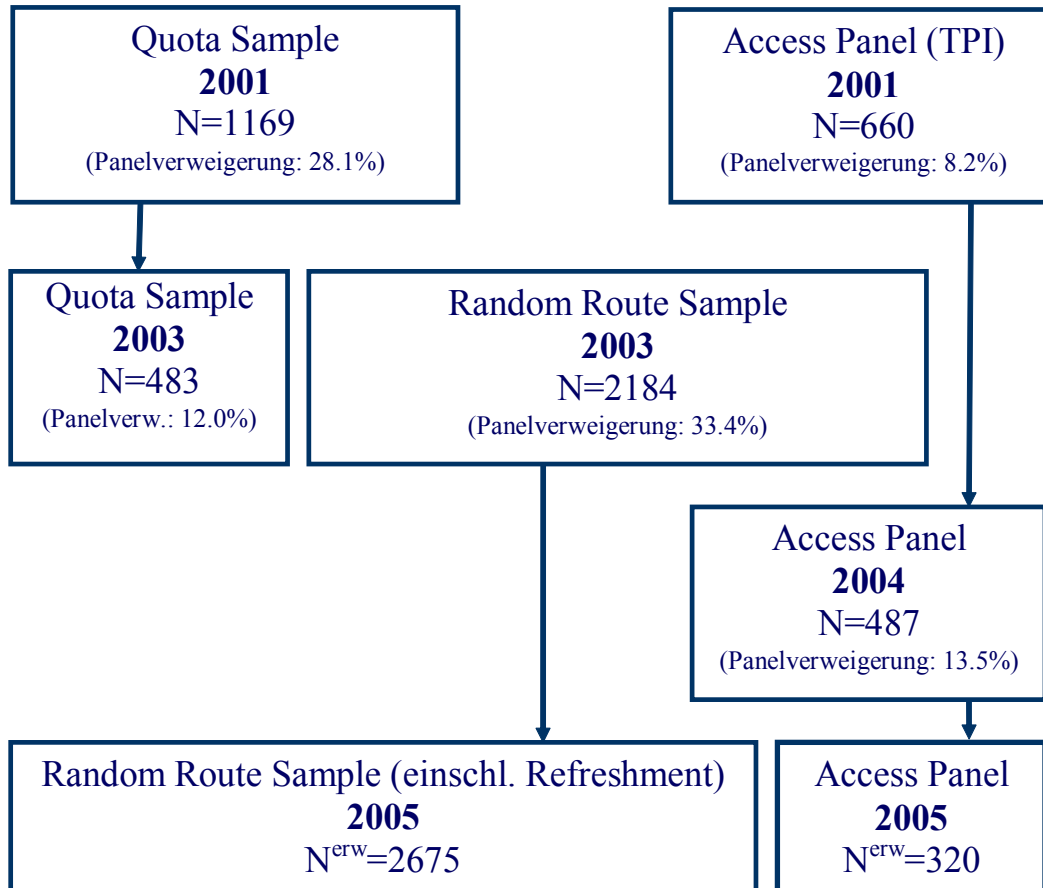
Figure 2: Age distribution in the *SAVE* 2001 and 2003 data set
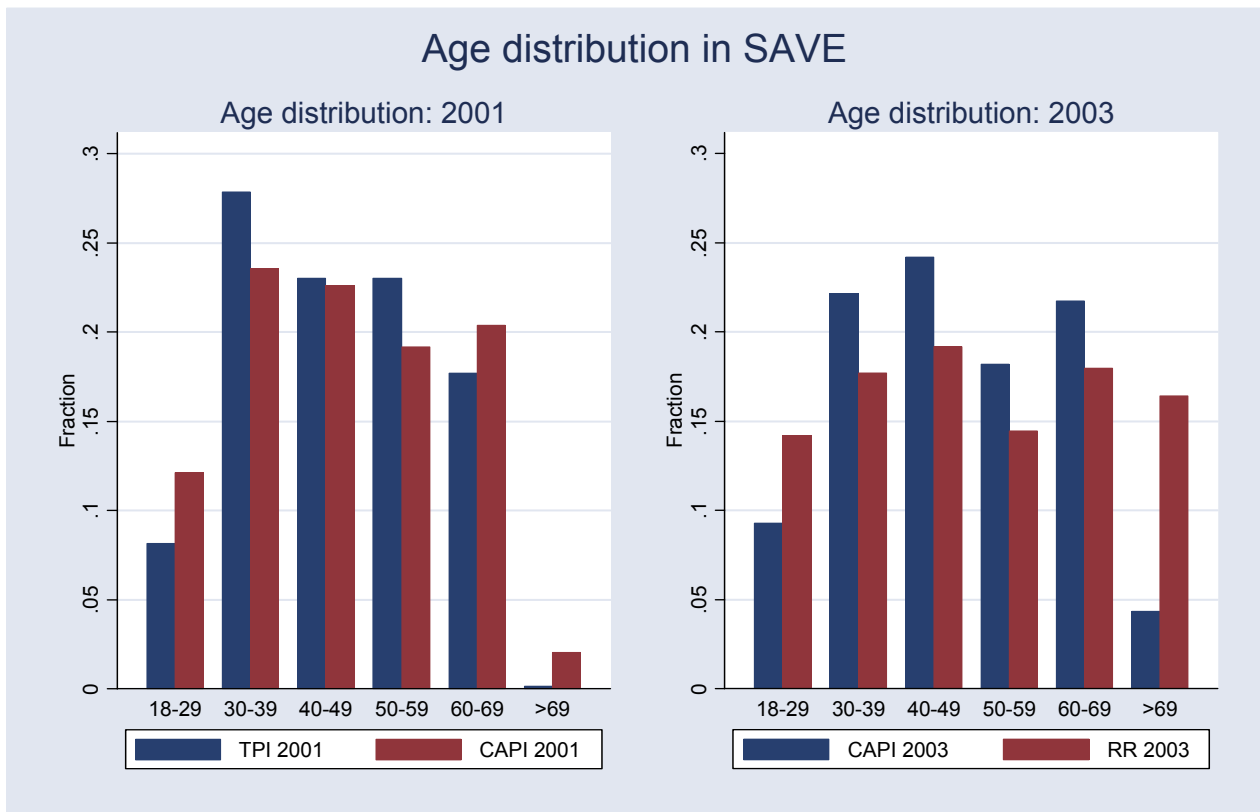
Note: Unweighted values

A.2 Tables

Table 1: Structure of the *SAVE* questionnaire

Part 1:	Introduction, determining which person will be surveyed in the respective household
Part 2:	Basic socio-economical data of the household
Part 3:	Qualitative questions concerning saving behavior, income and wealth
Part 4:	Budget balance: Quantitative questions concerning income and wealth
Part 5:	Psychological and social determinants of saving behavior
Part 6:	Conclusion: Interview-situation

Table 2: Experimental design of the *SAVE* 2001 data set

	Version 1	Version 2	Version 3	Version 4	Version 5
Sampling scheme	Quota	Quota	Quota	Quota	Access panel
Mode: Parts 1, 2, 3, 5 Mode: Part 4 (sensitive items) Response rate P&P	CAPI CAPI	CAPI CAPI	CAPI P&P (pick-up) 98.0%	CAPI P&P (mail-back) 90.5%	P&P P&P (mail-back)
Question format: income	open-end	open-end	open-end	open-end	open-end
Question format: assets	open-end	brackets	open-end	open-end	open-end
Number of households	295	304	294	276	660

Source: Essig and Winter (2003).

Table 3: Design of the *SAVE* 2003 data set

	Panel sample	Refreshment Sample
Sampling scheme	Quota	Random Route
Mode: Parts 1, 2, 3, 5	CAPI	CAPI
Mode: Part 4 (sensitive items)	P&P (pick-up)	P&P (mail-back)
Response rate P&P	98.0%	97%
Question format: income	open-end	open-end
Number of households	483	2184

Source: SAVE 2003.

Table 4: Income values: single and double measures

	2001 TPI	2001 CAPI[a]	2001 CAPI[b]	2003 old	2003 new
N	660	599	570	483	2,184
No part D	0	0	32	9	65
Open values	88.2% (455)	88.15% (528)	79.82% (455)	72.88% (352)	65.29%
Bracket values	23.9% (158)	3.0% (18)	63.56% (307)	63.56% (307)	62% (1354)
Both (open+brackets)	12.9% (85)	0	40.53% (231)	40.79% (197)	34.34% (750)
at least 5' in open field	3.5%(23)	4.67% (28)	2.11% (12)	7.45% (36)	5.95% (130)
at least 10' in open field	0	3.33% (20)	0.18% (1)	4.97% (24)	3.53% (77)
Mean (open values)	2520.11	2922.90	2191.53	4264.2	3385.79
Median (open values)	2351.94	2045.17	2045.17	2200	1800

[a] Only Mode 1 and 2 (full CAPI interview).
[b] Mode 3 and 4 (CAPI with dropoff).
Source: SAVE 2001 / 2003.

Table 5: Age distribution in *SAVE* 2001 and 2003

	2001				2003			
	TPI		CAPI		CAPI		Random Route	
Age class	N	Percent	N	Percent	N	Percent	N	Percent
18- 29	54	8.2	141	12.1	45	9.3	310	14.2
30- 39	184	27.9	274	23.4	107	22.2	387	17.7
40- 49	152	23.0	263	22.5	117	24.2	419	19.2
50- 59	152	23.0	223	19.1	88	18.2	316	14.5
60- 69	117	17.7	237	20.3	105	21.7	393	18.0
> 69	1	0.2	31	2.7	21	4.4	359	16.4

Source: SAVE 2001 / 2003.

Table 6: Income class differences

Class differences	Number of double answers			
	2001 TPI	2001 (only CAPI dropoff)	2003 old	2003 new
-11		2		
-10		5		2
-9		4		1
-8		3		
-7				
-6	2			
-5				
-4				
-3			1	3
-2	1	3		1
-1	1	173		12
0		39	137	54
1	68	1	39	14
2	5		2	5
3	4		1	2
4	2		2	2
5				
6				3
7			1	3
8		1		2
9			3	7
10			6	12
11			4	4
12			1	3
13				1

Source: SAVE 2001 / 2003

Table 7: Representativeness and weights of the *SAVE* 2001 samples

	Low income <2500		Medium income 2500-5000		High income >=5000		All income classes	
Age	CAPI	TPI	CAPI	TPI	CAPI	TPI	CAPI	**TPI**
up to 35 years	1.18	3.43	0.81	0.74	0.58	0.57	0.88	1.06
	81	17	116	77	52	32	249	126
from 35 up to 55 years	1.18	3.33	0.77	0.71	0.68	0.44	0.79	0.67
	65	14	225	148	201	190	491	352
55 years and older	3.34	6.45	1.12	1.37	0.81	0.69	1.40	1.62
	57	18	177	88	100	71	334	177
All age classes	1.79	4.51	0.90	0.90	0.70	0.52		
	203	49	518	313	353	293		
Household size								
Single	1.86	8.82	0.69	2.88	0.59	2.47	1.18	5.22
	142	18	160	23	28	4	330	45
Two	2.40	2.89	0.60	1.10	0.28	0.52	0.53	0.96
	30	15	329	108	314	103	673	226
3 and more	0.87	1.20	5.26	0.53	11.89	0.46	4.44	0.52
	32	14	30	179	12	185	74	378
All HH size classes	1.78	4.66	0.90	0.90	0.70	0.51		
	204	47	519	310	354	292		

Source: SAVE 2001 and German micro-census 2000.

Table 8: Representativeness and weights of the *SAVE* 2003 samples

	Low income <1300		Medium income 1300-2600		High income >=2600		All income classes	
Age	Panel	RR new	Panel	RR new	Panel	RR new	Panel	RR new
up to 35 years	1.42	0.95	0.97	0.91	0.86	0.75	1.10	0.89
	27	177	38	179	16	81	81	437
from 35 up to 55 years	1.01	0.93	0.74	1.02	0.73	0.91	0.78	0.96
	33	158	99	317	91	319	223	794
55 years and older	2.36	1.17	1.16	1.04	0.74	1.10	1.27	1.10
	32	283	75	366	51	150	158	799
All age classes	1.60	1.05	0.93	1.01	0.74	0.94		
	92	618	212	862	158	550		
Household size								
Single	2.62	1.56	1.12	1.47	1.00	0.99	1.74	1.49
	41	302	48	161	9	40	98	503
Two	0.90	0.69	0.86	0.98	0.56	0.83	0.75	0.87
	32	184	96	371	79	231	207	786
3 and more	0.57	0.36	0.89	0.81	0.92	1.02	0.87	0.81
	19	131	68	330	70	279	157	740
All HH size classes	1.60	1.05	0.93	1.01	0.74	0.94		
	92	617	212	862	158	550		

Source: SAVE 2003 and German micro-census 2002.

Table 9: Effect of weights usage: 2001

Weights	TPI 2001			CAPI 2001		
	None	Inc./Age	Inc./HHSize	None	Inc./Age	Inc./HHSize
Net Income						
Mean	2577.34	1962.76	1933.83	2300.81	2060.59	1941.71
Median	2300.81	1789.52	1789.52	2045.17	1738.39	1636.13
Gross savings						
Mean	5928.24	5903.74	5086.12	4246.96	3586.98	4163.52
Median	2556.46	2812.11	2556.46	2556.46	2045.17	2045.17
Financial Wealth						
Mean	35248.00	25765.22	24293.87	28043.36	22610.99	25842.35
Median	15364.32	8691.96	8078.41	8947.61	5777.60	5112.92
Total Wealth						
Mean	159472.10	152342.60	119679.90	125759.70	104399.10	110759.20
Median	92901.73	51020.79	27090.80	26127.02	1571.11	19684.74

Source: SAVE 2001 / 2003.
Notes: When no information on weights construction variables (income/age/household size) was available, weights were set to 1.

Table 10: Effect of weights usage: 2003

Weights	Panel 2003			RR 2003		
	None	Inc./Age	Inc./HHSize	None	Inc./Age	Inc./HHSize
Net Income						
Mean	2397.00	2091.79	2108.63	2732.43	2635.16	2641.33
Median	2100	1800	1800	1800	1750	1750
Gross savings						
Mean	5160.68	4745.93	4759.52	4333.62	4267.64	4193.16
Median	3000	2500	2500	2400	2400	2400
Financial Wealth						
Mean	29239.61	23393.43	22650.22	21312.56	21062.73	20629.94
Median	7530	4500	4500	2190	2300	2330
Total Wealth						
Mean	140537.40	116894.90	109512.60	139554.90	109512.60	133325.50
Median	38198	21990	18928	9000	9000	8000

Source: SAVE 2001 / 2003.
Notes: When no information on weights construction variables (income/age/household size) was available, weights were set to 1.

Table 11: Income measures: German microcensus and the German Socio-Economic Panel *GSOEP*

| | German Microzensus [a] | | GSOEP | | | |
| | | | Not weighed | | Weighed values | |
	Mean	Median	Mean	Median	Mean	Median
2000	1973.04	./.	2075.99	1891.78	1967.57	1738.39
2001	2015.40	./.	2127.49	1942.91	2000.77	1789.52
2002	2103.78	./.	2525.07	2096	2077.30	1800

[a] Income classes changed from 2001 to 2003. For the lowest class, 400 ewere assumed, for the highest, 7800 €.
Source: SAVE 2001 / 2003.

Table 12: Income measures: Income and expenditure survey *EVS*

| | Not weighted | | Weighted values | |
	Mean	Median	Mean	Median
1998 Euro	2844.30	2510.94	2301.91	1947.56
2003 [a] Euro	2612.29	2450	2120.59	1850

[a] EVS 2003 income values are self-classified measures for January income. Class means were assumed for the imputation.
Source: SAVE 2001 / 2003.

Table 13: Item nonresponse: descriptive results

| | TPI 2001 | | CAPI 2001[a] | | Panel 2003 | | RR 2003 | |
	N	Percent	N	Percent	N	Percent	N	Percent
Income								
Nonresponse	78	11.82	83	15.43	122	25.74	693	32.7
Savings accounts								
Ownership	513	78.08	407	76.36	303	65.58	1,153	58.44
Value nonresponse	99	19.3	100	24.57	77	25.41	331	28.71
Stocks								
Ownership	304	46.27	147	27.58	105	22.73	304	15.41
Value nonresponse	57	18.75	33	22.45	38	36.19	134	44.08

[a] Only modes 3 and 4, see Table 2.
Source: SAVE 2001 / 2003.

Table 14: Nonresponse regressions: household net income

Income	All samples		CAPI only	
	Coef.	*P> z*	Coef.	*P> z*
Respondent				
Age	-0.002	0.817	-0.007	0.464
Age squared	0.000	0.555	0.000	0.473
Secondary school (D)	**0.179**	0.002	**0.162**	0.019
Graduation diploma (D)	0.068	0.419	0.008	0.942
University degree (D)	-0.016	0.831	0.012	0.905
Partner (D)	**0.177**	0.001	**0.200**	0.000
East Germany (D)	0.009	0.889	0.073	0.265
Female (D)	0.047	0.389	0.034	0.555
Worker (D)	-0.019	0.827	-0.019	0.849
Civil Servant (D)	0.169	0.155	0.136	0.307
Freelancer (D)	**0.570**	0.002	**0.615**	0.002
Self-employed (D)	**0.233**	0.047	**0.268**	0.037
Part-time working (D)	0.022	0.832	0.013	0.910
Little working (D)	0.118	0.278	0.138	0.239
Not working (D)	0.022	0.813	0.025	0.803
Retired (D)	0.070	0.520	0.071	0.542
Unemployed (D)	-0.004	0.971	-0.004	0.971
Small Community (D)	0.004	0.962	0.0040	0.650
Version				
Sample: CAPI 2001 (D)	**0.212**	0.028		
Sample: CAPI 2003 (D)	**0.588**	0.000	**0.358**	0.000
Sample: RR 2003 (D)	**0.792**	0.000	**0.590**	0.000
Interviewer				
Interviewer changed in 2003			0.100	0.569
Experienced > 4 years (D)			-0.023	0.655
Female (D)			0.123	0.017
Older than resp. (D)			-0.156	0.027
Higher schooling (D)			0.009	0.913
Lower schooling (D)			-0.057	0.460
Constant	**-1.563**	0.000	-1.110	0.000
Number of obs	3684		3066	
LR	210.74		126.12	
Prob larger chi2	0.0000		0.0000	
Pseudo R2	0.05030		0.03440	
Log likelihood	-1987.9579		-1768.4779	

Source: SAVE 2001 / 2003.
Note: Interview versions dropped when part 4 was not P&P.

Table 15: Nonresponse regressions: savings accounts

Saving accounts	All samples				CAPI only	
	Coef.	*P> z*	Coef.	*P> z*	Coef.	*P> z*
Respondent						
HH income			0.000	0.737	0.000	0.811
HH income squared			0.000	0.992	0.000	0.928
Age	0.012	0.313	0.016	0.203	0.016	0.229
Age squared	0.000	0.542	0.000	0.350	0.000	0.373
Secondary school (D)	0.032	0.669	0.015	0.838	0.048	0.609
Graduation diploma (D)	0.005	0.963	0₅0.9	0.929	0.068	0.630
University degree (D)	0.006	0.949	-0.018	0.855	0.047	0.731
Partner (D)	**0.191**	0.007	**0.206**	0.005	**0.217**	0.006
East Germany (D)	**-0.162**	0.047	**-0.149**	0.075	-0.137	0.142
Female (D)	0.099	0.156	0.096	0.176	0.125	0.104
Worker (D)	-0.057	0.580	-0.060	0.568	-0.100	0.420
Civil Servant (D)	-0.074	0.584	-0.074	0.584	0.002	0.988
Freelancer (D)	0.168	0.438	0.209	0.339	-0.030	0.909
Self-employed (D)	-0.084	0.578	40.57	0.577	-0.130	0.464
Part-time working (D)	0.114	0.382	0.124	0.347	-0.007	0.964
Little working (D)	-0.106	0.450	-0.123	0.388	-0.170	0.293
Not working (D)	-0.058	0.639	-0.03	0.797	-0.023	0.869
Retired (D)	-0.108	0.444	00.343	0.320	-0.150	0.343
Unemployed (D)	0.111	0.510	0.079	0.646	0.072	0.696
Small Community (D)	0.013	0.903	-0.036	0.739	-0.009	0.938
Version						
Sample: CAPI 2001 (D)	**0.189**	0.097	**0.176**	0.072		
Sample: CAPI 2003 (D)	0.210	0.104	**0.191**	0.080	-0.002	0.986
Sample: RR 2003 (D)	**0.310**	0.082	**0.288**	0.001	0.103	0.251
Interviewer						
Interviewer changed in 2003					0.051	0.817
Experienced > 4 years (D)					-0.062	0.358
Female (D)					**0.187**	0.006
Older than resp. (D)					0.036	0.681
Higher schooling (D)					0.079	0.342
Lower schooling (D)					0.142	0.166
Constant	**-1.398**	0.000	**-1.452**	0.000	**-1.451**	0.000
Number of obs	2320		2284		1802	
LR	40.55		40.11		40.39	
Prob larger chi2	0.0064		0.0149		0.0611	
Pseudo R2	0.0154		0.0157		0.0195	
Log likelihood	-1298.4317		-1259.9054		-1017.1128	

Source: SAVE 2001 / 2003

Note: Interview versions dropped when part 4 was not P&P

Table 16: Nonresponse regressions: stocks

Stocks	All samples				CAPI only	
	Coef.	*P > z*	Coef.	*P > z*	Coef.	*P >*
Respondent						
HH income			0.000	0.346	-6.81E-05	0.263
HH income squared			0.000	0.121	3.88E-09	0.156
Age	-0.001	0.971	0.002	0.942	0.005	0.860
Age squared	0.000	0.876	0.000	0.972	0.000	0.983
Secondary school (D)	-0.019	0.885	-0.027	0.843	0.253	0.172
Graduation diploma (D)	-0.008	0.961	-0.014	0.934	0.160	0.515
University degree (D)	-0.136	0.1360	-0.158	0.317	0.254	0.301
Partner (D)	0.070	0.579	0.103	0.448	0.107	0.491
East Germany (D)	0.147	0.271	0.158	0.254	0.139	0.415
Female (D)	0.153	0.193	0.179	0.133	0.122	0.389
Worker (D)	-0.100	0.590	-0.088	0.636	30.735	0.735
Civil Servant (D)	-0.043	0.818	-0.004	0.984	0.129	0.570
Freelancer (D)	0.163	0.543	0.0320	0.945	-0.032	0.929
Self-employed (D)	-0.145	0.452	00.510	0.3430	-0.343	0.170
Part-time working (D)	0.161	0.412	0.152	0.444	0.254	0.280
Little working (D)	0.262	0.264	0.282	0.232	0.157	0.612
Not working (D)	0.282	0.154	0.260	0.196	0.279	0.253
Retired (D)	**-0.548**	0.019	**-0.560**	0.018	**-0.687**	0.016
Unemployed (D)	-0.349	0.221	-0.344	0.229	-0.378	0.252
Small Community (D)	-0.072	0.682	-0.046	0.793	30.873	0.873
Version						
Sample: CAPI 2001 (D)	0.151	0.317	0.143	0.347		
Sample: CAPI 2003 (D)	**0.586**	0.000	**0.541**	0.002	**0.425**	0.040
Sample: RR 2003 (D)	**0.722**	0.000	**0.662**	0.000	**0.509**	0.004
Interviewer						
Interviewer changed in 2003					-0.161	0.681
Experienced > 4 years (D)					0.120	0.332
Female (D)					0.177	0.148
Older than resp. (D)					0.105	0.502
Higher schooling (D)					0.210	0.190
Lower schooling (D)					-0.090	0.573
Constant	**-1.013**	0.089	**-0.987**	0.104	**-1.326**	0.079
Number of obs	840		828		538	
LR	71.97		78.2		52.15	
Prob larger chi2	0.0000		0.0000		0.0037	
Pseudo R2	0.0700		0.0778		0.0743	
Log likelihood	-477.98488		-463.78174		-325.07301	

Source: SAVE 2001 / 2003.
Note: Interview versions dropped when part 4 was not P&P.

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