

**Darkness Made Visible:
Field Management and Nonresponse in the 2004 SCF**

Arthur B. Kennickell
Senior Economist and Project Director
Survey of Consumer Finances
Board of Governors of the Federal Reserve System
Mail Stop 153
Washington, DC 20551
Voice: 202-452-2247
Fax: 202-452-5295
Email: akennickell@frb.gov

August 12, 2005

Paper prepared for the 2005 Annual Joint Statistical Meetings, Minneapolis, MN

The author wishes to thank Leslie Athey, Steven Pedlow, Fritz Scheuren, other NORC central office staff, and interviewers and other field staff at NORC for their help in testing and implementing the phased sample management model described here. Thanks also to Barry Johnson, Thomas Petska and Michael Strudler at SOI and to Brian Bucks, Gerhard Fries, Kevin Moore and Michael Neal at the Federal Reserve, without whom this work would not have been possible. The author is particularly grateful to the interviewers and field staff who have worked on past years of the SCF for the education they have given him in the way that surveys operate in the field. The opinions expressed in this paper are the responsibility of the author alone and do not necessarily reflect the views of the Board of Governors of the Federal Reserve System.

Darkness Made Visible: Field Management and Nonresponse in the 2004 SCF

Abstract

Nonresponse in field surveys is the joint outcome of the decision of survey staff to apply effort to inform and persuade respondents, and the evaluation of such inputs by respondents. In most such surveys, the field staff are under great pressure to produce completed interviews. Thus, as discussed in Kennickell [2004], they have an incentive to apply effort to cases that are most likely, in their view, to be completed with least effort. To the extent that interviewers' perceptions are unbiased, such behavior would tend to amplify latent patterns of nonresponse. When the characteristics of respondents that affect the likelihood of participation are correlated with variables of analytical interest in the survey, bias results, unless a means can be found of discovering and adjusting for the underlying behavioral structures. But, absent constraints on the behavior of interviewers, the observed outcomes are contaminated by the endogeneity of effort, and only strong a priori assumptions could disentangle the interviewer effects from the respondent effects. To address the problem of endogenous effort, the 2004 Survey of Consumer Finances introduced a phased plan of sample management to make effort more nearly exogenous through the first two of three phases of field work. Thus, nonresponse in these controlled stages should largely reflect respondent characteristics, not a mixture of respondent and interviewer characteristics. The dual frame design of the SCF offers two classes of sample cases for modeling nonresponse. For the area-probability sample, tract-level data are available from the 2000 Census of Population. For the list sample, frame case-specific data based on statistical records derived from tax returns are available. For both set of cases, some interviewer observations are also available. This paper presents estimates of nonresponse models based on these data.

Nonresponse in field surveys is the joint outcome of the decision of survey staff to apply effort to inform and persuade respondents, and the evaluation of such inputs by respondents. In most such surveys, the field staff are under great pressure to produce completed interviews. Thus, as discussed in Kennickell [2004], they have an incentive to apply effort to cases that are most likely, in their view, to be completed with least effort. To the extent that interviewers' perceptions are unbiased, such behavior would tend to amplify latent patterns of nonresponse. When the characteristics of respondents that affect the likelihood of participation are correlated with variables of analytical interest in the survey, bias results, unless a means can be found of discovering and adjusting for the underlying behavioral structures. But, absent constraints on the behavior of interviewers, the observed outcomes are contaminated by the endogeneity of effort, and only strong *a priori* assumptions could disentangle the interviewer effects from the respondent effects.

To address the problem of endogenous effort, the 2004 Survey of Consumer Finances (SCF) introduced a phased plan of sample management intended to make effort more nearly exogenous through the first two of three phases of field work. As described in more detail later in this paper, interviewers were given a flexible protocol intended to ensure that all sample cases were exposed to a certain level of effort and that two specific points in the course of the application of effort were marked for cases that had not been completed earlier. Those points classify the field operations on the cases into at most three phases, the last of which is limited only by the close of field work. If the framework holds, then response within the first two phases may be taken as independent of behavioral variations in the level of effort applied.

The first section of the paper provides an overview of the SCF and the approach to management of field resources developed for the 2004 survey and describes how this protocol worked in practice. The second section presents models of nonresponse in different phases of the field effort, conditional on both tract-level and case-level data. The final section summarizes the key findings and points toward the next step for the SCF.

I. Background on the SCF and the phased sample management protocol

The SCF is a triennial survey of household finances sponsored by the Federal Reserve Board in cooperation with the Statistics of Income Division (SOI) of the Internal Revenue Service.¹ Data for the 2004 survey, the basis the analysis presented here, were collected by NORC, a national organization for research and computing at the University of Chicago. For this survey, about 47 percent of the interviews were completed by telephone, though in-person work was a large part of the evolution of the great majority of cases over the field period, which ran from June 2004 to January 2005.

The survey employs a dual-frame sample design to select households from across the United States. A national area-probability sample (see O’Muircheartaigh *et al.* [2003]) is intended to give sufficiently robust coverage to describe characteristics that are widely distributed in the population, such as home ownership and use of credit cards. Using statistical records derived from tax return as a frame, a list sample employs stratification by a “wealth index” (see Kennickell [2001]) to over-sample wealthy households, who hold a disproportionate share of total wealth and who also tend to hold assets less likely to be held by more “typical” households. In the 2004 survey, about a third of the final interviews derived from the list sample. All respondents, except those in the wealthiest strata of the list sample, were initially offered \$20 as thanks for participation in the survey.²

With the exception of households that did not file a tax return, the area-probability and list samples in principle cover the same population.³ The important differences in the samples are in terms of stratification and clustering. The area-probability sample is a multi-stage equal-probability design with clustering at the last stage, where the cluster is generally an area equivalent to a census

¹See Aizcorbe, Kennickell and Moore [2003] for an overview of the survey and the 2001 data.

²The wealthiest list sample respondents were not initially offered money, because it was thought that the amount was small relative to their circumstances and that it might trivialize participation in their minds. However, if they requested money, a procedure was in place to allow them to receive the same amount as other respondents. Later in the field period, interviewers were allowed to negotiate payment of a higher amount of money. The effects of such payments are ignored here, largely because there is no information on offers made to sample nonrespondents.

³In 2001, an estimated 12 percent of households did not file a federal individual income tax return.

tract. The median number of cases selected into a cluster is five. The list sample is selected using the same broad localities selected at the first stage of the area-probability selection, but the units are selected without control on location within those areas. Thus, the list sample cases are more likely to be dispersed across a broader area than the area cases.

The survey combines a number of features that one might think would tend to exacerbate problems of nonresponse. First, the subject matter is one that is often considered highly private, particularly in light of continuing revelations of attempted and actual “identity theft.” Second, wealthy households are more likely to have either a staff or physical structures intended to keep everyone not explicitly invited by the household away from its private life. Third, wealthy households may also be more difficult to locate, because they often have multiple homes and because they sometimes take concrete steps to disguise their location. Finally, the survey is burdensome, in terms of both the recall needed to answer the questions and the time required for an interview. The number of questions asked of a respondent varies with the complexity of the household’s portfolio, but in the 2004 survey the median interview length was 82 minutes, while the 95th percentile of interview length was 165 minutes.

The 2004 survey contract specified a set of minimum required response rates. An overall minimum was specified for the area-probability sample and stratum-specific minima for the list sample. These rates were calibrated to be feasible and to maintain comparability with earlier surveys. The minimum targets are driven by practical considerations, but they may also have the effect of both complicating the management tasks faced by field supervisors and highlighting the sample structure in a way that could be deleterious to neutral application of effort.

Table 1: Final case disposition codes, by sample type, 2004 SCF.

	<i>All</i>	<i>AP</i>	<i>LS</i>
Not a housing unit	3.9	7.6	*
Vacant unit	5.0	9.7	*
Sample incorrect	0.4	0.7	0.0
Deceased	0.3	*	0.5
Out of country for field period	6.4	0.0	0.1
Complete, telephone	18.2	18.5	17.9
Complete, in-person	21.2	32.2	9.6
Conversion, telephone	2.3	2.9	1.7
Conversion, in person	1.6	2.5	0.6
Complete, proxy	0.2	0.2	0.1
Partially complete	0.1	0.0	0.1
Postcard refusal	6.4	*	13.1
Refusal	14.7	15.9	13.3
Breakoff	0.3	0.1	0.4
Refusal, gatekeeper	0.7	0.4	1.2
Unlocatable	0.5	0.6	0.5
Unavailable for field period	0.2	0.2	0.1
Language barrier (non-Spanish)	0.7	0.9	0.4
Too ill	0.7	0.9	0.4
Other active nonresponse	0.7	0.8	0.6
Stopped work	22.2	5.9	39.5
All	100.0	100.0	100.0
<i>Memo items:</i>			
Out of scope	15.9	18.0	13.6
Complete	43.5	56.3	30.0
Active nonresponse	18.4	19.8	17.0
Stopped work	22.2	5.9	39.5
Response rate	51.7	68.7	34.7
*: not applicable			

Nonresponse in the SCF is a serious problem (table 1).⁴ The overall 2004 unweighted response rate was only 51.7 percent overall—68.7 percent in the area probability sample and 34.7 percent in the list sample. It should be noted that the response rate in the list sample varies strongly by sample stratum, with the stratum most likely to be very wealthy having a response rate of only about 10 percent. However, these overall figures obscure some important detail.

The category “stopped work” accounts for a substantial fraction of the sample, and particularly so for the list sample. Cases in this group are ones that were considered still workable as of the end of the field period. Although clear refusals account for a sizable fraction of the last working case dispositions before this final code, “not home” and “call back/busy” both account for a much larger fraction of such

cases overall (table 2). Indeed, it is only for the list sample case that direct refusals seem to figure at all at this stage; however, it may be that the lower overall rate of stopped work cases in the area probability sample reflects a systematic tendency to code final refusals in that group rather than continuing to work such cases. The important point is that managers felt there was still “life” in all

⁴See Kennickell [2004, 2003, 2002, 1999a, 1999b] and Kennickell and McManus [1993] for an overview of nonresponse research on the SCF.

Table 2: Last working disposition for cases with a final disposition of “stopped work,” by sample type, 2004 SCF.

	<i>All</i>	<i>AP</i>	<i>LS</i>
Presumed to be no contact	0.2	0.0	0.2
Address observations completed	0.2	0.0	0.2
Deceased	0.2	0.0	0.2
Not home/No answer	36.7	71.1	33.4
Inaccessible	3.9	0.0	4.2
Unocatable (home)	6.2	0.0	6.9
Unlocatable (business)	0.4	0.0	0.4
New lead	1.9	0.0	2.1
New lead failed	0.2	0.0	0.2
Call back/Unavailable/Busy	18.5	17.8	18.6
R to call	9.3	2.2	9.9
Special letter sent	0.6	0.0	0.6
Language barrier (Spanish)	0.2	2.2	0.0
Language barrier (not Spanish)	0.4	0.0	0.4
Screener completed	1.0	0.0	1.1
Non-respondent refusal	2.5	0.0	2.8
Refusal	13.3	0.0	14.6
Hostile refusal	0.8	0.0	0.9
Express mail package refused	0.2	0.0	0.2
Broken appointment	1.7	6.7	1.3
Questionnaire break off	0.4	0.0	0.4
Completed with incorrect resp.	1.4	0.0	1.5
All stopped work cases	100.0	100.0	100.0

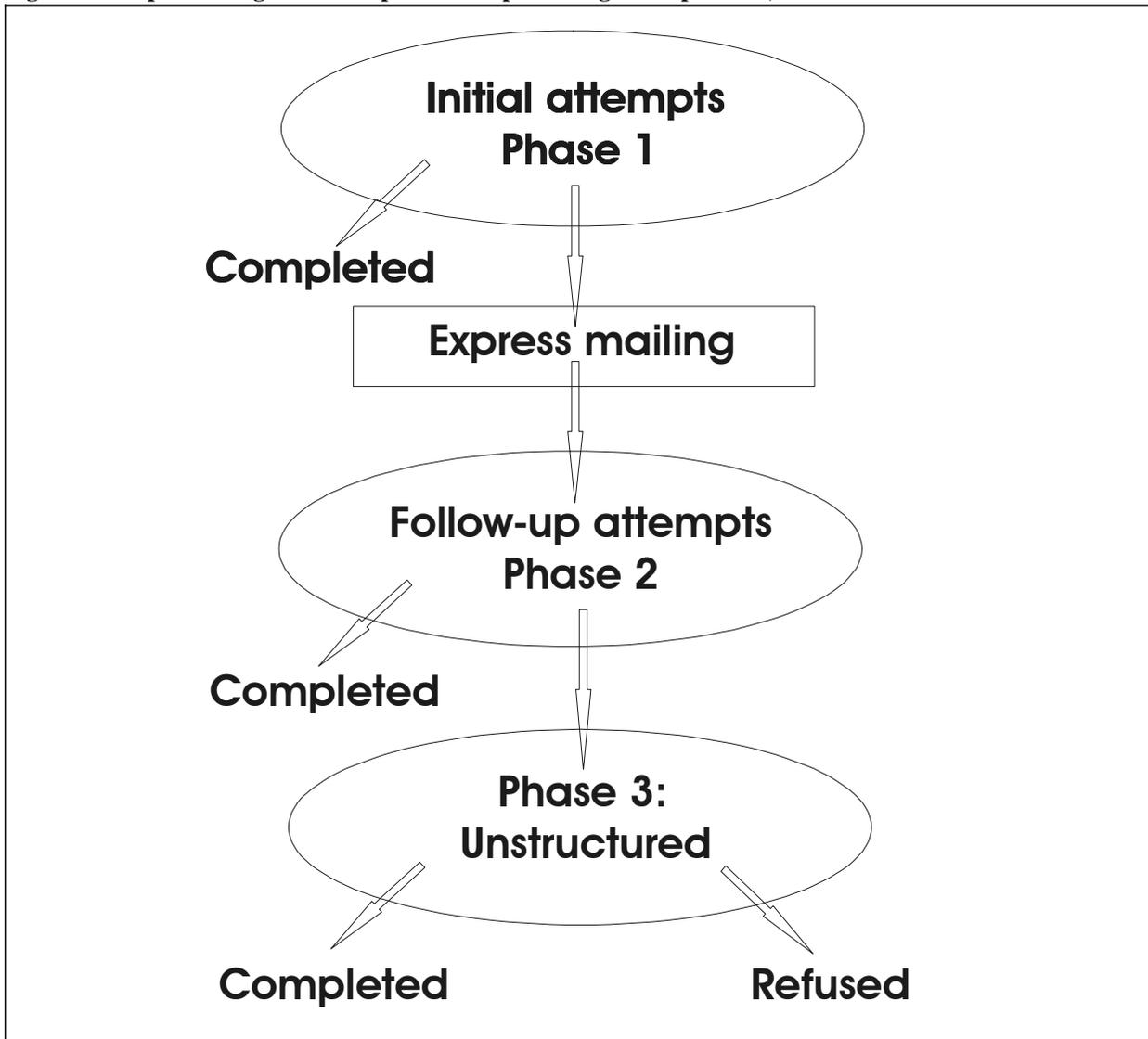
of such cases at the end of the field period, and the fact that they remained without a final completed or refused code reflects decisions that were made about the relative payoffs of working other cases.

Examination of call records in earlier waves of the SCF (see Kennickell [2003]) indicated that there was a systematic and notably nonuniform application of effort by interviewers. Moreover, there was evidence that this modulation of effort appeared to influence the ultimate patterns of nonresponse. Additionally, the skewed distribution of effort appears at face value to be logistically inefficient. That paper developed a simple formal model of interviewers' behavior in a survey where

their rewards are focused only on completion of cases, without regard any other characteristics of the cases. The virtually obvious implication of that model is that, all other things being equal, an interviewer would attempt to complete cases in the order of their expected subjective likelihood of completion. If the characteristics that enter the calculation of interviewers' expectations are correlated with the variables of interest in the survey, then latent patterns of nonresponse bias would be amplified.

Another problem with disproportionate application of effort is an ethical one. If different respondents are given different levels of effort to explain why they should participate, then implicitly a decision is made that the voices of some respondents are more important than others within their sample stratum. This seems unacceptable.

Figure 1: Simplified diagram of the phased sample management protocol, 2004 SCF.



To address the variations in effort, the 2004 SCF introduced a phased protocol for the application of field effort. Figure 1 provides a simplified schematic of the procedures, and appendix figure A1 provides additional schematic detail.

Underlying the case management protocol is a threshold model of respondents' behavior. Respondent i is assumed to reach an interim decision when the input received from interviewers, mailed material and other sources exceeds T_{1i} . The decision may be either to agree to be interviewed or to decline participation. In most social science surveys, respondents who decline initially are re-contacted in an attempt to secure their cooperation. Upon being re-contacted, a

respondent faces a second decision threshold, T_{2i} , which yields a second decision either to participate or refuse. For respondents who refuse at that point, one could specify a sequence of possible re-contacts and decisions. The important point in this model is that the first two transitions are, in principle, driven by respondent characteristics, not interviewer characteristics.

The phased contact model for the SCF was designed to have two clear “break points” that mark the progress of a case in the application of effort. In the first phase, interviewers were limited in the number of attempts they may make to contact and persuade a respondent to participate in the survey. Ideally, effort was applied in this phase until either a respondent agreed to participate or the respondent crossed a threshold that caused them to refuse. Respondents who could not be contacted after repeated attempts at this stage are assumed to have taken actions to isolate themselves that make them equivalent to those who directly refused. At this point, a specially designed package of materials was sent by express mail to the remaining respondents. This package was designed to motivate the project, the role of the respondent, the protections in place for the respondent, the role of NORC and the use of the data at the Federal Reserve Board. Although it summarized information already available to the interviewer in other materials for use with the respondent as needed, the express mailing was organized to present that material in a compact, integrated and attractive way. Sending the package by express mail was intended to heighten the sense of importance of the respondent and of the material presented. Because interviewers saw this mailing as a powerful persuasion tool, the initial fear was that they might tend to minimize the effort leading up to the mailing. To ensure that interviewers did not jump to this stage without sufficient initial effort, all requests for an express mail package were actually executed by field managers, who were responsible for checking interviewers’ efforts to that point. Care was taken to inform the interviewers when the package was transmitted and received. For respondents who had not already agreed to participate, the sending of this package marked the end of Phase 1.⁵

The second phase was intended to be a period of limited follow-up after the express mailing. If the respondent declined participation within the allowed period of follow-up, the case was to be moved a status requiring further review by the field manager before additional effort was to be

⁵Appendix table A1 shows the distribution of case disposition codes immediately preceding the marking of the end of Phase 1.

Table 3: Completion and refusal status of cases for the three phases of the 2004 SCF field period, percent of in-scope cases active in each phase.

	All	AP	LS
Postcard refusal	6.3	NA	12.9
Complete, Phase 1	28.6	42.0	15.2
Refused, Phase 1	3.6	2.3	4.7
Complete, Phase 2	28.1	35.4	22.2
Refused, Phase 2	39.9	27.2	50.8
Complete, Phase 3	17.5	27.7	8.0
Incomplete, Phase 3	82.5	72.5	92.0

undertaken. This third and final phase was intended to be left to the discretion of the field staff, as is the case for the full duration of most field periods. The various phases were marked using a set of case disposition codes in the electronic call records, which are maintained for every case. Note that there is no necessary correspondence in the time across cases at which the phase markers might be set; variations in staffing levels and exigencies of

individual cases might well cause the time to vary greatly.

Because the necessary actions of the interviewer are much too complicated to specify in precise detail *a priori* and because effort is inherently difficult to measure unambiguously, the case management protocol was established as a set of monitored guidelines, which managers were allowed to violate in light of the idiosyncracies of individual cases. At the point of interviewer training, both interviewers and their managers expressed enthusiasm for the protocol. During the field period, regular reports were generated for the field managers showing cases that appeared to have violated the guidelines, but the managers had the ultimate responsibility for monitoring.

Table 3 shows the percent of cases active in each phase that terminated within the phase. Overall, more than a quarter of all in-scope cases were completed within Phase 1. Although cases coded as final refusals in Phase 1 were supposed to have been moved immediately to Phase 2, information from the field supports the view that some cases refused so strongly that recontact was not a possibility. For further analysis here, the relatively small number of such cases are taken to have passed two threshold points and refused in Phase 3. The much higher final refusal rate recorded in Phase 2 indicates a serious problem with the way the protocol was followed beyond the first phase. By design, all cases that refused in Phase 2 should have been marked immediately for inclusion in Phase 3; such cases might have been treated as final refusals once that assignment was made, but only the most extreme refusals should have been accepted without the assignment of a case disposition code signifying the end of Phase 2.

Examination of the number of attempts recorded in the call records indicates that there was substantial variation in the way the markers of the sample phases were observed by the field managers.⁶ As shown in table 4, although the great majority of the activity in Phase 1 was contained within the first ten attempts, there are still a fair number of cases with larger numbers of attempts. For Phase 2 (table 5), the spread in the number of attempts is much broader. Several issues appear to be at the root of this unanticipated deviation from the sample management plan. First, the perception of an “attempt” that was sufficient to count toward progress within a phase has a subjective component and the information stored in the call records is not always sufficient to recapture that judgment directly. Thus, the available measure probably overstates the number of attempts that managers would have counted as meaningful. Second, Phase 2 lacked the compelling incentive present in marking the end of Phase 1—that is, the express mailing package. Second, the protocol was new both for the 2004 SCF and for NORC. For this reason, it is reasonable to assume

Table 4: Number of attempts at which cases were completed or refused before the express mailing, or number attempts at the time of the express mailing; both samples, area-probability sample only and list sample only; percent of cases in each completion status and sample type.

<i>x</i> attempts	<i>All</i>			<i>AP</i>			<i>LS</i>		
	<i>Comp.</i>	<i>Ref.</i>	<i>Express</i>	<i>Comp.</i>	<i>Ref.</i>	<i>Express</i>	<i>Comp.</i>	<i>Ref.</i>	<i>Express</i>
1	9.9	3.6	10.0	11.7	4.0	7.5	5.0	3.4	11.8
2	5.8	4.6	11.8	6.4	7.0	10.4	4.1	3.4	12.8
3	8.4	13.7	15.5	8.9	16.0	15.8	6.8	12.6	15.2
4	10.1	11.4	16.6	10.9	16.0	15.6	8.0	9.2	17.2
5	15.2	10.8	14.1	15.5	14.0	13.8	14.3	9.2	14.4
6	13.8	8.8	9.3	14.2	11.0	9.9	12.8	7.7	8.9
7	9.3	9.5	6.4	9.0	10.0	7.3	10.1	9.2	5.7
8	8.0	6.2	4.7	7.2	8.0	5.7	10.0	5.3	4.0
9	4.8	8.1	3.2	4.3	6.0	3.2	6.2	9.2	3.2
10	4.4	6.2	2.4	3.8	1.0	2.7	5.9	8.7	2.1
11	2.5	3.6	1.8	2.1	2.0	2.3	3.5	4.4	1.5
12	1.7	2.0	1.1	1.4	1.0	1.7	2.6	2.4	0.7
13	1.6	1.0	0.8	1.3	0.8	2.6	1.5	0.8	0.0
14	0.7	1.3	0.7	0.5	1.0	1.1	1.1	1.5	0.3
15	0.8	2.0	0.4	0.6	1.0	0.5	1.4	2.4	0.4
>15	3.2	7.5	1.3	2.2	2.0	1.8	5.9	10.1	1.0

⁶A small number of cases had obvious violations of the protocol. For example, in some cases an express mail package was sent after an interview had already been completed. Such problems are ignored in the analysis presented here.

Table 5: Number of attempts beyond Phase 1 at which cases were completed or refused before the end of Phase 2, or number attempts beyond Phase 1 at point when the end of Phase 2 was coded; both samples, area-probability sample only and list sample only; percent of cases in each completion status and sample type.

# attempts	<i>All</i>			<i>AP</i>			<i>LS</i>		
	<i>Comp.</i>	<i>Ref.</i>	<i>Phase 2</i>	<i>Comp.</i>	<i>Ref.</i>	<i>Phase 2</i>	<i>Comp.</i>	<i>Ref.</i>	<i>Phase 2</i>
1	0.1	5.2	20.8	0.1	3.3	20.5	0.0	6.0	21.1
2	0.5	9.7	13.4	0.7	10.6	14.2	0.3	9.3	12.5
3	1.9	11.0	15.9	1.7	13.7	15.9	2.0	10.1	15.9
4	1.9	9.9	12.9	1.8	12.0	12.8	1.9	9.1	13.0
5	3.9	8.7	7.6	3.6	8.6	6.95	4.3	8.8	8.2
6	5.0	8.0	6.9	4.7	9.2	7.51	5.4	7.5	6.4
7	6.4	7.8	6.0	6.5	6.9	4.3	6.4	8.1	7.7
8	8.0	6.7	4	7.6	5.7	4.3	8.4	7.1	3.7
9	8.2	5.3	2.9	8.5	5.5	2.4	7.9	5.2	3.3
10	8.5	5.2	2.4	8.7	4.1	2.8	8.2	5.6	2.0
11	7.3	4.0	1.5	7.4	2.9	1.8	7.2	4.4	1.2
12	7.6	3.0	1.2	6.8	2.3	1.2	8.6	3.3	1.2
13	5.5	2.6	0.5	6.4	2.5	0.7	4.5	2.7	0.4
14	5.7	1.85	1.0	5.6	2.1	1.1	5.8	1.6	0.9
15	5.7	1.8	0.7	6.6	1.7	0.7	4.73	1.8	0.7
>15	23.9	9.3	2.2	23.3	9.0	2.9	24.6	9.5	1.6

there might have been some initial confusion about how to proceed. Indeed, from debriefing the field managers, it appeared that some people saw the act of coding the end of Phase 2 as somehow limiting their ability to work further on such cases. In fact, marking the end of Phase 2 only should only have provided a focus for a formal reevaluation of a case for the usefulness of additional work.

Although the available Phase 1 marker may be sufficient for the original purposes of partitioning cases by levels of effort, the Phase 2 marker is clearly inadequate. For further analysis, two alternative markers are used along with the Phase 1 indicator. The point at which the sooner of either the end of Phase 1 had been reached or ten attempts had been undertaken is defined as Phase 1A. Similarly, the point at which the sooner of either the end of Phase 2 had been reached or ten attempts beyond Phase 1A had been undertaken is defined as Phase 2A. Phase3A is defined as the period beyond Phase 2A.

II. Models of nonresponse

A variety of information is available on both respondents and nonrespondents to support a model-based investigation of nonresponse. The census tract for the residence of every area-probability case is known and, in principle, that for the list sample may be inferred from a nine-digit ZIP code that is available for all list sample cases. The tract identifier may be used to link the survey cases with tract-level statistics from the 2000 Census of Population. In some instances, this information may serve as a noisy indicator of respondents' characteristics, but in other instances reflect structural characteristics of their neighborhoods. The variables extracted (see "Variable definitions for tables 6, 7 and 8") include indicators of population density, ethnic and racial composition, presence of exclusively non-English speakers, the age and income distributions, educational levels, work status, commuting time, housing type and vintage, typical rent and the prevalence of telephones. These variables are intended to span a variety of economic, cultural and other factors differences that might reasonably affect the propensity to respond.

The linkage to census tracts appears very clean for the area-probability sample. The list sample raises more problems. Each ZIP code for the list sample cases was supposed to be that of the residence of the taxpayer selected for the sample. But as has been clear throughout the history of the SCF, some tax returns are filed from a business address or through an accountant or lawyer. Unfortunately, we have no systematic information to identify the cases that did not have residential addresses.⁷ In addition, seven list sample cases were matched to tracts that had insufficient population to compute the variables used in the models.

Other data are available for the list sample from the tax-based information used in the original sample design (see "Variables definitions for tables 7, 8 and 9"). Unlike the tract-level variables, this information is specific to each of the sample observations. The variables examined include the age of the primary taxpayer, sources and amounts of several types of income and information on itemized deductions.

⁷Presumably, the detailed address information maintained by interviewers would have contained such information, but that is not available for any purpose other than the administration of the survey. Moreover, such information is systematically destroyed at the end of the project.

Interviewers were also required to collect some information on the informant who served for the initial screening and on characteristics of the sample address. Because the informant-level data are missing for about 40 percent of the 2004 sample, they are not useful for this nonresponse study. The address characteristics have less serious problems of missing data. Overall, 890 of the in-scope cases worked by the interviewers had missing information on the key variables describing physical limitations to contacting the respondent directly—presence of a doorman or guard, a locked gate, etc. Almost 60 percent of these cases were ones that received a final disposition code indicating that work had stopped and almost 30 percent were given the final disposition “final refusal.” All but 99 of the worked cases with missing data were members of the list sample. In addition, because the 665 list sample cases that returned a refusal postcard were never seen by an interviewer, information about the addresses is not available. Thus, results using these data for the list sample should be interpreted with caution.

The area-probability and list samples are modeled separately here. Although both samples cover very similar populations (as noted earlier, the list sample does not include households that did not file a tax return), the differences in the dispersion of the samples, the stratification of the list sample to obtain more wealthy households, and the approach field managers and interviewers may have taken to the samples argue for not estimating a pooled model. In addition, there are important differences in the data available for the two samples beyond the common tract-level data.

For the dependent variables shown in table 6, a series of six logit models was estimated for the area-probability sample (table 7). The models are structured to show the incremental effects of additional effort in the phases described above and to show the net effect across all phases. The first five models use the tract-level data along with the interviewer observations on obstructions to contacting the respondent. An additional model is shown for the final dependent variable, completion during any phase of the field period, without the interviewer observations in order to show the incremental effect of this information.

The two models of overall response (columns 5 and 6 of the table) are very similar. There are significant regional effects—higher response in the eastern north central region and lower response in the mid-Atlantic region—that may signal characteristics of “typical” residents or

Table 6: Dependent variables and sample definitions for logit models shows in tables 7, 8 and 9.

	<i>Dependent variable</i>	<i>Sample</i>
Area-probability sample models		
PHASE1	=1 if case completed before the express mailing	All in-scope cases.
PHASE1A	=1 if completed before the express mailing or mailing or 10 attempts, whichever came first	All in-scope cases.
PHASE2A	=1 if completed before 10 attempts after express mailing or 20 attempts, whichever came first	All in-scope cases where PHASE1A=0
PHASE3A	=1 if completed after 10 attempts after the express mailing or 20 attempts, whichever came first	All in-scope cases where PHASE2A=0
COMP	=1 if cases completed at any point	All in-scope cases
List sample models		
POSTCARD	=1 if refusal postcard not returned	All in-scope cases.
PHASE1A	=1 if completed before the express mailing or mailing or 10 attempts, whichever came first	All in-scope cases where POSTCARD=1
PHASE2A	=1 if completed before 10 attempts after express mailing or 20 attempts, whichever came first	All in-scope cases where POSTCARD=1 and PHASE1A=0
PHASE3A	=1 if completed after 10 attempts after the express mailing or 20 attempts, whichever came first	All in-scope cases where POSTCARD=1 and PHASE2A=0
COMP	=1 if completed at any point	All in-scope cases
COMPXPC	=1 if completed at any point	All cases in-scope cases where POSTCARD=1

differences in field management styles in these areas.⁸ Cases in neighborhoods with relatively high proportions of African-Americans, of people under the age of 18 and of workers who had relatively short commutes were more likely to cooperate. The association with commuting time has a natural economic interpretation: those with long commutes have less spare time, and thus should place a higher value on that time than would otherwise be the case. Response tends to be less likely in neighborhoods with higher proportions of people who have less than a high-school education. The access limitation variables included in model 5 indicate that respondents in housing units with a guard or doorman or where a “no trespassing” sign has been posted are less likely to be interviewed; simply living in a unit with a locked gate or lobby door appears to be unrelated to response. The effects of the tract-level variables discussed above do not change substantially when the access

⁸Because areas were reassigned, sometimes several times, over the course of the field period, it would be very difficult to extract a manager-specific effect from the data. Similarly, because cases were often reassigned to different interviewers or were worked on by other staff, interviewer-specific effects cannot be identified easily.

limitation effects are omitted, but there are other differences. In model 6, without the effects, population density has a significant negative effect; in the other model the effect is still negative, but not significant. Model 5, with the access effects included, shows additional positive significant effects of residence in the south Atlantic region and the percent of occupied housing units in the census tract, and negative effects from the proportion of households with a telephone and the proportion of townhouses in the tract. Because telephone coverage is so high (in 2001, 94.5 percent of all household had a telephone), it may be best to think of the positive effect on response of low telephone coverage

The overall response patterns are a result of outcomes in the separate phases of the field work. Phase 1 is the least complicated point at which to view the effects of the variables on

Table 7: Logit models of response for various phases of the field period, area-probability sample.

	(1)	(2)	(3)	(4)	(5)	(6)	P_LTHS	-0.006	-0.007	-0.005	-0.041+	-0.018+	-0.017+
	PHASE1	PHASE1A	PHASE2A	PHASE3A	COMP	COMP	P_INC_LT10	0.010	0.010	0.014	0.025	0.011	0.010
Intercept	2.418	0.413	-2.584	-4.281	-0.216	0.976	P_INC_75_150	-0.005	-0.009	0.013	-0.012	-0.001	0.000
NON_MSA	-0.002	1.969	2.786	5.322	2.128	2.067	P_INC_GE150	0.007	0.007	0.009	0.018	0.007	0.007
SM_MSA	0.058	0.092	0.036	-0.210	0.032	0.041	P_WORKERS	-0.031#	-0.015	0.018	0.005	0.000	0.006
NEW_ENGLAND	0.004	0.058	0.081	0.148	0.063	0.061	P_UNEMP	0.010	0.009	0.012	0.024	0.010	0.009
MID_ATLANTIC	0.075	-0.081	-0.067	-0.173	-0.112	-0.087	P_COMMUT_LT25	0.010	0.036#	-0.015	-0.008	0.014	0.008
S_ATLANTIC	0.163	0.075	0.109	0.204	0.081	0.080	P_COMMUT_GE45	0.011	0.011	0.016	0.032	0.012	0.012
E_S_CENTRAL	-0.054	-0.368*	-0.370+	0.735*	-0.274	-0.224	P_OCC_HOU	-0.003	0.006	-0.001	-0.053	-0.001	-0.007
W_S_CENTRAL	0.128	0.165	0.226	0.352	0.170	0.168	P_OWNOCC	0.014	0.014	0.020	0.044	0.015	0.015
E_N_CENTRAL	-0.243*	-0.030	-0.287+	-0.236	-0.258*	-0.274#	P_HOU_IATT_UNIT	0.006	0.011#	0.009	-0.005	0.010*	0.008+
W_N_CENTRAL	0.112	0.110	0.150	0.292	0.115	0.113	P_HOU_2_4_UNIT	0.004	0.004	0.006	0.011	0.005	0.005
MOUNT_PACIFIC	0.094	0.011	0.079	0.589#	0.152+	0.081	P_HOU_5_49_UNIT	0.010+	0.022#	0.006	-0.038*	0.010	0.007
POP_DENSITY	0.086	0.085	0.118	0.219	0.093	0.089	P_HOU_GE50_UNIT	0.006	0.006	0.009	0.017	0.007	0.006
P_NATIVE_BORN	-0.184	-0.333*	0.318	0.704+	0.016	-0.039	P_HOU_LE1939	0.026	0.022	0.014	0.168#	0.051*	0.035
P_HISP	0.153	0.154	0.212	0.404	0.166	0.162	P_HOU_1940_1959	0.022	0.022	0.034	0.060	0.027	0.025
P_AFAM	0.251*	0.416#	0.450#	-1.229#	0.383#	0.412#	P_HOU_1960_1989	-0.002	-0.004	-0.007	-0.011	-0.006	-0.008
P_ASIA	0.112	0.113	0.168	0.460	0.134	0.130	L_MED_RENT	0.006	0.006	0.008	0.014	0.006	0.006
P_RACE_OTH	-0.066	0.034	0.061	-0.180	0.011	0.010	P_PHONE	-0.010#	-0.009#	-0.001	0.000	-0.007*	-0.004
P_SPONLY_SPAN	0.087	0.086	0.121	0.241	0.094	0.092	GUARD	0.004	0.003	0.004	0.008	0.003	0.003
P_SPONLY_OTH	-0.267*	-0.254*	0.160	0.113	-0.066	-0.066	LOCKED_LOBBY	0.009+	0.008+	0.002	-0.006	0.009	0.008
P_AGE_LT18	0.128	0.127	0.170	0.306	0.134	0.132	LOCKED_GATE	0.005	0.005	0.008	0.014	0.006	0.006
P_AGE_GE65	0.286*	0.326#	-0.070	-0.536	0.079	0.144	NO_TRESSPASS	-0.005	-0.007	-0.005	0.001	-0.007	-0.007
P_GEBA	0.131	0.132	0.196	0.379	0.145	0.143	N	0.005	0.005	0.007	0.012	0.005	0.005
P_SOMCOLL	0.002	-0.003	-0.006	0.003	-0.004	-0.007*		-0.005	0.000	0.001	0.004	0.002	-0.001
	0.004	0.004	0.005	0.009	0.004	0.003		0.005	0.005	0.007	0.015	0.006	0.005
	0.000	0.001	0.002	0.006	0.002	-0.001		-0.003	-0.003	0.004	0.010	0.002	0.003
	0.009	0.009	0.013	0.024	0.010	0.010		0.004	0.003	0.005	0.009	0.004	0.004
	0.010	0.006	-0.016	-0.014	-0.012	-0.011		0.001	0.000	-0.003	0.004	0.000	0.000
	0.015	0.014	0.020	0.037	0.016	0.016		0.003	0.003	0.004	0.008	0.003	0.003
	0.002	0.002	0.007*	-0.005	0.005+	0.004+		-0.001	-0.001	0.000	0.008	0.001	0.001
	0.002	0.002	0.003	0.007	0.003	0.003		0.003	0.003	0.004	0.007	0.003	0.003
	-0.024#	0.010	-0.001	-0.021	0.005	0.010		-0.424*	-0.368*	0.327	-0.072	-0.025	-0.140
	0.008	0.007	0.010	0.021	0.008	0.007		0.189	0.186	0.250	0.455	0.195	0.190
	-0.059#	-0.013	0.002	-0.085	-0.013	-0.015		-0.038+	-0.038+	-0.004	-0.141#	-0.054*	-0.034
	0.022	0.020	0.028	0.093	0.022	0.022		0.021	0.021	0.032	0.055	0.026	0.025
	-0.008	-0.004	0.027	0.040	0.026	0.021		-0.072	0.457+	-1.538#	-1.776+	-0.481*	.
	0.018	0.018	0.026	0.047	0.020	0.020		0.251	0.242	0.493	1.050	0.243	.
	0.016	-0.007	0.006	0.024	0.000	-0.005		-0.193	-0.167	-0.031	-0.661	-0.237	.
	0.011	0.011	0.015	0.029	0.012	0.011		0.165	0.161	0.219	0.435	0.166	.
	0.026*	0.045#	-0.024	0.060+	0.028*	0.025*		-0.311	-0.349+	0.170	0.132	-0.111	.
	0.012	0.012	0.016	0.032	0.013	0.013		0.195	0.195	0.248	0.459	0.205	.
	0.001	0.018	-0.027+	0.005	0.001	-0.005		-0.500+	-0.589*	-0.630+	-0.526	-0.753#	.
	0.011	0.011	0.016	0.032	0.012	0.012		0.262	0.263	0.347	0.605	0.249	.
	0.010	0.009	-0.014	-0.012	-0.005	-0.007							.
	0.007	0.007	0.009	0.017	0.007	0.007							.
	-0.011	-0.024#	0.008	0.012	-0.011	-0.009							.
	0.010	0.010	0.014	0.025	0.010	0.010							.
							#:	<=1%,	*:	<=5%,	+:	<=10%	
								4271	4271	2295	1459	4271	4367

nonresponse. Unlike the overall response model, it is (in principle) uncontaminated by behavioral variations in the application of effort. In addition, the dividing point for the period is less ambiguous than is the case for the later phases. In the initial phase—according to either the Phase 1 or Phase 1A marker—response is positively associated with residence in the west south central or mountain pacific region, living in neighborhoods with higher proportions of people under the age of 18, higher concentrations of buildings with two to four units, and higher proportions of workers with long commutes to work. Response is negatively associated with residence in the west north central region, higher proportions of townhouses, a higher coverage rate for telephones, higher median levels of rent and the presence of a “no trespassing” sign at the sample address. The positive effect of the fraction of workers with long commuting times, particularly contrasted with positive effect of short commuting time in the overall response model, seems strange if it is taken as reflecting respondent characteristics. One possibility is that neighborhoods with high fractions of workers with long commutes also contain other people who for some reason are more willing to participate, but this smaller part of the pool of eligible respondents would have been exhausted early on. Of the effects significant in these two models, only two positive effects (residence in the west south central region and the proportion of people aged less than 18) and three negative effects (the proportion of townhouses, the coverage rate of telephones, and presence of a “no trespassing” sign) are also significant and of the same sign in the overall response model. For the straightforwardly defined Phase 1 model, several other effects are significant and all negative in their influence on response propensity: residence in the mid-Atlantic region, the proportion of people in the tract who are Asian or “other” race and the proportion of households with incomes of \$150,000 or more; of these only the mid-Atlantic effect carries through to the final model.

Generally over the course of the remaining phases, fewer variables are significant in the models and none of the initial effects are consistently sustained. In Phase 3A, where the application of effort was largely determined by the judgment of the field staff about where effort would be most likely to yield completed interviews, a largely different pattern of significant estimates emerges, some of which are the reverse in sign of the corresponding estimates for the first phase.

Overall, the break-out of response propensities over phases of the field period is hard to interpret, though the results do at least indicate that some sort of behaviorally-based selection process took place. Because the tract-level data are neighborhood characteristics, not respondent

characteristics, we can only guess at whether the observed effects are driven by neighborhood context or by the degree to which the respondents tend to share the neighborhood characteristics—or both. For example, we cannot tell whether the decline from Phase 1 in the importance of living in a high-income neighborhood as a driver of nonresponse is a result of a filtering through all income levels of respondents in such neighborhoods or whether individual high-income respondents tend to become more cooperative after receiving more information. In essence, we do not know the initial correspondence between respondents and their neighborhood characteristics or how that correlation changes among nonrespondents remaining at various points in the field period. To discriminate more clearly between these alternatives, we need either reliable interviewer observations on a broad array of characteristics observable for all respondents or external information on all respondents. As noted above, most of the interviewer-collected observations for the sample are too riddled with missing data to be useful for this exercise. But for the list sample we do have a limited amount of information specific to each selected case.

If we are to apply inferences from the list sample to the area-probability sample as well, it would be helpful if the pattern of association with the tract-level variables were similar in the two samples. A number of factors might limit this possibility. First, as noted above, the match to tract-level data is somewhat less certain for the list sample than for the area-probability sample. If the likelihood of having a business address is about the same for participants and non-participants, this would only make the estimates noisier. Second, the list sample is differentially sampled by an indicator of wealth. Controlling separately for the sample stratum should diminish distortions from this source, but such conditioning could offset some other effects that have a latent correlation with wealth; excluding the wealthiest cases might be a useful robustness check, but the smaller sample size would diminish the power. Third, the list sample does not include households where no one filed a tax return. Such households tend to be those that have very little labor income—this group primarily comprises people receiving some type of public assistance, people whose sole income source is social security, and those who are avoiding or evading taxes. Fourth, the list sample cases were given a chance to refuse participation absolutely by returning a postcard; no follow-up persuasion was allowed for such cases. Clearly this allowance might well influence the phase-specific models, but unless the postcard refusal cases are unlike area-probability cases that persisted in refusals through Phase 3, there should be no effect on an overall model of response. Fifth,

although there is some clustering in the list sample, that sample tends to be much more thinly spread than the area-probability sample. Consequently it may have been difficult to work with as great efficiency early in the field period. If there are aspects of effort not captured in the measures used to define the sample phases, then at least the phase-specific models could differ for this reason. Sixth, the contract for the survey specified a minimum number of cases that must be completed in each list sample stratum. These levels, which were chosen based on the experience of what had been seen as feasible in earlier surveys, were intended to ensure that every stratum would receive attention. The data suggest that list sample cases that did not return the refusal postcard were worked slightly harder than the area-probability cases, but it may still be that this difference reflects a higher average level of difficulty for the list sample.⁹

To explore the comparability of the response propensities for the area-probability and list samples, table 8 shows estimates of models for the list sample of overall completion (columns 1 and 3) and for overall completion beyond the postcard stage (columns 2, 4 and 5), using the tract-level variables and with (columns 3, 4 and 5) and without (columns 1 and 2) indicators for the list sample strata and with (column 5) and without (columns 1, 2, 3 and 4) the access limitation variables. This combination of models is intended to give a sense of the robustness of the models to the specification. A number of relationships are common or nearly so across these models, but the correspondence with the overall response models for the area-probability sample is weak. In one of the five list sample models (column 5) population density of the census tract was associated with a higher response propensity, in two models (columns 1 and 2) the proportion of people in the census tract younger than age 18 had a positive effect, and in one model (column 5) the presence of a guard or doorman has a negative effect on response. If the list sample included in the estimation is restricted to the least wealthy bottom four sample strata (about 40 percent of that sample), the significant effects for the full list sample are generally sustained (not shown in the table). Thus, while some part of the differences in the estimates for the two samples may still be related to the oversampling in the list sample, other factors including differences in the ways the samples were

⁹Overall, the mean number of attempts made on a case was 11.5, the median was 10 and the 95th percentile of the distribution was 24. For the area-probability sample, the figures were 11.1, 9 and 24; for the list sample, they were 12.0, 11 and 24.

Table 8: Logit models for overall response and overall response after the postcard stage, list sample.

	(1)	(2)	(3)	(4)	(5)						
	COMP	COMPXP	COMP	COMPXP	COMPXP						
Intercept	-2.981	-2.975	-2.866	-2.869	-2.975	P_INC_GE150	-0.013#	-0.017#	-0.006	-0.009+	-0.005
NON_MSA	1.869	1.918	1.890	1.949	2.113	P_WORKERS	0.005	0.005	0.005	0.005	0.006
SM_MSA	-0.037	-0.031	-0.046	-0.038	0.010	P_UNEMP	0.009	0.012	0.009	0.013	0.024*
NEW_ENGLAND	0.097	0.100	0.098	0.101	0.107	P_COMMUT_LT25	0.009	0.009	0.009	0.009	0.010
MID_ATLANTIC	-0.019	-0.094	-0.011	-0.086	-0.113	P_COMMUT_GE45	0.013	0.014	0.013	0.014	0.029*
S_ATLANTIC	0.158	0.162	0.159	0.164	0.175	P_OCC_HOU	0.012	0.012	0.012	0.012	0.014
E_S_CENTRAL	0.075	0.083	0.080	0.102	0.274+	P_OWNOC	0.003	0.004	0.005	0.007	0.007
W_S_CENTRAL	0.131	0.136	0.132	0.138	0.149	P_HOU_1ATT_UNIT	0.004	0.004	0.004	0.005	0.005
E_N_CENTRAL	-0.002	-0.016	-0.009	-0.031	0.102	P_HOU_2_4_UNIT	0.006	0.006	0.006	0.006	0.006
W_N_CENTRAL	0.100	0.104	0.101	0.106	0.113	P_HOU_5_49_UNIT	0.047	0.029	0.050	0.032	0.040
MOUNT_PACIFIC	-0.002	0.004	-0.014	-0.012	-0.003	P_HOU_GE50_UNIT	0.031	0.032	0.031	0.032	0.036
POP_DENSITY	0.091	0.094	0.092	0.096	0.102	P_HOU_LE1939	-0.006	-0.004	-0.007	-0.005	-0.006
P_NATIVE_BORN	0.161	0.064	0.150	0.052	-0.107	P_HOU_1940_1959	0.005	0.005	0.005	0.005	0.005
P_HISP	0.221	0.227	0.224	0.231	0.238	P_HOU_1960_1989	0.003	0.002	0.002	0.001	-0.001
P_AFAM	-0.122	-0.074	-0.146	-0.119	-0.110	LOCKED_LOBBY	0.004	0.004	0.004	0.004	0.005
P_ASIA	0.122	0.127	0.123	0.128	0.137	LOCKED_GATE	0.003	0.003	0.003	0.003	0.003
P_RACE_OTH	0.012	0.025	0.002	0.003	-0.188+	NO_TRESSPASS	-0.006#	-0.007#	-0.006*	-0.006*	-0.009#
P_SPONLY_SPAN	0.093	0.098	0.094	0.099	0.102	LS_STRAT7	0.003	0.003	0.003	0.003	0.003
P_SPONLY_OTH	-0.075	-0.024	-0.073	-0.003	-0.001	LS_STRAT6	0.003	0.003	0.003	0.003	0.003
P_AGE_LT18	0.155	0.162	0.156	0.164	0.174	LS_STRAT5	-0.006#	-0.007#	-0.006*	-0.006*	-0.009#
P_AGE_GE65	0.052	0.004	0.096	0.059	0.088	LS_STRAT4	0.003	0.003	0.003	0.003	0.003
P_GEBA	0.153	0.158	0.155	0.161	0.173	LS_STRAT3	-0.002	-0.003	-0.002	-0.003	-0.005+
P_SOMCOLL	0.004+	0.005*	0.002	0.003	0.008#	LS_STRAT2	0.002	0.002	0.002	0.002	0.003
P_LTHS	0.000	0.002	0.000	0.003	0.003	GUARD	-0.012	-0.001	-0.036	-0.035	0.122
P_INC_LT10	0.010	0.010	0.010	0.011	0.011	P_PHONE	0.128	0.131	0.129	0.133	0.142
P_INC_75_150	0.023	0.019	0.023	0.018	-0.008	LOCKED_LOBBY	-0.030	-0.010	-0.035	-0.016	-0.032
	0.014	0.015	0.015	0.015	0.017	LOCKED_GATE	0.031	0.031	0.031	0.032	0.036
	0.006+	0.006	0.006	0.005	0.004	NO_TRESSPASS	.	.	.	.	-0.429#
	0.003	0.004	0.003	0.004	0.004	LS_STRAT7	.	.	.	.	0.150
	0.013+	0.015*	0.010	0.012	0.009	LS_STRAT6	.	.	-1.002	-1.103	-0.932
	0.007	0.007	0.007	0.008	0.008	LS_STRAT5	.	.	0.135	0.137	0.145
	0.014	0.004	0.014	0.002	0.008	LS_STRAT4	.	.	-0.252#	-0.308	-0.202#
	0.032	0.033	0.032	0.034	0.036	LS_STRAT3	.	.	0.067	0.069	0.074
	-0.022	-0.021	-0.022	-0.020	0.013	LS_STRAT2	.	.	0.035	0.008	0.003
	0.018	0.019	0.018	0.019	0.021	N	4997	4336	4997	4336	3526
	-0.013	-0.018	-0.011	-0.017	-0.014						
	0.011	0.012	0.011	0.012	0.013						
	0.018+	0.022*	0.015	0.018	0.016						
	0.011	0.011	0.011	0.011	0.012						
	0.022*	0.026#	0.021*	0.025#	0.029#						
	0.010	0.010	0.010	0.010	0.011						
	0.011	0.010	0.012+	0.012+	0.007						
	0.007	0.007	0.007	0.007	0.008						
	0.000	-0.002	0.001	-0.001	-0.001						
	0.011	0.011	0.011	0.012	0.013						
	-0.008	-0.006	-0.006	-0.003	-0.003						
	0.012	0.013	0.012	0.013	0.014						
	0.002	0.003	0.004	0.004	0.003						
	0.011	0.011	0.011	0.011	0.013						
	-0.010+	-0.013*	-0.010+	-0.013*	-0.013*						
	0.006	0.006	0.006	0.006	0.007						

#: p<=1%, *: p<=5%, +: p<=10%

worked seem more likely to be part of the explanation.

The absence of strong parallel findings in the two samples for a parallel set of variables limits our ability to draw general conclusions for both sample. Nonetheless, response propensities for the list sample are interesting in their own right and examination of the effects of including observation-level variables in response propensity models may still suggest latent sources of response bias for both samples. Table 9 provides estimates of a set of response propensity models for the postcard stage (column 1), the subsequent three sample phases (columns 2, 3, 4 and 5), the overall period beyond the postcard stage (column 6), and the full overall period including the postcard stage (column 7). The explanatory variables used are the tract-level variables, indicators

for the list sample strata, and the case-level variables used in the sample design. Because of the relatively high fraction of missing information on access limitations for this sample, that information is not included in the models.

The overall model (column 7) shows a variety of significant effects involving both the tract-level variables and the case-specific variables. Among the tract-level variables, higher proportions of people who are African-American, Hispanic, aged younger than 18 or aged 65 and older, and residence in neighborhoods with higher proportions of occupied housing units are positively associated with response. Residence in neighborhoods with higher proportions of housing units in buildings with five or more units and residence in buildings built before 1960 are negatively associated with response.¹⁰ There are no significant geographic factors. Comparison of these model estimates with those shown in table 8 indicates that the tract-level characteristics are largely independent of the case-specific variables.¹¹ Response propensity is quadratic in age of the primary taxpayer, increasing until age 59 and then declining—reaching the equivalent effect of age 40 at about age 80. Income characteristics of the unit have strong effects on the response propensity. The amounts of total income and total financial income (the sum of dividends and taxable and nontaxable interest incomes) are both negative in their influence as is receipt of income from rents or royalties. At the same time, receipt of two of the components—nontaxable interest and dividends—have a positive effect; for a person having all three types, the estimated coefficients imply that the positive effect is not offset until the level of financial income reaches \$178,000. The level of itemized deductions for charitable contributions also has a positive effect; this result is consistent with a role for altruism in the decision to respond. Both the result for financial income and that for charitable contributions were reported in an overall nonresponse analysis of the list sample in the 1992 SCF by Kennickell and McManus [1993].

¹⁰If the access limitation variables are included in this model, the effects of housing size and vintage are sustained. Although the comparison is affected by the high missing data rate for this sample, these factors at least give no sign of being proxies for obstacles to accessing the respondent's residence.

¹¹A set of comparable models estimated using only the case-level variables also suggests the independence of most of the significant effects in this model.

To be approached by an interviewer, a list sample case must not have returned the refusal postcard. Avoiding this refusal requires one of two things: either the respondent never opens the mailing containing the postcard or having opened it they choose not to return the postcard. That choice could be based on a misunderstanding that the card should only be returned if they wanted to participate, a belief that return of the postcard might place them at risk, that they felt they had sufficient means of evading an interviewer later, or that they accepted the opportunity to receive more information about the survey. In the project debriefing, interviewers reported that very many list sample respondents did not recall ever having received the mailing; this suggests that the propensity to open unsolicited mail may be a key driver at the postcard stage. As shown in column 1, only a few systematic factors emerge in the model describing the initial passive agreement to continue (that is, the card was not returned). Neighborhoods that have higher proportions of Hispanics, household incomes of \$150,000 or more, and occupied housing units, and households with income from partnerships or s-corporations or losses from self-employment income were more likely not to return the refusal postcard.

There are no characteristics in the models that have a significant effect in all phases of actual (or potential) contact with an interviewer. Even the two measures of Phase 1 highlight many different factors, though a number are consistent. In the first phase, neighborhoods with a higher proportion of people with a bachelor's degree have higher response rates; this accords with reports from interviewers that more educated people are easier to persuade, because they are more likely to understand the importance of the survey. Refusals are more likely in neighborhoods with a higher proportion of households with at least \$150,000 of income. At the same time, receipt of taxable and nontaxable interest incomes and age of the primary taxpayer (peaking at about age 60) are positively related to response propensity; and as in the overall model, total income and total financial income have a negative effect.

The model for Phase 2A has no significant tract-level factors in common with the models for Phase 1 response; among the case-specific variables they share the key effects of age and financial income. The model for phase 3A has no significant factors in common other than stratum indicator with any of the models for the earlier phases. Indeed, the Phase 3A model reveals little systematic structure in terms of tract-level variables aside from a correlation of higher population density and higher percentages of unemployed workers with response. None of the case-specific

variables beyond the stratum indicators are significant; this suggests that continued effort may do less than usually hoped to alter the composition of the pool of cases remaining after the initial stages of field work. At the same time, it does not appear that allowing the application of effort in Phase 3A to the discretion of the field staff added much additional systematic distortion.

Table 9: Logit models of response for various phases of the field period, list sample.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)										
	POST-CARD	PHSE1	PHA-SE1A	PHA-SE2A	PHA-SE3A	COMPXPC	COMP	P_HOU_GE50_UNIT									
Intercept	4.963+	-6.526*	-8.194#	0.171	-5.107	-2.782	-2.490		-0.002	-0.001	-0.008	-0.008	-0.010	-0.009*	-0.009*	-0.004	0.004
NON_MSA	2.902	2.932	2.785	3.157	6.041	2.194	2.111		0.005	0.006	0.005	0.006	0.011	0.004	0.004	0.004	0.004
SM_MSA	-0.057	-0.092	-0.087	-0.076	0.525	-0.028	-0.048		0.003	0.002	-0.003	-0.010*	0.005	-0.006*	-0.005+	-0.005+	-0.005+
NEW_ENGLAND	0.157	0.127	0.121	0.149	0.388	0.103	0.099		0.004	0.004	0.004	0.004	0.004	0.003	0.003	0.003	0.003
MID_ATLANTIC	0.342	-0.038	0.148	-0.140	-0.822	-0.066	0.022		0.003	-0.003	-0.011#	-0.004	0.008	-0.007#	-0.006*	-0.006*	-0.006*
S_ATLANTIC	0.270	0.206	0.194	0.246	0.718	0.167	0.161		0.003	0.004	0.003	0.004	0.008	0.003	0.003	0.003	0.003
E_S_CENTRAL	-0.120	-0.050	-0.057	0.198	0.312	0.125	0.094		0.004	0.002	-0.003	-0.006+	0.007	-0.004	-0.002	-0.002	-0.002
W_S_CENTRAL	0.184	0.191	0.182	0.187	0.386	0.140	0.134		0.020	-0.024	0.308+	-0.194	-0.380	-0.006	-0.006	-0.006	-0.006
E_N_CENTRAL	0.047	-0.031	0.167	-0.130	-0.527	-0.023	-0.002		0.178	0.184	0.172	0.184	0.355	0.135	0.131	0.131	0.131
W_N_CENTRAL	0.144	0.144	0.133	0.153	0.353	0.108	0.103		-0.122*	-0.020	0.021	-0.060	-0.021	-0.013	-0.013	-0.013	-0.013
MOUNT_PACIFIC	-0.098	-0.179	-0.006	-0.054	0.305	-0.013	-0.003		0.055	0.042	0.042	0.044	0.090	0.032	0.031	0.031	0.031
POP_DENSITY	0.132	0.130	0.122	0.134	0.265	0.097	0.092		0.502	-1.195#	-0.602	-0.121	-1.068	-0.425	-0.356	-0.356	-0.356
P_NATIVE_BORN	0.588	0.341	0.024	0.128	-0.077	0.051	0.144		0.341	0.437	0.380	0.378	0.918	0.280	0.265	0.265	0.265
P_HISP	0.409	0.280	0.282	0.336	0.716	0.235	0.227		0.246	-0.358+	-0.202	0.065	0.877*	0.008	0.054	0.054	0.054
P_AFAM	-0.249	-0.608#	-0.103	-0.133	0.082	-0.132	-0.152		0.189	0.213	0.195	0.211	0.439	0.152	0.143	0.143	0.143
P_ASIA	0.168	0.185	0.163	0.181	0.334	0.131	0.124		0.130	-0.133	0.062	0.087	0.540+	0.068	0.102	0.102	0.102
P_RACE_OTH	-0.098	-0.001	0.084	0.011	-0.358	-0.015	-0.008		0.120	0.132	0.118	0.132	0.294	0.094	0.089	0.089	0.089
P_SPONLY_SPAN	0.129	0.129	0.124	0.139	0.308	0.101	0.095		0.005	0.231*	0.036	0.044	0.709#	0.070	0.100	0.100	0.100
P_SPONLY_OTH	-0.134	-0.029	-0.529*	0.098	0.566	-0.047	-0.117		0.113	0.117	0.109	0.125	0.268	0.089	0.084	0.084	0.084
P_AGE_LT18	0.199	0.214	0.243	0.214	0.350	0.166	0.158		-0.176	0.450#	0.231	0.114	-0.521	0.118	0.081	0.081	0.081
P_AGE_GE65	0.225	0.408*	0.251	0.019	-0.163	0.079	0.107		0.150	0.156	0.145	0.171	0.453	0.121	0.114	0.114	0.114
P_GEBA	0.241	0.198	0.198	0.228	0.462	0.163	0.157		-0.281	0.447*	0.271	0.192	0.459	0.277+	0.192	0.192	0.192
P_SOMCOLL	-0.003	-0.007	-0.006	0.005	0.017#	0.003	0.002		0.206	0.222	0.205	0.243	0.513	0.170	0.158	0.158	0.158
P_LTHS	0.003	0.005	0.004	0.003	0.006	0.003	0.002		-0.031	0.051*	0.044+	0.094#	0.010	0.067#	0.059#	0.059#	0.059#
P_INC_LT10	0.010	0.008	0.012	-0.015	-0.002	-0.003	-0.002		0.025	0.026	0.024	0.030	0.062	0.020	0.019	0.019	0.019
P_INC_75_150	0.015	0.015	0.014	0.015	0.028	0.011	0.011		0.011	-0.042+	-0.034	-0.074#	-0.011	-0.053#	-0.050#	-0.050#	-0.050#
P_INC_GE150	0.037+	0.032	0.012	0.024	0.022	0.018	0.026+		0.022	0.025	0.023	0.029	0.059	0.019	0.018	0.018	0.018
P_WORKERS	0.020	0.020	0.020	0.022	0.038	0.016	0.015		0.063	-0.196#	-0.248#	-0.131	-0.054	-0.192#	-0.155#	-0.155#	-0.155#
P_UNEMP	0.005	0.008+	0.009*	0.003	-0.003	0.005	0.006+		0.071	0.080	0.075	0.081	0.163	0.059	0.055	0.055	0.055
P_COMMUT_LT25	0.005	0.004	0.004	0.006	0.013	0.004	0.004		-0.291	-0.014	-0.189	-0.407	0.978	-0.112	-0.165	-0.165	-0.165
P_COMMUT_GE45	-0.004	-0.002	0.004	0.020+	-0.008	0.013+	0.010		0.326	0.376	0.353	0.375	0.642	0.270	0.256	0.256	0.256
P_OCC_HOU	0.010	0.011	0.010	0.011	0.024	0.008	0.007		0.033	0.021	0.046	0.039	-0.055	0.029	0.034	0.034	0.034
P_OWNOC	0.084	-0.064	0.021	-0.012	0.015	0.003	0.016		0.028	0.033	0.030	0.031	0.053	0.023	0.022	0.022	0.022
P_HOU_1ATT_UNIT	0.066	0.060	0.039	0.055	0.084	0.034	0.033		0.043	0.258*	0.350#	0.299*	0.135	0.346#	0.340	0.340	0.340
P_HOU_2_4_UNIT	-0.026	-0.029	-0.011	-0.029	-0.006	-0.018	-0.025		0.114	0.123	0.114	0.124	0.239	0.090	0.087	0.087	0.087
P_HOU_5_49_UNIT	0.025	0.026	0.026	0.027	0.045	0.019	0.019		-0.303	0.462+	0.519*	0.592+	0.026	0.620#	0.491*	0.491*	0.491*
	0.020	-0.003	0.000	-0.030+	0.004	-0.017	-0.012		0.329	0.267	0.260	0.324	0.715	0.222	0.209	0.209	0.209
	0.016	0.017	0.015	0.017	0.034	0.012	0.012		0.094	0.439#	0.395#	0.119	0.155	0.292*	0.282*	0.282*	0.282*
	-0.029+	0.025+	0.021	0.014	0.005	0.019+	0.014		0.166	0.165	0.158	0.187	0.376	0.131	0.125	0.125	0.125
	0.016	0.015	0.014	0.016	0.032	0.011	0.011		-0.102#	-0.063*	-0.050+	-0.085#	-0.061	-0.075#	-0.092#	-0.092#	-0.092#
	-0.011	0.019	0.034#	0.012	0.001	0.025*	0.021*		0.032	0.032	0.030	0.034	0.065	0.024	0.023	0.023	0.023
	0.014	0.014	0.013	0.015	0.030	0.011	0.010		-0.151	0.184	0.134	0.033	-0.428	0.037	0.004	0.004	0.004
	-0.001	0.030#	0.023*	-0.006	0.018	0.011	0.011		0.120	0.132	0.122	0.138	0.273	0.098	0.093	0.093	0.093
	0.010	0.010	0.009	0.011	0.022	0.008	0.007		0.067	0.227+	0.033	0.126	-0.384	0.038	0.040	0.040	0.040
	-0.005	0.014	0.008	-0.022	0.048	0.001	0.001		0.123	0.130	0.121	0.122	0.246	0.092	0.088	0.088	0.088
	0.015	0.016	0.015	0.017	0.034	0.012	0.011		-0.132	-0.072	-0.027	-0.354	0.479	-0.111	-0.116	-0.116	-0.116
	-0.019	0.018	0.019	-0.034+	0.023	-0.003	-0.006		0.196	0.233	0.218	0.251	0.369	0.168	0.161	0.161	0.161
	0.017	0.017	0.016	0.019	0.035	0.013	0.012		-0.097	0.059	-0.134	-0.196*	0.279	-0.133+	-0.146*	-0.146*	-0.146*
	-0.007	0.006	-0.003	0.012	0.000	0.006	0.004		0.095	0.100	0.092	0.101	0.201	0.073	0.070	0.070	0.070
	0.016	0.015	0.014	0.017	0.029	0.012	0.011		0.221+	-0.059	-0.243*	0.144	0.241	-0.036	0.029	0.029	0.029
	0.013	-0.019*	-0.009	-0.017+	-0.001	-0.012*	-0.009		0.123	0.126	0.117	0.141	0.277	0.097	0.093	0.093	0.093
	0.008	0.009	0.008	0.009	0.018	0.006	0.006		0.019	0.018	-0.214	0.222	-0.105	0.007	0.029	0.029	0.029
	0.012+	-0.027#	-0.017#	-0.003	0.007	-0.009	-0.005		0.149	0.176	0.170	0.155	0.326	0.120	0.116	0.116	0.116
	0.007	0.008	0.007	0.008	0.016	0.006	0.005		0.107	0.111	0.104	0.116	0.222	0.083	0.079	0.079	0.079
	-0.022+	0.003	0.004	0.011	0.037	0.014	0.009		0.444#	0.211	0.179	-0.202	0.180	0.004	0.078	0.078	0.078
	0.013	0.013	0.012	0.013	0.025	0.009	0.009		0.156	0.150	0.139	0.158	0.300	0.110	0.107	0.107	0.107
	0.004	0.009	0.019	-0.028	0.056+	0.011	0.010		0.159	-0.594+	-0.136	0.197	-0.341	0.002	0.046	0.046	0.046
	0.018	0.017	0.015	0.022	0.032	0.013	0.012		0.288	0.322	0.285	0.306	0.667	0.224	0.213	0.213	0.213
	-0.003	0.009	0.003	0.019*	-0.015	0.008	0.006		-0.019	0.060+	0.019	-0.022	0.024	-0.001	-0.007	-0.007	-0.007
	0.008	0.008	0.007	0.008	0.018	0.006	0.006		0.029	0.033	0.030	0.032	0.068	0.023	0.022	0.022	0.022
	0.012*	0.030	0.017	0.064	0.007	0.027	0.047		1.092	-2.404	-1.784	-0.591	-9.112	-1.789	-1.578	-1.578	-1.578

Variable definitions for tables 7, 8 and 9.**2000 Census data available for area-probability and list sample cases:**

NON_MSA: =1 if sample area not an MSA.
 SM_MSA: =1 if sample area not self-representing.
 NEW_ENGLAND: =1 if sample area in New England.
 MID_ATLANTIC: =1 if sample area in mid-Atlantic.
 S_ATLANTIC: =1 if sample area south Atlantic.
 E_S_CENTRAL: =1 if sample area east south central.
 W_S_CENTRAL: =1 if sample area west south central.
 E_N_CENTRAL: =1 if sample area east north central.
 W_N_CENTRAL: =1 if sample area west north central
 MOUNT_PACIFIC: =1 if sample area mountain Pacific.
 PACIFIC: omitted category: Pacific coast
 POP_DENSITY: number of people in census tract divided by area of tract in square meters.
 P_NATIVE_BORN: % native born in tract.
 P_HISP: %a Hispanic in tract.
 P_AFAM: % African American in tract.
 P_ASIA: %a Asian American in tract.
 P_RACE_OTH: % other nonwhite race in tract.
 P_SPONLY_SPAN: % in tract speaking only Spanish.
 P_SPONLY_OTH: % in tract speaking only language other than Spanish or English.
 P_AGE_LT18: % in tract aged less than 18.
 P_AGE_GE65: % in tract aged 65 or older.
 P_GEBA: % of adults in tract with a bachelor's degree or higher education.
 P_SOMCOLL: % of adults in tract with some college but less than a bachelor's degree.
 P_LTHS: % of adults in tract with less than a high school diploma.
 P_INC_LT10: % of households in tract with income less than 10,000.
 P_INC_75_150: % of households in tract with income 75,000 to 150,000.
 P_INC_GE150: % of households in tract with income of 150,000 or more.
 P_WORKERS: % of people in tract in labor force.
 P_UNEMP: % of people in tract unemployed.
 P_COMMUT_LT25: % of workers in tract commuting to work 25 minutes or less.
 P_COMMUT_GE45: % of workers in tract commuting to work 45 minutes or more.
 P_OCC_HOU: % of occupied housing units in tract.
 P_OWNOCC: % of housing units in tract owner-occupied.
 P_HOU_1_ATT_UNIT: % of housing units in tract attached single-family homes.
 P_HOU_2_4_UNIT: % of housing units in tract in buildings with 2 to 4 units.
 P_HOU_5_49_UNIT: % of housing units in tract in buildings with 5 to 49 units.
 P_HOU_GE50_UNIT: % of housing units in tract in buildings with 50 or more units.
 P_HOU_LE1939: % of housing units in tract built in 1939 or earlier.
 P_HOU_1940_1959: % of housing units in tract built between 1940 and 1959.

P_HOU_1960_1989: percent of housing units in tract built between 1960 and 1989.
 L_MED_RENT: natural logarithm of median value of residential rent in tract.
 P_PHONE: % of residences with a telephone.
 GUARD: =1 if doorman or guard at gate at residence of respondent.
 LOCKED_LOBBY: =1 if residence of respondent in a building with a locked lobby.
 LOCKED_GATE: =1 if resident of respondent behind a locked gate.
 NO_TRESPASS: =1 if "no trespassing" sign posted at residence of respondent.
 LS_STRAT7: =1 if list sample stratum 7.
 LS_STRAT6: =1 if list sample stratum 6.
 LS_STRAT5: =1 if list sample stratum 5.
 LS_STRAT4: =1 if list sample stratum 4.
 LS_STRAT3: =1 if list sample stratum 3.
 LS_STRAT2: =1 if list sample stratum 2.
 LS_STRAT1: omitted category: list sample stratum 1.
SOI data available for list sample cases only:
 AGE: age of primary taxpayer.
 AGE_SQ: square of age of primary taxpayer.
 L_TOTINC: ln(total 2002 income).
 D_SALARIES: =1 if had 2002 wages.
 L_SALARIES: ln(max(1,2002 wages)).
 D_NTAX_INTEREST: =1 if had 2002 nontaxable interest income.
 D_TAX_INTEREST: =1 if had 2002 taxable interest income.
 D_DIVIDENDS: =1 if had 2002 dividends.
 L_FININC: ln(max(1,2002 income from nontaxable interest, taxable interest and dividends)).
 D_NET_KG_GAIN: =1 if had 2002 positive capital gains.
 D_NET_KG_LOSS: =1 if had 2002 capital losses.
 D_FARM_INC: =1 if had 2002 farm income.
 D_RENT_ROY: =1 if had 2002 income from rents or royalties.
 D_PART_SCORP: =1 if had 2002 income from partnerships or subchapter s corporations.
 D_ESTATE_TRUST: =1 if had 2002 income from estates or trusts.
 D_SCH_C_NET_GAIN: =1 if had 2002 positive self-employment income.
 D_SCH_C_NET_LOSS: =1 if had 2002 losses from self-employment income.
 D_TOT_PENSION: =1 if had 2002 pension income.
 L_TOT_PENSION: ln(max(1,2002 pension income)).
 D_TOT_SOCSEC: =1 if had 2002 social security income.
 L_TOT_SOCSEC: ln(max(1,2002 social security income.)).
 D_TOT_DEDUCT: =1 if had 2002 itemized deductions.
 D_MORT_DEDUCT: =1 if had 2002 deduction for mortgage interest.
 D_CASH_CHARITY: =1 if had 2002 deduction for charitable contributions.
 L_CASH_CHARITY: ln(max(1,2002 deduction for charitable contributions).

III. Summary and future research

In the SCF, as in many other surveys, nonresponse is a serious problem. To maintain response rates in the face of growing difficulties in gaining cooperation, the survey has been obliged to invest increasingly in training, materials, contact management and refusal conversion. A key to making progress—or at least maintaining the *status quo*—is understanding the causes of nonresponse. Earlier research on the SCF (Kennickell [2004] and references cited there) has highlighted the importance of the choices made by interviewers in application of effort to persuade respondents to participate, and the possible distortions that may be introduced as a result of those choices. With the goals of gaining a clearer picture of response propensities uncontaminated by variations in interviewers' levels of effort and of managing field resources more efficiently, field operations for the 2004 SCF were redesigned around a phased protocol of sample management.

The field period was divided into three phases. The first phase was designed to cover a period of a limited number attempts devoted to locating and contacting the respondent and to persuading the respondent to participate. If contact proved impossible or the respondent balked at participating, the case was to have been marked to receive a special informational package by express mail. This mailing marked the beginning of the second phase. The second phase was designed to include sufficient follow-up to ensure that respondents who had been contacted previously did not have lingering questions after the express mailing. Where the respondent had not yet been reached directly by an interviewer, the goal was to make a reasonable effort to reach the respondent to follow up on the mailing. Again, if contact within a limited number of attempts proved impossible or if the respondent refused to participate, the case was to have been assigned to the third phase. The division of the field work across the first two phases is taken to be driven by a threshold decision model on the part of the respondent; the level of effort applied to reach that threshold should not have been driven by any feeling the interviewers or field managers had about the case. In the third phase, the field staff were allowed to make their own evaluation of which cases still had the possibility of being completed and to target effort to those cases largely as they saw fit.

Unfortunately, the adherence to the protocol appears to have been imperfect. According to the call records for the cases, the number of attempts made to interview cases was somewhat more spread in the first phase than had been intended, but the problem was far worse in the second phase. Although some of this deviation may be explained by the fact that the information available in the

call records is too crude to distinguish what are probably important differences in the level of effort applied to the cases, the spread is too large to be explained entirely by that means. Thus, analysis of response over the field period requires alternative measures of the sample phases, at least for the field effort beyond the first phase.

The paper presents a number of logit models of response for different parts of the field period. For the area-probability sample, data matched by census tract and interviewer observations on human and physical barriers to contacting the respondent are used as independent variables. The data reveal a number of patterns in an overall model of nonresponse (for example, higher response propensity among neighborhoods where more people have relatively short commutes and lower propensity in neighborhoods where more people have less than a high school education). A few of the patterns seen in the initial sample phase are sustained to the end of the field period (for example, people in neighborhoods with a high proportion of people under the age of 18 are more likely to respond) and some initial effects are offset by the close of the field period (for example, in the first phase, people living in neighborhoods with higher fractions of households having \$150,000 or more of income are less likely to respond). However, interpretation of the models is clouded by the fact that there is no means of distinguishing whether the significant effects in the model are describing important context effects, respondent characteristics or both. Moreover, the correlation between area characteristics and the characteristics of respondent who have not yet been interviewed at each point may well change over the field period. Without case-specific data, we only know that there are systematic selection effect and we can only guess at the underlying structure.

The list sample offers the opportunity for bringing some case-level data to bear on nonresponse. The SOI data set available from the original sample design contains the age of the primary taxpayer, income characteristics and information on itemized deductions. To apply conclusions from the analysis of the list sample to the area-probability sample requires that the populations modeled are the same. But estimates of overall response models using only the tract-level data for the two samples reveal a structure that seems different in many ways.

Nonetheless, further modeling of nonresponse for the list sample is important in its own right and it still may give a general sense of what is missed by relying only on contextual indicators, such as tract-level characteristics, to characterize nonresponse. The models presented for the list sample do indicate that both contextual and case-level variables are significant explanatory factors. Some

key tract level factors in overall response are residence in neighborhoods with higher fractions of older buildings (negative effect), of apartment buildings with more than five units (negative effect), of people aged younger than 18 or 65 and older (positive effects), of people with at least a bachelor's degree (positive effect), and of households with upper-middle class incomes (negative effect). The case-specific variables show strong overall effects for age (positive effect), financial income (negative) and charitable contributions (positive), among others. As in the case of the models for the area-probability sample, there is variation in the importance of factors over the phases of work.

For the future, tightening the field application of the phased sample management protocol is a high priority. A clearer division of the field period would offer several possibilities. First, a model indicating the types of cases that tend to be under-represented up through the end of Phase 2 could be used to give guidance to field staff in the final phase of the survey that would be better informed by benefits and costs.¹² It seems unlikely that such modeling could be done using current field work, if only because of the great logistical difficulties of moving cases together through the phases of work. But Phase 1 results might be used to calibrate results estimated from the previous round of a survey. Second, a better understanding of how different cases respond over the field period could lead to improvements in the approach taken to persuade people to participate. Third, clearer modeling could lead to better nonresponse adjustments at the weighting stage. Finally, the trajectory of effects of various factors over the field period could lead to deeper insights into the nonignorable nonresponse that nearly all surveys fear.

¹²An alternative approach is the “responsive sampling” model (Heeringa and Groves [2004]), which attempts to target effort dynamically toward cases most likely to be completed.

Bibliography

Aizcorbe, Ana M., Arthur B. Kennickell, and Kevin B. Moore [2003] "Recent Changes in U.S. Family Finances: Evidence from the 1998 and 2001 Survey of Consumer Finances," *Federal Reserve Bulletin*, v. 89 (January), pp. 1-32.

Heeringa, Steven G. and Robert M. Groves [2004] "Responsive Design for Household Surveys," mimeo Institute for Social Research, University of Michigan.

Kennickell, Arthur B. [2004] "Action at a Distance: Interviewer Effort and Nonresponse in the SCF," *Proceedings of the American Statistical Association Social Statistics Section*.

Kennickell, Arthur B. [2003] "Reordering the Darkness: Application of Effort and Nonresponse in the Survey of Consumer Finances," *Proceedings of the American Statistical Association Survey Methods Research Section*.

Kennickell, Arthur B. [2001] "Modeling Wealth with Multiple Observations of Income: Redesign of the Sample for the 2001 Survey of Consumer Finances," working paper, <http://www.federalreserve.gov/pubs/oss/oss2/method.html>.

Kennickell, Arthur B. [2000] "Asymmetric Information, Interviewer Behavior, and Unit Nonresponse," working paper, <http://www.federalreserve.gov/pubs/oss/oss2/method.html>.

Kennickell, Arthur B. [1999b] "Analysis of Nonresponse Effects in the 1995 Survey of Consumer Finances," *Journal of Official Statistics*, v. 15 no. 2, pp. 283-304.

Kennickell, Arthur B. [1999a] "What Do the 'Late' Cases Tell Us? Evidence from the 1998 Survey of Consumer Finances," <http://www.federalreserve.gov/pubs/oss/oss2/method.html>.

Kennickell, Arthur B. and Douglas A. McManus [1993] "Sampling for Household Financial Characteristics Using Frame Information on Past Income," *Proceedings of the American Statistical Association Social Statistics Section*.

O'Muircheartaigh, Colm, Stephanie Eckman, and Charlene Weiss [2002] "Traditional and Enhanced Field Listing for Probability Sampling," *Proceedings of the American Statistical Association Social Statistics Section*, pp. 2563-7.

Appendix

Figure A1: Sample management protocol, 2004 SCF.

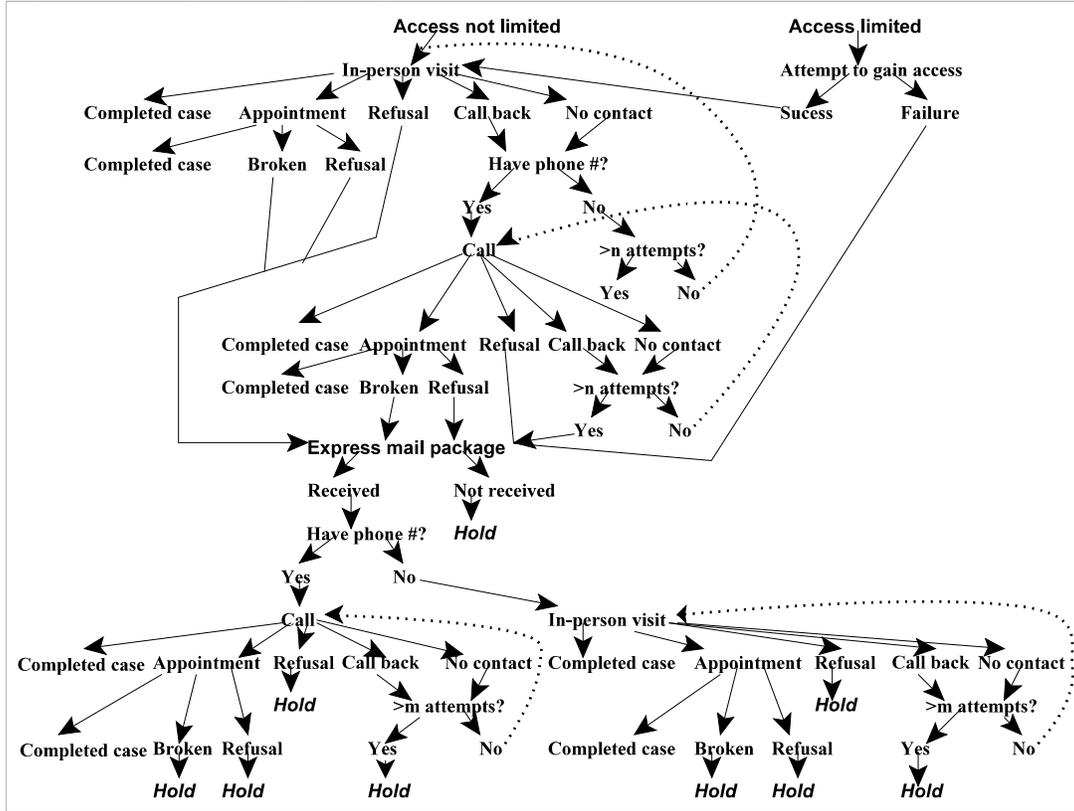


Table A1: Case disposition immediately preceding request for express mailing, in-scope cases that received an express mailing, 2004 SCF.

	All	AP	LS
Presumed to be no contact	3.7	2.7	4.4
Screener break off	0.4	0.7	0.2
Sample address observations completed	6.0	6.0	6.1
No one over 18	0.1	0.2	*
Not Home/No Answer	30.8	31.5	30.3
Inaccessible	2.9	2.6	3.2
Non HU	0.0	0.0	*
Vacant	0.1	0.3	*
Sample incorrect	0.1	0.1	0.0
Unlocatable (home)	1.7	0.0	2.9
Unlocatable (business)	0.4	0.0	0.6
New lead	4.7	0.0	7.9
New lead failed	0.2	0.0	0.3
Call back/Unavailable/Busy	12.8	10.3	14.5
R to call	1.3	1.1	1.4
Special letter sent	3.1	2.1	3.8
R too ill	0.2	0.4	0.1
Language barrier (Spanish)	0.0	0.1	0.0
Language barrier (not Spanish)	0.3	0.5	0.1
Screener/Informant obs. completed	7.9	11.0	5.7
Non-respondent refusal	1.3	0.9	1.5
Refusal	17.7	22.9	14.2
Hostile refusal	1.5	2.4	0.9
Appointment/Rescheduled	0.3	0.4	0.3
Broken appointment	1.1	2.1	0.5
Questionnaire break off	0.3	0.4	0.1
Conversion of break-off	0.0	0.0	0.0
Interview completed	0.1	0.2	0.1
Final refusal	1.0	1.2	0.9
Final unlocatable	0.0	0.0	0.0
Final language barrier (not Spanish)	0.0	0.1	0.0
Final R too ill	0.0	0.0	0.0
Memo items: % of all in-scope cases			
Completed before express mailing	26.7	39.1	14.2
Final incomplete before express mailing	3.1	1.9	4.3
*: not applicable			