

RESPONSE IMPROVEMENT INITIATIVES IN THE 1992 ECONOMIC CENSUSES

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Introduction

Over the past several years, response to both mandatory and voluntary U.S. Census Bureau economic surveys has been declining. It has become particularly difficult to convince companies to file forms for surveys that are voluntary, but response to mandatory surveys also has dropped. New technologies, the deregulation of many industries, the internationalization of the U.S. economy, and the resulting increased competitiveness within the American business community have forced companies to streamline their operations and trim operational costs wherever possible. In many cases, these cost savings have come at the expense of those departments responsible for filing both external and internal statistical reports.

The 1989 Recordkeeping Practices Survey,¹ determined that companies are finding it increasingly difficult to comply with the many Federal, state, and local government paperwork requirements. Only 21 percent of the companies included in this survey indicated that they file all survey forms requested by the Census Bureau. Thirty-three percent file only those forms required by law, while the remainder have no company policy on filing Census forms. For many companies, the filing of census forms is a matter of complying if and when time can be found to do the research necessary to complete the forms.

This trend was apparent in the 1987 Economic Census where response (as measured by the number of forms returned as compared to the number of forms mailed) was below that of 1982. Those forms that came in were received at a slower rate than in 1982, resulting in increased costs for follow-up activities. Most disturbing of all, was the slow response of the "L" companies (those companies with 5,000 or more employees) in the 1987 Economic Census.

To stem this growing tide of nonresponse to census surveys, especially the economic census, an Economic Census Response Improvement Initiatives Committee was established in 1990. The Committee's primary objective was to develop a program that would ensure, as a minimum, the same response rate in the 1992 census as that achieved for 1987, while at

the same time minimizing analyst resources. This paper describes how the program was developed, the elements of the program, and its success to date in improving response to the economic census.

The Economic Census

The Economic Census provides the major source of facts about the structure and functioning of the U.S. economy. It presents a detailed snapshot of the economy at a particular point in time and is the only source of detailed economic geographic information. The census also provides the benchmark for most of the current surveys conducted by the Census Bureau.

Response to the census is required by law (Title 13, United States Code). That same law protects these responses so that all data provided by companies are confidential and can be published as statistical totals only.

While the census covered about 15 million establishments for 1992, the Census Bureau mailed forms to only about 4.2 million establishments. Approximately 165,000 companies owned 1.2 million of these establishments. These large multiestablishment companies represent about 45 percent of economic activity in the United States. The remaining 3 million businesses are single establishment firms. Information for the approximately 10 million establishments not mailed census forms was received from the administrative records of other government agencies.

For 1992, the census was expanded to include industries previously excluded--finance, insurance, real estate, transportation, communications, and public utilities. This expansion increased the coverage of the economy from 75 percent of gross domestic product to about 98 percent. This expansion also increased the number of small companies receiving census forms for the first time.

Approaches to Response Improvement

The Response Improvement Initiatives Committee used a number of resources to help identify alternatives for improving response. Response rates and timing of response by industrial sector in 1987 were examined, and analysts responsible for contacting companies to request information were queried. The

Committee also used the results of three studies, the 1987 Economic Advertising and Response Behavior Survey (ECARBS), the Census of Construction forms design pretest, and the 1989 Recordkeeping Practices Survey to determine methods of improving response for 1992.

The ECARBS² was conducted in 1987 to provide measures of the penetration and effectiveness of the 1987 census promotional program and to identify key stimuli and barriers that affect response behavior. Data for the survey were collected via the telephone from four different panels at four points in time. Of particular interest to the Response Improvement Initiatives Committee was the finding that the major reason companies filed their 1987 economic census forms was because it was required by law.

The Census of Construction forms pretest was designed primarily to test the effectiveness of different forms designs being considered for the 1992 census. During the cognitive interview phase of this test, census staff observed personnel from construction companies completing 1987 census forms. Census staff found that those construction forms were difficult to follow, with instructions that were not always clear. The test also reinforced the ECARBS findings that companies generally responded to the census because it was required by law.

The Recordkeeping Practices Survey supported the findings of both ECARBS and the construction pretest. It also provided additional information on ways to improve response for 1987.

There are five separate elements of the response improvement initiative for 1992: redesign of the materials mailed to respondents, inclusion of a duplicate copy of the census form (hereafter referred to as form follow-up) in all follow-up mailings to delinquent single-establishment companies, provision for a toll-free number for respondents to call with questions, the multiunit contact program, and the publicity program. These are detailed below.

Redesign of Mail-Out Materials

The mailing package for 1987 included a form, return envelope, transmittal letter, separate instructions where appropriate, and a brochure, explaining the specific census for which the firm received a form. ECARBS found the following regarding that mailing package:

88% opened the mailing package and looked at the form

65% recalled the transmittal letter

74% recalled the instructions

47% recalled the brochure

These results prompted us to eliminate the brochure from the 1992 mailing package. The response to the brochure did not seem to warrant the cost of designing, printing, and assembling the packages to include the brochure.

Information from the other tests convinced us to redesign the form to clarify instructions and make both the form and instructions more user-friendly. The form also would emphasize the mandatory nature of the census. In addition, all oversized forms (10-1/2 by 17 inches) were converted to either 8-1/2 by 11 inch or 8-1/2 by 14 inch forms.

The redesigned forms emphasized the due date and the mandatory provisions of Title 13. The items to be completed also were changed to a question format, where possible, using plain English. The questions were highlighted with bold type. In addition, the entire form was shaded except for the address box and the answer boxes. This draws the attention of the person completing the form to those areas requiring an answer. These forms were redesigned as a result of the construction pretest and with the help of the Census Bureau's Center for Survey Methods Research which conducted the forms pretest.

The biggest change to the mailing package, however, was the redesign of the envelope to include a box indicating that official U.S. Census Bureau forms were enclosed, that the completion of the enclosed forms was required by law, and that the forms were due on February 15. We felt this large notice on the outside of the envelope would assure that the forms would receive immediate attention.

Form Follow-up for Delinquent Single Establishment Companies

In 1987, we mailed duplicate census forms to approximately 200,000 companies that either lost their forms or claimed they never received the original mailing package. About two-thirds of the telephone calls received in 1987 were from company representatives requesting additional materials (60,933 calls out of a total number of 95,695 calls received). These calls were generally received shortly after a reminder letter had been mailed that included the toll-free telephone number.

Follow-up letters which included the toll-free number, but did not include a duplicate form, were mailed at the beginning of April and May. There was a surge in telephone requests for duplicate forms immediately following receipt of those letters by the

companies. Follow-up letters in March and June did not include the toll-free number. In addition, the follow-up in March included a duplicate form for some respondents. As a result of these data, we decided to include a duplicate form in each follow-up mailing package for 1992.

Logistics of assembling mailing packages did not permit us to mail duplicate forms to the large multiestablishment companies that did not respond by the due date. All single establishment companies, however, did receive a duplicate form.

By the end of August, we had received just 20,000 requests for duplicate forms. Only 5.5 percent of the telephone calls asked for a remail of a form. These numbers are far below the numbers cited earlier for 1987. Certainly, including a duplicate form in the follow-up mailing packages has provided companies the materials needed to complete their census questionnaires in a more timely manner.

Toll-Free Telephone Number

In 1987, a toll-free number was available to Census respondents. It was not, however, included in the initial mailing package but was included in print ads that began running in late January 1988 and in selected follow-up letters to nonrespondents. To serve our customers better and to help improve response by providing immediate answers to respondents' questions, we included the toll-free number on all census forms, except classification forms, all transmittal and follow-up letters, and in all print advertisements for 1992.

The number of calls received as a result of the toll-free number has been less than expected. By the end of August we received approximately 239,000 calls. A fully trained telephone staff in our Data Preparation Division (DPD) office has handled 90 percent of the calls received. A menu-driven interactive telephone system provides operators access to the latest status information on the company, allows the operators to handle all types of inquiries, and also provides detailed management information to census analysts. Complex questions on how to report specific items are referred to either Washington or DPD analysts for the analysts to call the company back.

Multiunit Contact Program

As noted earlier, the large companies with more than one establishment (multiunit companies) account for about 45 percent of all economic activity in the United States. Since these companies were slow to

respond during 1987, we developed a special program for them to encourage response.

In the summer of 1991, we identified 11,000 of the largest companies across all sectors of the U.S. economy. The criteria for inclusion in the program varied by sector but was generally based on employment size or number of establishments operated. These 11,000 companies were then divided further. The 1,100 largest, most complex companies were designated Washington contact cases. Individual analysts in Washington were each assigned 10 or 15 large companies. These analysts, some 68 in total, were responsible for contacting the companies to provide any assistance needed in completing their census forms. The remaining 9,900 companies were designated DPD contact cases. Contact with these companies would be made through our DPD office.

In November 1991, we sent each of the 11,000 contact companies a booklet, "Preparing for the Economic Census...Advance Information You Can Use," illustrating each of the major types of census questionnaires. The booklet explained when the census would be mailed, the mandatory and confidentiality provisions of Title 13, and other pertinent information related to the census. The early timing of the mailing allowed companies to augment their recordkeeping systems for 1992 if needed.

The mailing also included a "contact exchange" card, giving the name and phone number of the specific Washington analyst responsible for that company in the census, if a Washington contact case, and the name and phone number of the branch chief for each sector for the DPD contact cases. The card, in exchange, asked for the name and telephone number of the person within the company who would be responsible for completing the 1992 census forms. We asked for the card to be returned to the Census Bureau, along with any address changes. Response to this program was over 90 percent. We were successful in notifying large companies early that they needed to begin to prepare for the census.

The multiunit contact program provided for regular telephone calls to companies included in the program at preselected intervals of time. For the DPD contact companies, the schedule is as follows:

January/February 1993 Call companies to assure census forms received.

March/April/May 1993 Call companies for which forms have not been received to remind them the

forms are past due; for those companies with time extensions, remind them when the extension expires.

The 1,100 Washington contact cases received even more attention.

November 1992 Washington analysts call the companies for which they are responsible to introduce themselves as census contacts and to tell the company contacts that the census is coming.

January/February 1993 Call to ensure that census forms received and to offer any assistance needed.

March/April/May 1993 Call companies for which forms have not been received to remind them the forms are past due; for those companies with time extensions, remind them when the extension expires.

There was a limited multiunit contact program in 1987, but it was not as proactive as this program. Staff of the large companies interviewed during the Recordkeeping Practices Survey indicated they needed to know about the census early so they could create a system that would provide the information collected. Staff at these companies also indicated having a single person with whom to speak if questions about the census arose would be extremely helpful. This program is designed to answer those issues.

Publicity and Advertising

For 1992, we redesigned our publicity and advertising campaign to focus on the print media, with limited exposure to television and radio coverage. This decision was based on results from the ECARBS, mentioned earlier. To help us create an effective program, we contracted with an outside advertising agency.

The publicity campaign was designed to promote response on the economic censuses through public service advertising in a variety of print media; develop, reproduce and distribute print media to support the plan; and evaluate the effectiveness of the public service advertising. The program incorporated the

census is required by law theme, expressed in the census mailing packages.

Media kits were developed and distributed in three waves, phased by media type, with each focusing on a particular phase of census processing. Included in the kits were suggested ads to be run, questions and answers about the census that could be incorporated into a news story, a prewritten editorial about the census, press releases, and examples of uses of economic census data.

The first wave announced that the census was coming and required by law. Information on the usefulness of census data also was included. The message of the second wave focused on the fact that the due date was fast approaching and urged businesses to send in their forms. Wave 3 stressed that the census due date had passed and that it was important for businesses to complete their forms promptly.

By the end of April 1993, over 500 articles had appeared in newspapers, trade journals, and industry newsletters as a result of these mailings to the media. The campaign also produced a number of television and radio clips about the census, raising the awareness of the importance of the census to the business community.

Has the Program Worked?

Ask anyone from the economic areas of the Census Bureau this question and the answer is an unequivocal yes. Response from single-unit companies far exceeds their response in 1987 and tops the 1982 response, which was one of the best ever. By the end of August 1993, 88.2 percent of single-unit forms had been received while at the same time in the 1987 processing cycle only 76 percent of the single-unit forms had been received. Even multiunit response, which always lags single-unit response, tops 1987 (81.6 percent received by the end of August 1993 versus 79.8 percent for the 1987 Census).

Which part of the program was most effective? Cost and timing prohibited us from doing an in-depth evaluation of each part of this program. We believe, however, that the increased emphasis on the fact that the census is required by law was most effective.

The Quarterly Financial Report survey, one of the current surveys conducted by the Census Bureau, began including the mandatory message on its mailing envelope for the first quarter 1992. By the third quarter 1992, response had increased to 88.1 percent for all companies from the rate of 82.2 percent in the third quarter 1991. For the smaller companies, the jump was even larger, increasing from 67.5 percent for

the third quarter 1991 to 78.1 percent for the third quarter 1992. Similar results were achieved during a pretest of census forms in the finance, insurance, and real estate industries.

We also believe that providing a widely advertised toll-free number has helped response. Callers have received quick answers to their questions, allowing them to complete their forms in a more timely manner.

Taken as a whole, the program has exceeded our expectations. We will continue to study the effects of the program and make improvements where necessary for 1997. We are testing an 8-1/2 by 11 inch form in the Census of Retail Trade to determine if the smaller form size, which results in more pages to the form, has any effect on response. We also plan to incorporate the notice as it appeared on the single-establishment company envelope on the mailing packages for multiestablishment companies in 1997. As we begin to plan for 1997, we will continue to pursue other avenues to improve response to this critical economic statistics program.

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RESPONSE IMPROVEMENT INITIATIVES FOR VOLUNTARY SURVEYS

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RESPONSE IMPROVEMENT INITIATIVES ASSOCIATED WITH BUSINESS SAMPLE REVISION (BSR-92)

INTRODUCTION

The Census Bureau's Business Division formulates overall plans and implements programs for the collection, processing, and dissemination of statistical data from special and current surveys engaged primarily in the distribution of goods and services. Monthly estimates of retail and wholesale trade sales and inventories serve as the basis for such economic measures as the Gross Domestic Product. Government economists, policy makers, private economists, and financial analysts use these data to assess current economic conditions.

The tendency toward decreasing response rates as the public reacts negatively to the increasing barrage of surveys is of primary concern to data collection organizations. Higher response rates can translate into higher data quality. Most surveys these days do quite well to maintain historic response levels, especially voluntary surveys with no "teeth" to require and enforce participation. To survive in today's world of data collection, agencies must solicit and act upon their customers' expectations, improve in-house administrative systems and management, automate effectively, and increase research efforts and act effectively on research results.

To achieve the Census Bureau's goal "to recognize and value respondents and other data suppliers" as set forth in the Bureau's current strategic plan, Business Division is committed to a program of continuous quality improvements - largely involving the development of response rate maintenance or improvement strategies. Our efforts along these lines have taken shape on several fronts, including implementation of customer-suggested management and automation improvements associated with this year's introduction of new list samples for our voluntary monthly retail and wholesale surveys, studying respondent/data supplier characteristics, developing advanced data collection techniques, and formulating a number of planned future research and evaluation initiatives.

Business Division at Headquarters in Suitland, Maryland, is responsible for overall planning of the survey, clerical and interviewing procedures, forms design, check-in and processing of data from respondents' "own forms" and special handling cases, analysis of the estimates, and final presentation of results. We interact with a number of customers to accomplish these objectives. One such customer, the Census Bureau's Data Preparation Division (DPD) in the Jeffersonville, Indiana processing office, is responsible for the preparation and quality control of the mailing pieces as well as the mail-out, collection, follow-up, and editing of the various report forms. The DPD also performs the directory services to update the data files to include new businesses or new establishments (births), to delete firms or establishments that have gone out of business (deaths), and to make other changes; and performs data entry. Other customers directly or indirectly involved in these processes are Headquarters professionals that review survey results, the respondents themselves, and the general public (taxpayers) who pay for these surveys.

New business samples are selected every 5 years to maintain acceptable levels of sampling variability and coverage and to redistribute the reporting burden (we replace over 95 percent of the small- and medium-size firms in revising the samples). This project was termed the "Business Sample Revision - 1992" or "BSR-92" since we began publishing estimates from the new samples during 1992.

Introducing the new BSR-92 list samples for the voluntary monthly retail and wholesale trade surveys involved concurrently canvassing both the old (BSR-87) and new samples for a four month overlap period (December 1991 through March 1992 data months). During this period, we compared old and new estimates for sales and inventories prior to publishing the new sample estimates for the April 1992 data month. **We enjoyed apparent response increases for every month in every category.**

Through June 1992, the second month after the overlap for the new sample, response rates had continued to climb, for both retail and wholesale trade sales and inventories, to a point achieved only after over a year of processing the BSR-87 sample. And, as of March 1993,

after a full year of publishing from the BSR-92 sample, response rates were coming in higher than BSR-87 levels from comparable periods five years ago.

In addition to achieving improved initial response and, ultimately, maintaining historic levels, we are pleased that operations associated with the BSR-92 sample revision in DPD and at Headquarters progressed much more smoothly than for BSR-87. Following are some of the initiatives taken by Business Division to satisfy our customers by improving operations and collection procedures, which yielded the improved response.

1991 Precanvass – Plans began in August 1989 to obtain essential contact information in advance of the overlap months through a precanvass of firms newly included in the new sample. Normally, this information would not have been obtained until the first month of the overlap. Staff in DPD suggested this initiative to give the interviewers a head start in contacting delinquent respondents at the start of the overlap. Rather than spending time obtaining phone numbers, interviewers devoted more time to explaining and selling the surveys to the new respondents. In addition, a review of firms classified as retail and wholesale prior to the selection of the new sample enabled us to re-classify some firms in the potential universe. This helped to reduce the selection of businesses that were "out-of-scope" to the retail or wholesale surveys.

Timing of the Overlap – We made plans to begin data collection effective with the December 1991 data month (during January), thus avoiding extra data collection during the holidays. This timing change helped improve our response. For BSR-87, data collection started with the October 1986 data month. As a result, data collection for the first two months of BSR-87 occurred during the Thanksgiving and Christmas holiday periods. These timing benefits did, however, entail placing some additional strain on the processing of our annual surveys (they are mailed at the beginning of the calendar year).

Use of the Automated Control System (ACS) Check-In – For BSR-87, all check-in, forms accounting, and management reports were done manually with data posted to over 50,000 hard copy record cards. During the last overlap, stacks of forms-not contacted-were often found after each closeout date. In August of 1990, we began plans for introducing an Automated Control System to allow us to check in the forms and track them through various stages of production. Introduced fully with the 1991 precanvass, the ACS eliminated the need for DPD to organize and maintain the record cards. This freed up interviewing resources to concentrate on

telephone follow-up. The ACS also provided an automated, interactive, detailed tracking account of each case, e.g., status of receipt, processing, analytical review and keying. Instances of lost or unaccounted for forms experienced during BSR-87 were completely eliminated for BSR-92.

DPD Staffing – We spent over a year working with DPD to develop a comprehensive yet cost-effective staffing plan. The plan called for having the experienced interviewers call the new sample cases; setting up a new unit comprised of newly hired interviewers to call the old sample cases, many of whom had participated in our surveys for five years; and flowing the more complicated cases canvassed to statistical assistants, who are a higher grade level and more experienced than the interviewers. This division of labor resulted in smoother processing and higher response rates for BSR-92.

Training and Experience – To accomplish more effective data collection and to improve response rates and data quality, extensive training programs were targeted toward the crucial functions of the ACS and overlap processing. Self-administered sessions given to the interviewers to improve their skills were handled more efficiently than before. For BSR-87, on-the-job procedures served as the sole source of training documentation. Simple training materials as well as on-the-job procedures were the keys to improved training for BSR-92. Also, we greatly benefitted from having a much more experienced staff for BSR-92. For BSR-87, we had only been collecting data in DPD for a little over a year (our survey data had been collected by Field Division Regional Offices prior to 1984).

Improved Retail Report Forms – We consolidated on one form inquiries that were previously collected on separate retail sales and retail inventories questionnaires. Having one combined form where there had been two reduced processing complexity for DPD staff and respondents.

Monitoring – We used our existing capability to conduct remote monitoring of interviewers' telephone calls to respondents to improve interviewer performance and, in return, to increase response and the quality of the data. This monitoring identified deficiencies in procedures and interviewing practices which Headquarters reacted to on a timely basis to correct.

Automated Data Analysis – We developed interactive routines for use by Headquarters professionals to analyze retail sales data prior to monthly publication to account for differences in the BSR-87 and BSR-92 monthly samples and to verify computer updates and coding. These interactive routines were a valuable tool for reviewing

company data and for establishing reporting arrangements for companies included in the new sample.

Expanded Reporting Options – We provided respondents with the option to FAX (using an 800 number) completed questionnaires to DPD or to call in their response via a toll free 800 number in lieu of collect calls. Separate toll free numbers also were established for respondents to request information regarding their participation in the survey.

The results of these efforts are summarized by noting the following comparisons between our 1987 and 1992 operations:

- 1) The DPD staff attempted to contact their entire workload of cases for each month of the BSR-92 overlap period. This was not the case five years ago.
- 2) The Automated Control System enabled both DPD managers and Headquarters professionals to track cases, giving both groups greater accountability and follow-through on respondent referrals.
- 3) Processing of computer correction and tabulation processing ran more smoothly as compared to BSR-87 operations. This translated into less time devoted to putting out fires and more time available for obtaining and analyzing data from respondents.
- 4) Despite the additional initiatives and improved results, processing costs for BSR-87 versus BSR-92 were basically the same.

We believe that by achieving initial higher response for the new retail and wholesale samples and maintaining them at historic levels over time, by improving operations at no increase in cost through the Business Sample Revision, we have met or exceeded the expectations of our various customers. The next section describes steps we are taking or will take to continue this improvement process.

PRESENT INITIATIVES TO INCREASE OR ACCELERATE RESPONSE

One of the tenets of today's quality revolution is that to improve quality in a system, we must remove causes of problems in the system. We are told by quality experts that this should lead to improved productivity. In other words - and for our purposes here - we need to define our data collection system, identify our problems, determine the reasons why those problems occur, and then eliminate the causes as best we can. This should result in higher productivity (i.e., higher response rates, lower costs, etc.). Below, we describe steps we are now

taking to determine the causes for the problems and ways to eliminate them.

Data Collection System Problem Categories and Their Causes for Current Retail and Wholesale Trades - In terms of response rate issues, our problem categories can be defined as 1) delinquent cases - those requiring telephone follow-up because they have not mailed or FAXed in their forms; and 2) other non-response cases - those for which, for various reasons, we cannot obtain data. (Cases for which we receive "bad" data (edit failures) and "hard core refusals", while also a concern, are not within the scope of this paper.)

Out-of-scope and out-of-business cases are problems to the extent that these cases have not been removed from the processing workload as much as possible prior to the beginning of processing for a particular month - the problem being caused by not having taken steps to clean the files.

"No data" cases; that is, cases for which DPD personnel were unable to contact the business or for which the business was contacted but data were purportedly not available before closeout - are a problem to the extent that we might have obtained data for them by using an alternate (i.e., successful) approach to collect the data. Similar to the refusals, the "no data" case problem exists (from a data collection standpoint) to the extent that we are not employing alternative data collection methods and techniques for those cases that would have otherwise reported data.

What We Are Doing to Eliminate or Reduce the Causes of Our Data Collection Problems Categories - We readily recognize that our present data collection techniques are not as effective as they could be. As described in the previous section, one cause of our telephone follow-up "problem" is that it is a relatively expensive, manually-intensive follow-up procedure versus other means of data collection; the causes of our refusals and "no data" cases "problems" are due at least to some degree to our not using more effective data collection, survey selling, and follow-up techniques with businesses; and the causes of our out-of-scope and out-of-business "problems" are due to not employing file cleaning procedures as efficiently as possible. The following section describes specific steps we have been taking to eliminate causes of these problems.

Telephone Follow-up -

Automation - To reduce the manually-intensive telephone follow-up activities, we have extensively automated our

telephone follow-up operations. Business Division's Integrated Surveys Processing Network (ISPN) is now used for telephone follow-up for MARTS and Wholesale. ISPN has cut in half the cost of telephone interviews for delinquent firms, mail response failed-edit cases, and status changes (e.g., cases going out of business, cases involved in mergers, etc.) by eliminating paper handling via interactive analytical routines, improved management reports, and scheduling calls when data are most likely to be available. We plan to extend the automated activities to the "full" monthly retail sales and inventory surveys by the end of 1994 with substantial cost reductions due to efficiency gains.

Efforts to reduce the number of calls required each month - Increasing the receipt of returned responses before telephone follow-up activities begin reduces the delinquent telephone follow-up workload. To these ends, Business Division has, for the last two years, *provided respondents with the opportunity to provide data via facsimile machine* for the monthly Retail, Wholesale, and MARTS surveys. This opportunity was quickly embraced by respondents - we now receive over 2,000 FAX receipts (over 20 percent of the mail/FAX total) each month for these surveys - with a study showing 10 percent of these receipts replacing what had previously been a telephone follow-up case. Also, fewer forms are received each month after survey closeout.

Further expand reporting options by which respondents may report data - While we now have several ways, including mail, FAX, toll free call-in numbers, and "own forms" (printouts provided by respondents in lieu of official questionnaires), we also need to consider expansion to more technologically advanced reporting methods such as touch-tone data entry (TDE), voice recognition entry (VRE), electronic data interchange (EDI), and possibly menu-driven diskettes as part of implementing several types of automated self-reporting techniques for more expeditiously collecting data for the monthly surveys.

Investigate Faxing Follow-up Messages and Questionnaires to Respondents - We are investigating the legal, security-related, procedural and practical implications of using a fax message (coupled with a questionnaire for retransmittal) for follow-up with nonrespondents before beginning telephone call-backs. We are presently conducting a small-scale test of the monthly wholesale sample to determine the effectiveness of faxing reminders to delinquent respondents. We plan to fax the reminders two working days after the form's due date and about a week before call-backs begin. Effectiveness will be measured by a reduction in the number of cases requiring

telephone follow-up and/or increased timeliness of receiving the data. If test results look promising, we will begin taking steps to expand the use of these reminders to the entire wholesale sample as well as to the portions of monthly retail survey.

Develop a Bureau-wide Centralized TDE/VRE system - Together with the Bureau's Computer Assisted Survey Information Collection (CASIC) office and the Statistical Research Division, we are investigating TDE and VRE technology using the MARTS survey as our prototype. With TDE and VRE, respondents can submit data at their convenience, any time of the day or night, on weekends or on holidays. Offering TDE and VRE will provide alternative methods of reporting and, as such, should reduce respondent inconvenience. Those respondents who do not like to report by mail, do not want to be contacted by telephone, or do not have a FAX machine may report via TDE or VRE instead. Similarly, those respondents who do not want to report via TDE can report using VRE and vice versa.

And, importantly, since reporting via TDE/VRE should make reporting more convenient, we expect some currently reluctant respondents to start participating in the survey, thereby reducing costs of telephone follow-up for delinquent reporters.

Also, the Bureau of Labor Statistics has conducted a study which concluded that "the traditional view that mail is the least expensive data collection option available to statistical agencies is no longer true. The major technology breakthroughs of the 1980s in automated telephone collection cannot only reduce the collection cost below that of mail, but can also improve timeliness and control over the collection process."¹ We plan to take advantage of these benefits.

Another potential benefit of TDE/VRE is a reduction in clerical keying of returned questionnaires, thereby reducing transcription and freeing up DPD personnel to concentrate on the telephone follow-up that still exists instead of performing data entry chores. Data keying costs comprise about 6 percent, on average, of the data collection budget for the monthly business surveys. Developing MARTS as the prototype and expanding to other monthly surveys in DPD within the next few years should be cost-effective.

Conduct a respondent study - To prepare for expanding reporting options, by 1995 we plan to canvass firms to determine their preferences for alternative modes of reporting, to determine the various types of equipment to which they have access, and to find out the earliest date

monthly data are available. Our future (1995 and beyond) data collection and modernization plans (such as for using techniques like EDI) will be largely based upon the results of this study.

EDI - Electronic data interchange is another promising technique for collecting data, especially from companies with many establishments such as the multi-establishment firms in the full monthly retail trade survey. We will arrange for electronic transmission of sales data for direct entry into the retail data base for the largest multi-establishment firms in the monthly retail sales survey.

Out-of-Scope and Out-of-Business Cases -

Annual Sample Update - This operation helps to keep our monthly samples up to date by systematically updating our records to reflect establishment coverage changes as identified by the Bureau's annual Company Organization Survey (COS) of larger multi-units. Before its advent, we did a good job of keeping our samples current via a quarterly birth and death program and well-defined rules for processing status changes. However, we had long recognized that we were missing an important opportunity to further improve survey coverage by taking better advantage of current information from the Bureau's central control file of economic establishments which is updated annually from the Bureau's COS.

"No data" Cases -

"No data" study - With the Automated Control System, we are able to track characteristics of both the responding and non-responding cases. Last summer, we studied the "no data" cases with efforts focused on those firms not reporting for two consecutive panel rotations. These fall into two broad categories: (1) interviewers were unable to contact the respondent, or (2) interviewers contacted the respondent but data were not available before closeout. We are taking steps to eliminate each cause.

Currently, we are identifying cases that have not responded for an extended period of time. For example, if a certainty case has not reported for 6 consecutive months, we are assigning it to a special nonmail category. This will eliminate the mailing and telephone follow-up for about one-third of the total of these cases each month (amounting to a savings of approximately \$4,000 a month). However, we will continue to periodically contact these cases, based on whether they report in the mandatory annual programs.

We believe attacking the causes of our problems head on will yield improved response rates and save money. Successful approaches for collecting data from these nonresponse cases will be shared among the various survey takers in Business Division and other economic area divisions at the Census Bureau in an effort to improve response and to offer new techniques to the interviewers and statistical assistants in DPD for future canvassing.

Next Steps

Strive for continuous improvements - There is much more work to further improve response rates for the voluntary monthly surveys. In fact, efforts to identify and eliminate causes of problems seem to be never-ending, and they actually are - to the extent that we realize we will never achieve the "perfect" data collection system. However, our progress to date encourages us to explore other sources of improvement.

Look for opportunities to create goodwill - These initiatives are important even if an increase in response rates may not be immediately or directly attributed to them. One such initiative involved sending a thank you letter to companies that were dropped from the MARTS sample last February when the new MARTS sample was introduced. We have found that many former respondents appreciated being thanked for their efforts. We may send a similar flyer to all cases dropped from the BSR-92 sample when we introduce the BSR-97 sample in late 1996.

Conduct more studies to identify tools that will help us increase response - We soberly realize that not all our efforts to increase response will yield tangible, direct benefits - in fact, some well-intentioned efforts may yield no noticeable effects on response at all. For example, in late 1990, we enclosed a public relations brochure with our retail trade mailing pieces to assess its effectiveness as a means of increasing response rates. Based on the test results, we concluded that using no brochure at all was just as effective in drawing response as was using the brochure. However, although this was discouraging in terms of response rates, we do not know to what extent the brochure might have improved the Census Bureau's image. We need to determine ways to assess this. We just do not know the intangible effects, either positive or negative, that promotional tools such as flyers, brochures, etc. actually have on our respondents. *More study is needed and will be done in this regard to determine the extent to which we will use such tools for our surveys.*

Promote the Economic Censuses and Surveys - The more the public is aware of what the Census Bureau does during the interim between population censuses every ten years, the more likely we are to get a better response to not only the retail and wholesale surveys but to other Census Bureau surveys as well. Coordinated efforts, such as those described below, implemented across the Bureau are the key to successfully instituting wide-ranging response rate initiatives.

Establish an economic area-wide company communications program - This program was established in 1991 to improve communication with data providers and to examine issues related to improving response rates and data quality.² To date, collaborators on this project have produced specifications for a prototype database containing about 150 major companies, including some of our major nonrespondents to economic surveys and censuses. This data base, when complete, will contain a profile for each company including the surveys/censuses questionnaires they receive, the reporting status of each, size and structure characteristics, company contacts, census contacts, and other relevant information about their response history (are they good reporters, are they chronically late, do they always need follow-up, do they never report, what is the frequency of requests for reporting extensions, etc.). Results of the 1989 Recordkeeping Practices Survey indicated that 41% of the large companies interviewed said a single contact within the Census Bureau would make it easier to report.³ Having access to such information in a comprehensive company data base will ultimately go a long way toward helping the Census Bureau to effectively accommodate this data supplier need.

Undertake an economic area-wide company visits program - The intent here is to obtain more information from and make better use of the data obtained from our company visits. Currently, there is little coordination among the divisions when planning or evaluating the results of these visits. Consequently, there are times when the Census Bureau appears to be disorganized and uninformed. To change that image, steps are being taken to gather, coordinate, and disseminate the information for company visits among all the appropriate economic divisions. Keeping a record of the company visits in the company data base would be a good idea, too. As we continually develop and update the data base, this information promises to be readily accessible for our use in the future.

Form a Bureau-wide team to increase the impact of exhibits program on the Census Bureau's overall communications effort - The Census Bureau has

sponsored booths at over 200 trade shows and conventions during some recent years. By more efficiently pooling our resources, we can increase respondent awareness and appreciation for our censuses and surveys at a fraction of the current cost. We are now investigating how we can better integrate the Bureau's exhibits program and/or other various outreach activities into its overall communications package.

Clearly, Business Division plays an important role in contributing to various response improvement processes within the Census Bureau. Response improvement initiatives in introducing the new monthly retail and wholesale samples have resulted in improved response as compared to the introduction of the new samples 5 years ago - exceeding our expectations. Our continuing participation in various division-level and Bureau-level program initiatives promises to maintain and possibly improve monthly retail and wholesale response rates, despite ever-decreasing cooperation of survey participants. We look forward to the challenge of contributing to the improvement of all of these ongoing processes as we collaborate with other Census divisions and various data collection agencies to build upon our efforts to recognize and value respondents and other data suppliers.

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IMPROVING RESPONSE RATES BY TOUCHTONE DATA ENTRY ON THE MANUFACTURERS' SHIPMENTS, INVENTORIES, AND ORDERS SURVEY

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1. INTRODUCTION

The Manufacturers' Shipments, Inventories, and Orders (M3) survey is a principal Federal economic indicator and it estimates important components of the Gross Domestic Product. Government and business use the results to assess current and future conditions in the domestic manufacturing sector, and to develop economic and monetary policy. The U.S. Census Bureau only has three to four weeks to collect, summarize, and publish data for each monthly advance report. The Bureau is interested in touchtone data entry (TDE) for collecting M3 data, since TDE could save time, money, and paperwork, and obtain earlier responses. Therefore, the Bureau began an evaluation of TDE for collecting M3 data in January 1992. This paper concentrates on response rates using TDE and strategies to improve them.

With TDE, the respondent dials a toll-free "800" number that allows data entry 24 hours a day, seven days a week. The respondent keys an ID and survey data using the telephone's touchtone keypad. The TDE system says each keyed value back to the respondent, who can reenter if the value is incorrect, or go on to the next question. This process continues until the interview is complete. For more details on features, hardware, software, and costs of our TDE system, see Bond et al. (1993).

We thought TDE could work well in the M3 survey for the following reasons:

- The M3 survey is monthly, so the respondent should remember how to use TDE from one report to the next.
- The M3 questionnaire is short (five or seven items), requiring little time to enter data.
- TDE can eliminate handling of questionnaires and key entry of data.
- It can reduce postage costs.
- Data can be received more quickly than by mail.
- The Bureau of Labor Statistics (BLS) has completed over 100,000 TDE interviews for its Current Employment Statistics (CES) survey, which is similar to the M3 survey (Werking and Clayton 1991).

- BLS found a low error rate and good acceptance of TDE by CES respondents (Phipps and Tupek 1991).

In section 2 we present background information on the M3 survey. Section 3 describes our experimental design, and section 4 gives results. In section 5 we present conclusions and recommendations.

2. THE M3 SURVEY

The M3 survey is a monthly nonprobability survey for which nearly all U.S. manufacturing companies with \$500 million or more in annual value of shipments voluntarily provide data. A sample of smaller companies, to improve coverage in selected industry categories, brings the number of reporters to about 3,000 each month. The reporting unit is usually all operations of a company that operates in only one M3 industry category; but for large, diversified companies, there is typically a separate reporting unit for each division with a significant amount of manufacturing.

The Bureau releases results in an advance report on a preset date that is three to four weeks after the end of the reference month. Revised figures and data for more industry groups are released in a preliminary report on a preset date about a week later.

The Bureau mails all questionnaires near the end of the reference month to sample units, which return them by mail or fax. M3 analysts phone all the largest nonrespondents and selected smaller reporting units that do not respond. Most units are followed up by phone if they do not respond for two consecutive months. M3 processing is divided into the following cycles:

- Cycle 1 begins two to three weeks after the end of the reference month, and lasts about a week. The Bureau releases the advance report the day after the end of cycle 1.
- Cycle 2 ends about a week after cycle 1. The preliminary report is released the day after the end of cycle 2.
- Cycle 3 ends about two weeks later, when cycle 1 begins for the next reference month. There is no report after cycle 3.

The Bureau cannot use data received during cycle 3 or later (the "late period") in the advance or preliminary reports for the reference month; however, these data are

used in preparing estimates for the next reference month's reports.

3. EXPERIMENTAL DESIGN

3.1 Experiment 1

We asked 53 longtime, good reporters, primarily large petroleum refiners, to switch from mail and fax response to TDE, effective with data for January 1992. These firms had a 100% response rate, by the end of the late period, all but one month since February 1991. At the start of this experiment, we contacted every firm by phone to explain the upcoming switch to TDE reporting. We also mailed a cover letter and information packet, which contained information on the M3 survey, a sample questionnaire, TDE instructions, and a printed copy of the TDE script they would hear when they called the toll-free number.

We continued mailing questionnaires for the first three months. After that, we only sent an advance notice postcard the tenth of each month following the reference month, to those firms that agreed to use TDE. We continued to mail questionnaires to the few firms that did not agree to use TDE. We are still using TDE as the primary data collection mode for this group.

3.2 Experiment 2

We selected a probability sample of 1,762 units that were new to the M3 survey, and randomly assigned them to four groups:

- T12 - immediately begin reporting by TDE, and continue for 12 months.
- C3/T9 - report by mail or fax with CATI follow-up for nonresponse, for three months; then report by TDE for nine months.
- C6/T6 - same as C3/T9, but a six month/six month split.
- C12 - report by mail or fax with CATI follow-up, for all 12 months.

We assigned units in the ratio 2:3:3:3 for T12, C3/T9, C6/T6, and C12, respectively. We began with collection of April 1992 data. We sent a cover letter and M3 instruction manual to every unit. We also sent a TDE information packet (similar to what we used in experiment 1) to the T12 group, but we did not phone this group. We mailed an advance notice postcard the tenth of every month following the reference month, as in experiment 1.

Because of initially low response rates, we identified 196 T12 units that had not reported data by any mode

for the first two months, and divided them into treatment (98 units) and control (98 units) subgroups. M3 analysts "warm contacted" the treatment subgroup by phone, to encourage them to use TDE, effective with collection of August 1992 data, help reporters with any problems they had, and answer questions.

The Bureau mailed questionnaires to the C3/T9 group for the first three months. CATI interviewers followed up for nonresponse, beginning about three weeks after the end of the reference month, and continuing for 10 to 14 days. The CATI system assigned the highest priority to units whose data were needed for the advance report. Before the fourth month, we mailed a cover letter and TDE packet to this group. After that, we only sent a TDE advance notice postcard each month.

C6/T6 units were treated like the C3/T9 units, with a six month/six month split. We also identified 308 units that included July 1992 respondents and a few nonrespondents that were probably in-scope, and assigned them to treatment (152 units) and control (156 units) subgroups. Prior to the seventh month of data collection, M3 analysts attempted to "warm contact" the treatment subgroup by phone at the same time they received TDE packets and cover letters, to encourage the use of TDE, give a brief explanation of the conversion to TDE, and answer any questions.

4. RESULTS

We will discuss one measure of response rates, which we call the "return rate," defined as:

Responses/Mailed,

where "Responses" is the number of reports (with one or more completed items) received by any mode (mail, fax, CATI, TDE, or analyst phone call), and "Mailed" is the number of questionnaires or advance notice postcards mailed out. "Mailed" includes out-of-scope and refusal units from previous months, to which we did not actually mail a questionnaire or postcard in subsequent months. The denominator of this rate rarely changes from month to month, unless units combine with other units or split into two or more units. We adjusted the return rates of the T12 and C6/T6 groups after they were split into treatment and control subgroups, to take out the effects of the treatment subgroups. This made the T12 and C6/T6 group rates comparable to the C3/T9 and C12 group rates. We also computed a "conservative response rate," which takes out-of-scopes out of the denominator; see Bond et al. (1993) for details.

4.1 Experiment 1

Table 1 shows a 79% TDE return rate by the end of the late period for January 1992 data, the first month TDE was available. The rate was 76-89% through collection of December 1992 data, except for July 1992 when we had our only PC hardware problem and M3 analysts had to phone more respondents than usual. The overall return rate continued to be 100% by the end of the late period virtually every month since we began offering TDE, and the cycle 2 overall rate (prior to the preliminary report) generally increased a little after introducing TDE.

4.2 Experiment 2

In this section, a "significant" difference means the *p* value was 0.05 or less in a chi-square test. The return rate for the T12 group was very low the first month, at 9% for TDE and 29% overall by the end of the late period (Table 2). M3 analysts instructed respondents not to mail or fax questionnaires the next month, and use TDE instead, but TDE usage fell to 5% and the overall return rate was only 10%. The TDE and overall rates have not been above 11% and 19%, respectively, since then.

M3 analysts were able to contact about two-thirds of the 98 units in the T12 subgroup selected for a "warm contact," to encourage them to use TDE for reporting August 1992 data. The warm contact did not significantly improve the overall return rate for August or later months, and no treatment (or control) unit used TDE to report August data (Table 3). The primary benefit of the warm contact was the identification of 24% of the units as refusals, which were not sent any more advance notice postcards. The treatment and control units continued to have very low TDE and overall return rates through the end of the experiment (March 1993 data).

When the C3/T9 group was switched to TDE, its overall return rate significantly dropped about 20 percentage points, to 42%. But this was significantly higher than the 29% rate that the T12 group started out with on TDE. The C3/T9 group's TDE usage was also significantly higher, 22% versus 9%. The overall return rate of the C6/T6 group significantly dropped from 61% to 42% when it was switched to TDE for collection of October 1992 data, with a TDE return rate of 24%; note the similarities to results for the C3/T9 group. To summarize: the TDE return rates following three or six months of mail and fax with CATI follow-up were not significantly different, but they were both significantly higher than the rate for the T12 group (no mail, fax, and CATI follow-up before TDE).

M3 analysts contacted just over two-thirds of the 152 units in the C6/T6 "warm contact" subgroup at the time of the switch to TDE (October 1992 data). There was no significant effect on the overall return rate, but the TDE return rate significantly improved from 38 to 49% (Table 4). TDE return rates generally declined for both subgroups through collection of January 1993 data, but rebounded for February 1993 data, though not to the levels of October 1992. The gap between the treatment and control subgroups narrowed, but the treatment TDE return rates persisted at higher levels than the control rates, through the end of the experiment.

5. CONCLUSIONS AND RECOMMENDATIONS

TDE was successful when offered to longtime reporters who were well prepared by M3 staff for a switch to TDE. It did not do well with new reporters, who did not receive a personal phone call to introduce them to it. Three months' preparation, by following up mail and fax nonrespondents with CATI, significantly improved TDE usage, but fell far short of TDE return rates achieved with the petroleum refiners. Another three months of CATI follow-up did not significantly improve TDE usage or overall return rates. A "warm contact" to nonrespondents did nothing to improve TDE or overall return rates, but a warm contact to mail/fax/CATI respondents at the time of the switch to TDE significantly boosted TDE usage.

Based on these results, we may need to do certain things to improve and maintain TDE response rates. For example, we probably should contact reporters by phone before offering TDE, explain the new system, and answer any questions or concerns that respondents have. We probably need to "warm up" less reliable reporters with CATI or some other nonresponse follow-up, to raise response rates before introducing TDE. Finally, we should study the effects of prompting TDE nonrespondents to use TDE; phone calls or faxed reminders could be used. BLS found that prompting was necessary to maintain high TDE response rates.

On the basis of these and other evaluations (see Bond et al. 1993), we concluded that TDE is a reliable system that respondents generally prefer to mail and fax for reporting their data, and that it is an inexpensive way to collect good quality M3 data. Therefore we offered it to about 1,700 M3 units (including the former C12 group) to collect May 1993 data. We selected units where the reporter would only have to submit one report, because TDE is not appropriate for reporters who have to complete multiple forms. We will offer TDE to several hundred more single-unit reporters in the near future.

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Table 1: Return Rates (%) by Month for Which Data Were Collected, Experiment 1

Mode of data collection and cycle by which data were loaded into database																					
Month	n ¹	Mail				Fax				TDE				Phone				All			
		1	2	3	L	1	2	3	L	1	2	3	L	1	2	3	L	1	2	3	L
Feb 91	50	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	34	90	100	100
Mar 91	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	17	90	96	100
Apr 91	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	23	92	100	100
May 91	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	38	92	98	100
Jun 91	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	92	98	100
Jul 91	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	33	92	100	100
Aug 91	52	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	58	92	98	98
Sep 91	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	53	91	98	100
Oct 91	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	74	96	100	100
Nov 91	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	47	91	100	100
Dec 91	53	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	77	98	100	100
Jan 92*	53	6	11	11	11	0	8	8	8	51	77	79	79	0	2	2	2	57	98	100	100
Feb 92	53	9	17	17	17	0	8	8	8	0	72	76	76	0	0	0	0	9	96	100	100
Mar 92	53	0	4	6	6	0	8	8	8	40	77	83	83	0	4	4	4	40	92	100	100
Apr 92	53	2	8	8	8	4	4	4	4	64	87	87	87	0	2	2	2	70	100	100	100
May 92	53	2	9	9	9	4	4	4	4	34	81	85	85	0	2	2	2	40	96	100	100
Jun 92	53	2	9	9	9	4	4	4	4	53	76	79	79	0	8	8	8	58	96	100	100
Jul 92	53	0	9	9	9	4	4	4	4	28	51	53	53	0	34	34	34	32	98	100	100
Aug 92	53	0	2	6	8	4	4	4	4	32	77	81	81	0	6	6	6	36	89	96	98
Sep 92	53	2	9	9	9	4	4	4	4	58	83	87	87	0	0	0	0	64	96	100	100
Oct 92	53	0	8	8	8	4	4	4	4	45	76	81	83	0	4	6	6	49	91	98	100
Nov 92	53	2	2	2	2	4	4	4	4	62	77	85	85	8	8	9	9	76	91	100	100
Dec 92	53	8	8	9	9	0	0	0	0	55	89	89	89	0	0	0	0	62	96	98	98

¹ n is the number "mailed out."

* Data collection by TDE began for Jan 92 data. Data collection mode not available earlier.

Note: numbers may not add to "all" due to rounding.

Table 2: Return Rates (%) by Month for Which Data Were Collected, Experiment 2

Mode of data collection and cycle by which data were loaded into database																						
Month & treatment	n ¹	Mail				Fax				CATI				TDE				All ²				
		1	2	3	L	1	2	3	L	1	2	3	L	1	2	3	L	1	2	3	L	
<u>Apr 92</u>																						
T12	316	2	4	6	9	6	9	11	11	0	0	0	0	6	8	9	9	15	21	26	29	
C3/T9	477	13	20	22	23	4	8	10	10	2	20	32	32	0	0	0	0	19	48	64	65	
C6/T6	475	14	22	23	24	6	10	11	12	1	18	30	30	0	0	0	0	22	50	64	65	
C12	494	13	20	24	26	5	9	10	10	1	21	32	32	0	0	0	0	19	49	67	69	
<u>May 92</u>																						
T12	316	0	1	1	2	2	3	3	3	0	0	0	0	2	4	5	5	5	7	9	10	
C3/T9	477	19	21	22	22	4	5	5	5	2	36	38	38	0	0	0	0	25	63	66	66	
C6/T6	475	18	19	20	20	5	6	7	7	2	36	40	40	0	0	0	0	25	62	66	67	
C12	496	16	19	19	20	6	8	8	8	2	34	37	37	0	0	0	0	24	60	65	65	
<u>Jun 92</u>																						
T12	316	1	2	2	6	1	1	2	2	0	0	0	0	4	7	8	8	6	10	11	16	
C3/T9	477	25	32	32	33	0	3	4	4	1	17	27	27	0	0	0	0	26	52	63	63	
C6/T6	475	26	35	36	36	2	4	5	5	0	14	23	23	0	0	0	0	28	54	64	64	
C12	496	22	29	30	30	1	2	3	3	1	21	29	29	0	0	0	0	24	52	63	63	
<u>Jul 92</u>																						
T12	316	4	4	5	6	4	4	4	4	0	0	0	0	3	4	9	9	10	12	18	19	
C3/T9	477	10	12	14	14	5	5	6	6	0	0	0	0	5	6	22	22	20	24	41	42	
C6/T6	475	23	24	25	25	6	7	7	7	15	26	29	29	0	0	0	0	45	57	62	62	
C12	496	26	27	27	27	5	5	5	5	14	24	28	28	0	0	0	0	46	56	60	60	
<u>Aug 92</u>																						
T12	316	2	2	2	3	2	2	2	2	0	0	0	0	5	7	7	7	8	11	11	12	
C3/T9	477	0	1	1	2	0	1	1	1	0	0	0	0	8	16	17	17	9	18	19	20	
C6/T6	478	27	28	28	28	8	9	9	9	8	20	24	24	0	0	0	0	43	57	61	61	
C12	496	26	27	27	27	7	8	8	8	10	20	24	24	0	0	0	0	43	54	59	59	
<u>Sep 92</u>																						
T12	316	1	1	1	2	1	1	1	1	0	0	0	0	5	7	9	9	8	10	11	12	
C3/T9	477	0	1	1	1	0	0	0	0	0	0	0	0	15	18	19	19	15	19	20	20	
C6/T6	478	29	30	30	30	11	12	12	12	0	15	19	19	0	0	0	0	40	57	61	61	
C12	496	28	30	30	30	8	9	9	9	1	16	21	21	0	0	0	0	38	55	60	60	
<u>Oct 92</u>																						
T12	316	1	1	1	2	1	1	1	1	0	0	0	0	5	6	7	7	7	9	10	10	
C3/T9	477	1	1	1	4	0	0	0	0	0	0	0	0	12	16	17	17	13	17	18	21	
C6/T6	478	7	10	10	12	4	6	6	6	0	0	0	0	20	24	24	24	31	39	40	42	
C12	496	28	30	30	30	4	5	5	5	1	19	24	24	0	0	0	0	33	55	60	60	
<u>Nov 92</u>																						
T12	316	2	2	2	3	1	1	1	1	0	0	0	0	6	7	8	9	9	10	11	12	
C3/T9	477	1	2	2	2	0	0	0	0	0	0	0	0	13	15	19	19	14	17	21	22	
C6/T6	478	2	2	2	2	1	1	1	1	0	0	0	0	16	19	21	21	19	22	24	24	
C12	496	23	23	24	25	6	7	7	7	12	24	27	27	0	0	0	0	41	54	58	59	
<u>Dec 92</u>																						
T12	316	1	1	1	2	1	1	1	1	0	0	0	0	6	7	8	8	7	10	10	11	
C3/T9	477	1	1	1	3	0	0	0	0	0	0	0	0	11	14	17	17	12	15	18	20	
C6/T6	478	2	2	2	2	0	0	1	1	0	0	0	0	14	18	20	22	16	20	23	25	
C12	496	22	23	23	23	8	8	8	8	6	23	28	28	0	0	0	0	37	55	60	60	
<u>Jan 93</u>																						
T12	316	1	1	1	2	1	1	1	1	0	0	0	0	4	7	7	7	6	9	10	11	
C3/T9	477	1	1	2	4	0	0	0	0	0	0	0	0	6	10	13	13	8	12	14	17	
C6/T6	478	2	3	3	5	1	1	1	1	0	0	0	0	10	15	17	17	13	19	21	23	
C12	496	20	21	22	22	10	10	10	10	6	22	25	26	0	0	0	0	37	53	58	58	
<u>Feb 93</u>																						
T12	316	2	2	2	3	1	1	1	1	0	0	0	0	7	9	11	11	10	12	15	16	
C3/T9	477	1	1	1	2	0	0	0	0	0	0	0	0	12	16	18	18	13	17	20	20	
C6/T6	478	2	3	3	4	0	0	1	1	0	0	0	0	17	22	24	24	20	25	27	28	
C12	496	19	21	21	21	8	9	9	9	7	23	27	27	0	0	0	0	35	54	58	58	
<u>Mar 93</u>																						
T12	316	1	2	2	2	0	1	1	1	0	0	0	0	7	8	11	11	8	11	14	15	
C3/T9	477	1	1	2	3	0	0	0	0	0	0	0	0	9	14	19	19	10	16	21	23	
C6/T6	478	2	3	3	4	0	1	1	1	0	0	0	0	14	19	23	23	17	24	27	28	
C12	496	20	21	21	21	8	10	10	10	0	21	27	27	0	0	0	0	28	52	57	57	

¹ n is the number "mailed out."² Includes phone calls by analysts, which very rarely occurred. Numbers may not add to "all" due to rounding.

Table 3: Return Rates and Components of Nonresponse (%) for Treatment and Control Subgroups of the T12 Group, Experiment 2

Month & treatment	n ¹	Mode of data collection or component of nonresponse ²						
		Mail	Fax	TDE	All	Refusal	OS	UR
<u>Aug 92</u>								
Treatment	98	3	1	0	4	24	3	68
Control	98	3	0	0	3	2	1	94
<u>Sep 92</u>								
Treatment	98	2	1	3	6	24	3	66
Control	98	0	0	4	4	2	1	93
<u>Oct 92</u>								
Treatment	98	1	0	2	3	24	3	69
Control	98	0	0	2	2	2	1	95
<u>Nov 92</u>								
Treatment	98	3	0	2	5	24	3	67
Control	98	1	0	2	3	2	1	94
<u>Dec 92</u>								
Treatment	98	1	0	3	4	26	3	67
Control	98	0	0	4	4	2	1	93
<u>Jan 93</u>								
Treatment	98	1	0	0	1	26	3	70
Control	98	0	0	4	4	2	2	92
<u>Feb 93</u>								
Treatment	98	0	0	3	3	26	3	68
Control	98	0	0	5	5	2	2	91
<u>Mar 93</u>								
Treatment	98	0	1	5	6	26	3	65
Control	98	0	0	4	4	2	2	92

¹ n is the number "mailed out."

² OS - out-of-scope; UR - unresolved.

Note: numbers may not add to "all" due to rounding.

Table 4: Return Rates and Components of Nonresponse (%) for Treatment and Control Subgroups of the C6/T6 Group, Experiment 2

Month & treatment		Mode of data collection or component of nonresponse ²						
		n ¹	Mail	Fax	TDE	All ³	Refusal	OS
<u>Oct 92</u>								
Treatment	152	14	9	49	72	2	2	24
Control	156	19	10	38	66	1	0	33
<u>Nov 92</u>								
Treatment	152	3	2	40	47	3	3	48
Control	156	4	2	32	38	1	0	61
<u>Dec 92</u>								
Treatment	152	3	2	36	43	3	3	51
Control	156	3	2	33	38	2	0	60
<u>Jan 93</u>								
Treatment	152	3	3	34	41	3	3	53
Control	156	8	2	26	36	2	1	62
<u>Feb 93</u>								
Treatment	152	3	2	43	49	3	3	45
Control	156	6	1	36	44	3	1	53
<u>Mar 93</u>								
Treatment	152	5	1	44	52	3	3	42
Control	156	6	2	35	43	3	1	54

¹ n is the number "mailed out."

² OS - out-of-scope; UR - unresolved.

³ Includes phone calls by analysts, which very rarely occurred.

Note: numbers may not add to "all" due to rounding.

SELECTED RESULTS OF THE INCENTIVE EXPERIMENT ON THE 1992 FARM COSTS AND RETURNS SURVEY

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ABSTRACT: A split ballot experiment was conducted on the 1992 Farm Costs and Returns Survey (FCRS) in four States to test the effects of a prepaid nonmonetary incentive on response rates and related variables. Results showed a statistically significant improvement in response rates of 5.4 percentage points due to the incentive. The incentive appeared to be the most effective among farms stratified in the smallest and largest sales classes. In addition, the incentive appears to have enhanced identification of non-eligible sample units (non-farms) over the No Incentive group, reducing a potential nonsampling error.

KEY WORDS: Incentive, prepaid, nonmonetary, split ballot experiment, response rates

INTRODUCTION

The Farm Costs and Returns Survey (FCRS) is a nationwide multiple frame survey of U.S. farm operators, conducted annually by the National Agricultural Statistics Service (NASS) of the U.S. Department of Agriculture (USDA). The purpose of the FCRS is to gather data for estimating total expenditures, net farm income, cost of production for selected agricultural commodities, and other economic indicators of the financial condition of the agriculture sector. In addition, the FCRS provides a data base for price index construction and microeconomic analyses.

The FCRS is considered by NASS personnel, from field enumerators to headquarters staff, to be a challenging survey. Face-to-face interviews averaging just over 90 minutes in length request detailed expenditure and income information, which is highly sensitive in nature, from individual farm operators. It is not surprising that the FCRS has suffered low U.S. level response rates that have declined in recent years from 69 percent to 63 percent (Rutz, 1993).

Concern for declining response rates has prompted NASS, like other survey organizations, to search for methods by which potential respondents may be encouraged to participate in its surveys, particularly the FCRS. In recent years, extensive broad-based public relations materials have been disseminated in the

popular farm press, and special refusal conversion efforts have been attempted. In addition, FCRS participants are routinely offered an Individual Farm Financial Analysis, which summarizes a number of economic characteristics of each respondent's own farm in comparison with farms of similar type and size in the same State, based on data from the survey. While none of these efforts is considered inconsequential, they have been met with little or no apparent success at actually increasing response rates.

In order to continue to explore methods for increasing response to the FCRS, NASS decided to investigate the use of incentives, a method often considered in survey research for the purpose of influencing survey participation. In such studies, typically a monetary or nonmonetary incentive is either prepaid unconditionally or promised for survey completion. In the study reported in this paper, a split ballot experimental design was utilized in four States to test the effect of a prepaid nonmonetary incentive on response rates on the 1992 FCRS.

LITERATURE REVIEW

Incentives have long been used in mail surveys, particularly of the general population, in order to increase response rates. A wide body of published literature suggests that monetary incentives are more successful at eliciting response than are nonmonetary gifts, and that prepaid incentives are more effective than rewards promised upon return of completed survey instruments. See for example qualitative review articles by Armstrong (1975) or Linsky (1975), or quantitative meta-analyses by Church (1993), Heberlein and Baumgartner (1978), or Yu and Cooper (1983). In particular, Church (1993) found promised incentives of any kind, monetary or nonmonetary, to be ineffective, asserting that "[t]hese types of incentive plans are simply not worth the energy involved" (p.75).

A recent study reports the results of an incentive experiment in an establishment survey, a mail survey of small construction subcontractors asking for detailed information about employees' health insurance coverage (James and Bolstein, 1992). Tested for their effect on

response rates were prepaid monetary incentive amounts increasing from \$1 to \$40, along with a promised monetary incentive of \$50 contingent upon survey return. Each of these was coupled with up to four follow-up mailings. The promise of \$50 performed no better than the control condition of no incentive with multiple mailings. Although prepayment of \$20 maximized survey response, it was not considered cost effective, and the authors concluded that token amounts such as \$1 or \$5 were sufficient to influence survey participation.

James and Bolstein attribute their positive incentive effects to social exchange theory: "By giving money the researcher extends a token of trust to the survey participant and initiates a social exchange relationship which invokes a social obligation for the participant to reciprocate in kind" (p.451). Social exchange theory and the principle of reciprocation are typically invoked to explain the positive effects of incentive use in surveys of households and among the general population (Dillman, 1978; Groves, Cialdini, and Couper, 1992). Applying this reasoning to establishment surveys is a nontrivial matter because it is unclear who in an establishment we are attempting to influence with the use of an incentive. Incentives are meant to influence the survey participation decision and to motivate the respondent. However, in an establishment survey, the decision-maker may not be the actual respondent, the most knowledgeable provider of the information being sought. This is typically the person who has access to and understanding of any records to be used as a source for responding (Edwards and Cantor, 1991).

Farmers, on the other hand, are likely to be both the decision-maker regarding survey participation and the most knowledgeable provider of the information sought on the FCRS. Hired accountants or record-keeping services were used routinely for keeping farm financial records by less than half of the farms with sales of \$250,000 or more in 1987. Moreover, farms of this size account for only about 5 percent of all U.S. farms. Approximately 11 percent of all farms subscribed to record-keeping services in 1987. Although the proportion of farmers using outside services for financial record-keeping may have increased in recent years, it is still likely that the majority of farm operators are the most knowledgeable source of the financial information being requested by the FCRS, since evidence suggests that even service users have some close hands-on method of keeping track of finances, such as a workbook or ledger (Willimack, 1989).

Furthermore, almost 99 percent of U.S. farms were sole proprietorships, legal partnerships, or family-held corporations in 1990. These operations are, by definition, family farms and are attached to farm operator households (Ahearn, Perry, and El-Osta, 1993). Indeed, "family farms .. meet either definition," households or establishments (Edwards and Cantor, 1991). Farmers may call upon a decision rule not unlike that of a householder regarding a request for survey participation. Thus using incentives to influence farm operators takes advantage of their characteristics as 1) the person most knowledgeable of the information requested, 2) the decision-maker regarding survey participation, and 3) a householder.

DESIGN AND METHODOLOGY

The FCRS utilizes a multiple frame design, consisting of a list frame and a complementary area frame. The list frame accounts primarily for medium, large, and specialty farms. For the FCRS, the operations on the list are stratified by type and size, including only those with "estimated value of sales" of \$20,000 or more. The area frame, which is stratified geographically and by land use, covers farms that are missing from the list, called nonoverlap (NOL). NOL farms are typically, though not exclusively, small farms. The U.S. list and area NOL sample size for the 1992 FCRS was 21,000.

FCRS data are collected using several questionnaire versions in face-to-face interviews averaging 90 minutes in length. Data for the previous calendar year are collected during February and March of the current year, which coincides with the end of the traditional tax preparation period for U.S. farms. Any operation having agriculture qualifies for an interview, although it may not qualify as a farm. The official USDA definition of a farm is any establishment which sold or would normally have sold at least \$1,000 of agricultural products during the previous year.

The 1992 FCRS Incentive Experiment utilized a "split ballot" experimental design in four States -- Georgia, Idaho, Kansas, and Michigan -- representative of historically low or declining response rates, as well as agricultural and geographic diversity. Sample elements were randomly assigned to the two incentive treatment groups by version and by stratum, resulting in 1181 sample units in the Incentive Group and 1183 sample units in the No Incentive Group.

The nonmonetary incentive item was a vinyl pocket portfolio containing a notepad and a removable solar

calculator. It bore an imprint identifying the survey, along with the State's and the Agency's identification. It was token in nature and not intended to represent compensation for the respondent's time and survey participation. The item cost \$7.06 per unit to produce.

The incentive item was prepaid; its receipt was not contingent upon survey participation. It was enclosed along with the pre-survey notification letter mailed to sample units prior to interviewer contact. Letters containing the incentive item acknowledged its enclosure, saying, "While this token in no way equals the value of your contribution to this survey, it represents our appreciation for your consideration." Letters to sample units in the No Incentive Group did not include the incentive item, nor did they mention it. Other than the above additional statement, letters in both groups were identical, written and signed by the State Statistician of each participating State. All pre-survey letters were addressed to the farm operator or operation by name and were mailed 1-2 weeks prior to the beginning of FCRS data collection in each State.

Survey interviewers were informed of the identity of incentive recipients and nonrecipients by way of a special code on each questionnaire label. They were allowed to use this knowledge in an appropriate manner upon contact with incentive recipients only. They were not allowed to personally carry or possess the incentive item, nor were they allowed to promise it as a gift for survey completion among nonrecipients.

On the FCRS, the various sample disposition rates have the following definitions:

$$\text{Response Rate} = \frac{\text{Number of Completed Interviews}}{\text{Number Eligible for FCRS}}$$

$$\text{Refusal Rate} = \frac{\text{Number of Refusals}}{\text{Number Eligible for FCRS}}$$

$$\text{Eligibility Rate} = \frac{\text{Number Eligible for FCRS}}{\text{Number of Sample Units}}$$

NASS traditionally reports response rates in terms of sample counts, with each sample unit being given equal weight. That is, these calculations do not take account of the sample design, and sampling weights are not applied.

RESULTS

Although both unweighted and weighted analyses were

conducted for this paper, only the unweighted results will be reported in detail, as this appears to be more common in the survey literature. (By our definition, "unweighted" analysis completely ignores the sample design, while a "weighted" analysis incorporates the design.) Reference will be made to weighted analysis in summary, and exceptions will be noted. In all cases, a one-tail test of significance is of primary interest. The decision criteria will be relative to a one-tail confidence level of $\alpha=0.10$, since the wide variability of sampling weights in the NASS stratified sample design is not particularly beneficial to the estimation of proportions. Nevertheless, two-tail p-values will always be reported, allowing the reader to make his/her own judgments.

The response rates were 63.3 percent in the Incentive Group and 57.9 percent in the No Incentive Group, representing a statistically significant increase in response rates due to the incentive of 5.4 percentage points (two-sided p-value=0.009). The reduction of nearly 5 percentage points in refusal rates, from 29.9 percent in the No Incentive Group to 25.0 percent in the Incentive Group, is also statistically significant (two-sided p=0.011). See Table 1.

Furthermore, the eligibility rate of 90.8 percent in the Incentive Group is significantly lower than the comparable rate of 93.2 percent in the No Incentive Group (p=0.034). That is, sample units that had no agriculture, and thus were not eligible for the FCRS, were more likely to be identified among incentive recipients than among nonrecipients. The lack of eligibility emanates primarily from the list frame. The farm status of individual list records has likely not been determined as recently as operations sampled from the area frame, which have been contacted at least once in the past year.

Table 1: Response Rates, Refusal Rates, and Eligibility Rates, by Incentive Group, 1992 FCRS Incentive Experiment 1/

	Incentive	No Incentive	Two-tail p-value 2/
Response Rate (n)	63.3 % (1072)	57.9 % (1102)	0.009
Refusal Rate (n)	25.0 (1072)	29.9 (1102)	0.011
Eligibility Rate (n)	90.8 (1181)	93.2 (1183)	0.034

1/ Multiple frame, unweighted, ratio estimates.

2/ H_0 : Rate(Incentive) = Rate(No Incentive).

Table 2: State-level Response Rates and Refusal Rates, by Incentive Group, 1992 FCRS Incentive Experiment 1/

State	Incentive	No Incentive	Two-tail p-value 2/
<u>Georgia</u>			
Response Rate	73.5 %	66.0%	0.070
Refusal Rate	18.5	23.0	0.227
(n)	(238)	(244)	
<u>Idaho</u>			
Response Rate	75.3	67.9	0.061
Refusal Rate	19.2	25.7	0.078
(n)	(255)	(265)	
<u>Kansas</u>			
Response Rate	44.0	41.2	0.472
Refusal Rate	37.2	42.4	0.183
(n)	(309)	(311)	
<u>Michigan</u>			
Response Rate	64.8	59.9	0.235
Refusal Rate	22.2	25.9	0.314
(n)	(270)	(282)	

1/ Multiple frame, unweighted, ratio estimates.

2/ H_0 : Rate(Incentive) = Rate(No Incentive).

As can be seen in Table 2, the incentive appears to have increased response rates and reduced refusal rates in each of the four States. Even though the experiment was not specifically designed with sufficient sample sizes to support State level inferences, the response rate differences in Georgia and Idaho were large enough to reach significance. In addition, the refusal rate is significantly reduced (according to a one-tail test with $\alpha=0.10$) by the incentive in Kansas, a State that has historically found FCRS survey participation to be particularly troublesome.

Table 3 shows the distribution of Incentive and No Incentive response rates and refusal rates by "estimated farm value of sales," the variable used explicitly for stratification purposes in the list frame and for classification purposes in the area frame. Here an interesting phenomenon appears. Increases in response rates due to the incentive are highly significant in the smallest size class and in the largest size class only, although small mid-size farms in the \$40,000-\$99,999 sales class appear to have been significantly influenced by the incentive as well. Two size classes, \$20,000-\$39,999 and \$250,000-\$499,999, exhibit nonsignificant reversals, where the Incentive Group suffered lower response rates than the No Incentive Group. However,

Table 3: Response Rates and Refusal Rates, by Stratified Farm Value of Sales Class, by Incentive Group, 1992 FCRS Incentive Experiment 1/

Farm Value of Sales	Incentive	No Incentive	Two-tail p-value 2/
<u>less than \$20,000</u>			
Response Rate	81.3 %	64.3 %	0.001
Refusal Rate	8.2	22.1	0.001
(n)	(134)	(140)	
<u>\$20,000-\$39,999</u>			
Response Rate	61.6	68.0	0.364
Refusal Rate	24.4	19.4	0.409
(n)	(86)	(103)	
<u>\$40,000-\$99,999</u>			
Response Rate	69.4	62.2	0.145
Refusal Rate	21.7	29.4	0.094
(n)	(180)	(177)	
<u>\$100,000-\$249,999</u>			
Response Rate	59.7	57.4	0.593
Refusal Rate	29.3	30.9	0.696
(n)	(273)	(256)	
<u>\$250,000-\$499,999</u>			
Response Rate	56.0	61.8	0.327
Refusal Rate	35.2	27.4	0.160
(n)	(125)	(157)	
<u>\$500,000 or more</u>			
Response Rate	57.7	46.1	0.007
Refusal Rate	26.6	38.7	0.003
(n)	(274)	(269)	

1/ Multiple frame, unweighted, ratio estimates.

2/ H_0 : Rate(Incentive) = Rate(No Incentive).

these reversals become negligible as well as nonsignificant when the sample design is considered and appropriate sampling weights are applied.

Estimation taking account of the sample design enables inference of these experimental findings to the population of U.S. farm operators. Although the level estimates change when sample weights are applied, the direction of the differences and their statistical significance are retained in all cases reported above, except in the largest sales class. Moreover, when analysis is limited to list frame sample elements, this largest size class exhibits a highly significant increase in response rates of more than 12 percentage points ($p=0.006$), due to the incentive. It appears that the loss of significance in the multiple frame estimate is due to the influence of an area frame refusal or inaccessible sample element with a large sample weight.

In order to further understand the effects of the incentive, additional analysis was undertaken using the list frame sample only. The greatest sampling efficiency is gained in the list frame since it accounts for the largest farms, which contribute the most to the FCRS estimates of expenditures and income. Thus, response from these list frame sample elements is crucial to data quality. However, it is well documented that FCRS response rates decline as farm size increases (Rutz, 1993). Therefore, it is important to evaluate the effect of the incentive in the list frame.

A regression was performed incorporating the sample design using data from list frame records only. Response behavior was regressed on incentive receipt, the stratification variable "estimated farm value of sales," as well as a term representing their interaction, along with variables that controlled for State and questionnaire version effects. While the incentive variable by itself proved nonsignificant, its interaction with the size variable significantly increased the probability of response of a list sample unit. The selected estimated equation is:

$$\begin{aligned} &(\text{Probability of Response}) * 100\% = \text{Intercept} \\ &- 3.29 \ln(\text{Size}) + 0.56 [\ln(\text{Size}) * \text{Incentive}] \\ &\quad (p=0.067) \quad (p=0.091) \\ &+ \text{State variables} \\ &+ \text{Questionnaire Version variables,} \\ &\text{where Size} = \text{Estimated farm value of sales} \\ &\text{and Incentive} = 1 \text{ if incentive,} \\ &\quad 0 \text{ if no incentive.} \end{aligned}$$

Incentive receipt appears to have significantly offset the decline in the probability of response among larger farms.

CONCLUSIONS

Clearly the inclusion of a nonmonetary incentive with the pre-survey notification letter resulted in a significantly higher response rate on the 1992 FCRS in the four States included in the experiment. The increase in response rates appears primarily due to a reduction in refusals among those who received the incentive. In addition, the incentive appears to have enhanced identification of non-eligible sample units

(non-farms) over the No Incentive control group, reducing a potential nonsampling error. Incentive recipients who had no agriculture may have been more attentive to the survey request and more determined to notify the interviewer of their non-farm status, rather than to become refusals or inaccessible sample units.

Furthermore, the incentive appears to have had the largest and most significant effects on response rates among the smallest farms from the NOL area frame sample and among the operations sampled from the largest farm strata on the list frame. These two groups of farms have in common high likelihood of repeated contact for NASS surveys. Area frame NOL farms remain in the NASS sample for five years. Those selected for the FCRS are in their fourth and fifth years of their sample rotation and have likely been called upon repeatedly for a variety of NASS surveys, for it is their role to account for the incompleteness of the list. The largest list frame operations, likewise, are frequently subject to repeated contact for NASS surveys. As the largest operations, they account for a substantial portion of agricultural production. In addition, their higher degree of variability results in their being sampled at a higher rate.

The incentive, as a token item, cannot have compensated respondents, especially the large farms, for their FCRS participation. Thus these results cannot be interpreted using an argument based on economic exchange. Instead, the effects of the incentive must be interpreted in a social context. The incentive may have 1) drawn attention to the pre-survey letter, 2) legitimized the survey request, 3) identified and differentiated the survey sponsor (this is especially relevant since the U.S. Census of Agriculture was conducted just prior to the 1992 FCRS), 4) notified the farmer of the impending visit by an interviewer, and 5) offered a sign of appreciation, enabling the trust necessary for social exchange to occur.

Indeed, the latter explanation drawing upon social exchange theory, may be most appropriate, given that the two groups most affected by the incentive, the smallest NOL farms and the largest list frame farms, are those most frequently requested to participate in NASS surveys. It is likely that a relationship, rapport, has been built between these farm operators and the interviewers. Unconditional receipt of the incentive item may have been perceived by these FCRS respondents as a token of appreciation consistent with the ongoing social relationship of survey contact. This may have been particularly meaningful among the smallest farms, which are noncommercial in nature, and

their operators may not even consider themselves to be farmers. The incentive may have symbolized the trust that, according to Dillman (1978), is necessary for social exchange to successfully occur, invoking social norms in the respondent consistent with survey participation. Thus, like James and Bolstein (1993), it seems reasonable to attribute positive incentive effects in the FCRS, an establishment survey of farmers, to social exchange theory.

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INCREASING MAIL QUESTIONNAIRE COMPLETION FOR BUSINESS POPULATIONS:
THE EFFECTS OF PERSONALIZATION AND A TELEPHONE FOLLOWUP
PROCEDURE AS ELEMENTS OF THE TOTAL DESIGN METHOD

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Key Words: Mail survey, personalization, telephone followup, businesses.

In a recent study by Paxson, Dillman, and Tarnai (1993) it was suggested that response rates of establishment surveys conducted by a university based survey research facility differed when the mailing information included a named individual in the address. They reported that the response rates for surveys without an individual person named averaged 40%, compared to 72% for those survey mailings addressed to a named individual.

This paper presents results from a follow-up study that looks at the effect of individual names on response to a mail survey of a large number of businesses in Washington State. For which some addresses included a person name and others did not. The same questionnaire and combination of contact procedures were used across the sample frame. Completion rate statistics are presented comparing stratifications within the sample of Washington businesses. The objectives for this study include: 1) evaluating the effect of having an individual contact name available for personalization in a sample of businesses, 2) determining the added level of mail questionnaire completion as a result of using a telephone reminder prompt in place of a certified mailing for the fourth contact of businesses, and 3) assessing whether types of businesses differ in response behavior to the same combination of survey procedures.

Many techniques and procedures have been tested for improving response rates. Past mail survey research substantiates that the number of contacts with respondents is the most significant factor influencing questionnaire completion (Heberlein, 1978, Dillman, 1991, Dillman, 1993). Past research also shows that first class mailings, personalization of correspondence and combinations of mailing strategies can positively influence mail survey response. It should also be noted that for most factors studied there existed at least one study that provided a contradiction or exception to the findings (Dillman, 1991). The results of studies investigating the effect of personalization on response rates are inconsistent for business surveys (Forsgren, 1989). Some researchers questioned the applicability of methods for business surveys that are derived primarily from studies of individual person (e.g., general

population) surveys. It may be that some procedures are not appropriate for business surveys.

A set of procedures normally used for individual person surveys known as the Total Design Method (TDM) has been developed for reducing nonresponse when conducting mail surveys of the general public (Dillman, 1978). TDM is a system that uses personalization of mailings, specific questionnaire design techniques, and extensive follow-up procedures to consistently obtain high response rates in mail and telephone surveys (Dillman, 1978). The theoretical basis for the TDM is social exchange theory which suggests that a questionnaire recipient is most likely to respond if they feel the perceived benefits of responding outweigh the perceived costs of doing so. Therefore, the TDM method emphasizes techniques that reduce the perceived personal costs for respondents (i.e. ease of answering questions and less time consuming), increases their perceived benefits (i.e. using interesting questions, demonstrating the relevance of the research, and appealing to their contribution), and increasing their trust (i.e., using letterhead and organizational sponsorship). In recent years, Dillman (1991) and other researchers have suggested that a telephone follow-up can be used to replace the final certified mailing in TDM when a telephone number is available. Justification for use of a telephone follow-up is based on recent trends for dual worker households in society and an increased participation of individuals in the work force which may possibly reduce the contacting of respondents through certified mail (Dillman, 1991). However, telephone follow-ups as an element of TDM have not been extensively investigated for general businesses and other establishment populations. There has been minimal survey research that evaluates the use of survey follow-up procedures in terms of influencing response behavior of establishments.

SAMPLE DESCRIPTION AND PROCEDURES

In the spring of 1992, the Social and Economic Sciences Research Center, a university based survey research facility, conducted a mail survey of a large number

businesses from the population of all businesses that are registered as taxpayers with the Washington State Department of Revenue. Five different business populations were sampled with sample selection conducted by the Washington State Department of Revenue. The first sample of all businesses included 3,191 businesses and was stratified by 8 categories derived from the 11 Standard Industrial Classifications (SIC). Additionally, each SIC category was further stratified according to whether the business was identified as being large or small based on the amount of reported Gross Business Income. Once all 16 strata had been identified, a systematic random sample of 200 businesses were drawn for each strata in the all business population and are identified under the SIC sample. Four other business populations were sampled from separate business lists maintained by the Department of Revenue. Systematic random samples of 200 were drawn for Audited Businesses, Delinquent Tax Businesses, Women Owned Businesses, and Minority Owned Businesses. The main purpose for stratifying the business populations was to establish if there existed differences between these business subgroups and their taxpayer service needs and satisfaction with tax services. This sample strategy also provides the opportunity to determine if differing types of businesses exposed to the same survey procedures vary in response and whether the availability of a contact name had varying influence on response of these business subgroups.

The Total Design Method was administered uniformly across the sample subgroups of businesses in this survey effort. These procedures included: 1) an initial mailing of a 12 page questionnaire booklet, first class personalized envelope, a first class return envelope, and a personalized cover letter that targeted "the person who has the most experience interacting with the Department of Revenue and who you feel best represents the interest of your business" as the respondent, 2) a postcard reminder thank you was sent one week later, 3) a first class personalized second questionnaire, new cover letter and first class return envelope were mailed to nonrespondents three weeks after the initial mailing of the questionnaire, and 3) six weeks after the initial mailing a telephone prompt (5 attempted calls per business) for return of the mail questionnaire was made with all nonrespondents.

DISCUSSION

After the three mail contacts the completion rate (the ratio of the number of completed questionnaires to the

total number of eligible respondents) for all business subgroups averaged 45.4%, the refusal rate was 2.5%, and the non-response rate was 52.1%. Since the completion rate was considered to be low, it was decided that a telephone followup would be made to encourage respondents to complete the mail questionnaire. The completion rate for the mail survey after the telephone followup prompt was 55.9% for the SIC sample, 56.8% for Audited Businesses, 35.6% for Delinquent Businesses, 56.6% for Women Owned Businesses, and 35.9% for Minority Owned Businesses.

Difference in naming and contact information thought to influence response were coded and analyzed. Table 1 displays the overall completion of surveys by the availability of an individual person contact name for the original SIC Sample by Business Size, Audited Businesses, Delinquent Businesses, Woman Owned, and Minority Owned Business samples. For SIC small businesses, there were considerably more businesses with a contact name than without. Availability of a contact name did not increase questionnaire completion rate for small businesses (53.1% vs. 55.8%). The majority of SIC large businesses were without contact names yet still had more completed questionnaires than not completed questionnaires (57.5%). The Audited Businesses sample had more completed than noncompleted questionnaires for both businesses with a contact name (57.1%) and without a contact name (56.7%). Delinquent Businesses had a greater number of businesses with contact names, but experienced a greater rate of questionnaires that were not completed regardless of the contact information. Women Owned Businesses demonstrated the highest level of completion for businesses without contact names (55.5%). Minority Owned Businesses had a larger number of businesses without contact names and experienced a low rate of completion for those businesses (35.9%).

A major problem in implementing surveys of businesses is that an individual is asked to respond on behalf of the business and the analysis of survey data will most likely be examined and described using characteristics of the business unit. Whereas for general population surveys it is an individual that responds to the survey and it is the collective individual attributes that characterize response. Therefore the burden for business surveys lies with identifying an appropriate person associated with that business who will have knowledge of the survey topic as well as about the business. Often the person deemed appropriate to receive mailings is the business owner or manager. For small businesses because of

their size, it may generally be viewed that they have fewer employees and that there will be fewer problems with the mailing being directed to the appropriate person once it is received at the business. For this analysis, because of the low overall response rate and the knowledge that a large portion of the sample was missing contact names, it was hypothesized that businesses with a contact name would have a higher questionnaire completion rate than businesses for which we had no contact name. In terms of the topic asked about in this survey, excise tax reporting and tax services, the appropriate person (or business title) to answer the survey could vary significantly for the different industrial classifications, size, tax status, and ownership of businesses. This is an important difference from surveys of the general public where the researcher has a list of specific names in the sample to fully personalize all letters and mailing. Table 2 presents the number of questionnaires completed by SIC stratification. The business classifications most impacted by lack of an individual contact name (the completion rate "With Contact Name" is greater than "Without Contact Name") were: small wholesalers, finance/real estate, and service 8000. Having a contact name improved mail questionnaire completion by 3.5% to 6.5% for these business classifications. For five of the eight SIC strata, questionnaire completion was greater for the portion of the sample without contact names. Table 3 is a summary of mail questionnaire completion as a result of personalization with a name for SIC classifications further stratified by business size. Small manufacturers, small wholesalers, and small finance/real estate businesses had higher response associated with contact names in their sample information. The other four small business classifications had higher response for sample information without contact names. The percentage of completion for large businesses was greater than 50% (range of 52.3% to 67.9%) and was associated with sample information without contact names.

Table 4 displays a summary of the response for the questionnaire mailing and the telephone follow-up contacts for each of the business populations and population subgroups. For all the populations, the mail portion of the survey accounted on average for 46% of the response. For the different business populations sampled, the Women Owned Business population experienced the highest level of response to the mailing with 56%. The Delinquent Tax population experienced the lowest response to the survey mailing at 32%. The telephone follow-up averaged across all population

samples increased response by 5%. However, it should be noted that the women and minority owned populations did not have phone numbers available in the contact information for telephone follow-up. Both the Audited tax sample and the SIC sample experienced an enhancement in response of 8% and 6%, respectively.

The response for each SIC stratification is also summarized in Table 4. The percentage of completed questionnaires for the initial three mailings was largest for large construction businesses (57.1%) and lowest for large wholesale businesses (44.1%). The telephone follow-up accounted for a 5% to 7% increase in completion across the SIC stratifications. However, further disaggregation of the businesses by size and SIC reveals a greater influence on completion when size of business is considered. Generally the results show that small businesses had a higher refusal/no response rate than large businesses. The three mail contacts accounted for 50% (on average) of the response for small businesses and 49% for large businesses. Across all SIC codes the telephone follow-up accounted for 6% of the increase in response. Large businesses experienced a higher level of response as a result of the telephone follow-up contact than did small businesses on the average (9% vs. 4%). The highest level of response for the telephone follow-up was reported for large transportation/utility (10.9%) and construction businesses (11%). The small business sectors that were most influenced by the telephone follow-up were the small service-8000 (4.8%) and the small wholesale businesses (4.8%).

CONCLUSIONS

This research effort is an example of applying the Total Design Method to a mail survey of a large sample of businesses in the State of Washington. It was not possible to "personalize" the mailings to all businesses with an individual respondent name because the sample lists did not contain contact names for most businesses. Because this limitation in the sample lists, not all of the elements of the TDM could be followed. This was hypothesized as a factor which contributed to the low response rate (45%) after the first three mailings of the survey. An attempt was made to further enhance response rates through a telephone follow-up procedure instead of a fourth (certified) mail contact called for in TDM. The telephone follow-up was viewed as another way to personalize the contact with the business and reach the appropriate person. An effort was made in this contact to persuade the businesses' to participate by returning a questionnaire. This study provides

information on whether businesses with various attributes (i.e. size, tax status, industrial classification, and ownership) have varying response behavior as a result of personalizing with a contact name. In this case there is little evidence that having a contact name helps response when other TDM procedures are used in implementing the survey across the business population subgroups. However, for some SIC classifications especially small businesses having a contact name improved completion. While for large businesses, having a contact had little influence on questionnaire completion regardless of industrial classifications. This research also demonstrates the effectiveness of the telephone contact for businesses with different size, industrial classification, ownership and tax status characteristics. The telephone follow-up was most effective for large businesses. Questionnaire completion for small businesses were not improved as much by the telephone follow-up when compared to large businesses. A telephone follow-up may be more effective for businesses where a specific individual may not be known for the certified mailing. When a contact name is not known, the cover letter and the description of who should complete this questionnaire may be very important to insuring the questionnaire reaches the appropriate person.

These results suggest that large and small businesses respond differently to survey mailings and telephone follow-ups. Perhaps some of the reasons for this differing response behavior lies with the role and characteristics of the person that receives and distributes the mail within large and small businesses. Large businesses, are likely to have personnel trained in evaluating the mail who follow a decision process for routing the mail to the appropriate recipient. While this process may take additional time it may be effective for finally directing the mail. This may also explain why the telephone follow-up was considerably more effective for large businesses. For small and minority-owned businesses the person receiving the mail most likely varies considerably in their training and ability to decipher how important particular mail may be and who should receive it. In addition, for small businesses, the person receiving and sorting the mail may have many responsibilities and when figuring out what to do with a particular piece of mail is difficult, it may take more time or have lower priority compared to the rest of their responsibilities.

Minority owned businesses and delinquent tax businesses had considerably less completed

questionnaires compared to the other business subgroups. Minority owned businesses may also have the problem of language difficulty or English literacy with the person receiving and distributing the mail. Delinquent tax reporting businesses may have a lower questionnaire completion rate as a result of management problems or a negative attitude towards reporting of information. These findings suggest that if responses from all businesses are important to a research question then non-response bias is likely to occur unless specific efforts are made to go beyond these situational barriers. One limitation to this study is that businesses were not randomly assigned to treatment groups. Further evaluation of the role of personalization is warranted. Other suggestions for future research in establishment settings should direct some attention to overcoming nonresponse with specific sub-populations of businesses and the effectiveness of introducing mixed modes of follow-up contacts as a way to overcome the types of constraints identified in this research.

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Table 1. Effect of Personalization with Contact Name on Mail Survey Response for Specific Population Subgroups of Businesses in Washington State.

Population Subgroup Description	Sample N	<u>With Contact Name</u>		<u>Without Contact Name</u>		Overall Completion Rate %
		Number N	Completion Rate %	Number N	Completion Rate %	
Tax Audited Businesses	183	56	57.1	127	56.7	56.8
Delinquent Tax Businesses	177	109	35.8	68	35.3	35.6
Women Owned Businesses	166	20	65.0	146	55.5	56.6
Minority Owned Businesses	170	4	25.0	166	36.1	35.9
Small SIC Businesses	1,484	880	53.1	604	55.8	54.2
Large SIC Businesses	1,562	14	64.3	1,548	57.5	57.6
Average			50.1		49.5	

Table 2. Effect of Having a Contact Name for Personalization on Mail Questionnaire Completion for Business of Standard Industrial Classifications.

SIC	Sample N	<u>With Contact Name</u>		<u>Without Contact Name</u>		Overall Completion Rate %
		Number N	Completion Rate %	Number N	Completion Rate %	
Construction	383	138	46.4	245	68.6	60.6
Manufacturing	379	89	53.9	290	57.0	57.8
Transport./Utility	378	87	48.3	291	61.2	58.2
Wholesale	383	53	54.7	330	51.2	51.7
Retail	372	133	49.6	239	52.7	51.6
Finance/Real Estate	385	90	56.7	295	50.2	51.7
Service 7000	384	151	54.3	233	58.4	56.8
Service 8000	382	153	61.4	229	57.2	58.9

Table 3. Effect of Having a Contact Name for Personalization on Mail Questionnaire Completion for Businesses by SIC and Size.

Population Subgroup Description	Size of GBI	Sample N	<u>With Contact Name</u>		<u>Without Contact Name</u>		Overall Completion Rate %
			Number N	Completion Rate %	Number N	Completion Rate %	
Construction	Small	185	136	45.6	49	71.4	52.4
Construction	Large	198	2	100.0	196	67.9	68.2
Manufacturing	Small	182	89	53.9	93	53.8	53.9
Manufacturing	Large	197	0	-	197	61.4	61.4
Transport./Utility	Small	185	87	48.0	98	65.3	57.3
Transport./Utility	Large	193	0	-	193	59.1	59.1
Wholesale	Small	188	53	54.7	135	49.6	51.1
Wholesale	Large	195	0	-	195	52.3	52.3
Retail	Small	178	133	49.6	45	51.1	50.1
Retail	Large	194	0	-	194	53.1	53.1
Finance/Real Estate	Small	189	90	56.7	99	45.5	50.8
Finance/Real Estate	Large	196	0	-	196	52.6	52.5
Service 7000	Small	188	148	54.1	40	67.5	56.9
Service 7000	Large	196	3	66.7	193	56.5	56.7
Service 8000	Small	189	144	61.8	45	57.8	60.9
Service 8000	Large	193	9	55.6	184	57.1	57.0

Table 4. Summary of Mail Questionnaire Completion as a Result of Three Mail Contacts and Telephone Prompt for Business Population Subgroups.

Description	Size	Sample N	Refusals or No Response %	Completion Rate		Overall Completion Rate %
				Three Mail Contacts %	Telephone Prompt %	
Audited Tax		183	43.2	48.6	8.2	56.8
Delinquent Tax		177	64.4	32.2	3.4	35.6
Women Owned		166	43.4	56.0	.6	56.6
Minority Owned		170	64.1	35.3	.6	35.9
All SIC		3,046	44.1	49.8	6.1	55.9
Construction	Small	185	47.6	49.7	2.7	52.4
	Large	198	31.8	57.1	11.1	68.2
Manufacturing	Small	182	46.1	51.1	2.8	53.9
	Large	197	38.6	52.3	9.1	61.4
Trans/Utility	Small	185	42.7	53.5	3.8	57.3
	Large	193	40.9	48.2	10.9	59.1
Wholesale	Small	188	48.9	46.3	4.8	51.1
	Large	195	47.7	44.1	8.2	52.3
Retail	Small	178	50.0	47.8	2.3	50.1
	Large	194	46.9	46.4	6.7	53.1
Fin./Real Est.	Small	189	49.2	47.1	3.7	50.8
	Large	196	47.5	45.4	7.1	52.5
Service 7000	Small	188	43.1	55.3	1.6	56.9
	Large	196	43.4	48.0	8.7	56.7
Service 8000	Small	189	39.2	56.1	4.8	60.9
	Large	193	43.0	48.2	8.8	57.0

IMPLEMENTING MULTIMODAL SURVEYS FOR BUSINESS ESTABLISHMENTS

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KEY WORDS: Multimodal surveys, response rates

Multimodal surveying involves the use of multiple methodologies to collect information from a sample of residents or businesses. Multimodal surveys have been used at the Tennessee Valley Authority (TVA) for over a decade to collect information from business consumers for load forecasting, rate analysis, and program design. These multimodal surveys have combined mail, telephone, and in-person data collection approaches in a single survey effort in order to achieve a high response rate to provide estimates to support various agency purposes. This paper will describe the background of multimodal surveys at TVA and elsewhere, the details of the multimodal approach used at TVA, and the advantages of the multimodal methodology. Further research planned at TVA with respect to multimodal surveys for establishments will also be described.

Background

As noted by Lyberg and Kasprzyk (1991), mail and telephone surveys represented the primary alternatives for data collection between 1940 and 1970. The increasing availability of the telephone and sampling by random digit dialing significantly expanded the use of telephone data collection methodologies since 1970. Despite the availability of telephone, mail, and in-person possibilities for data collection, there has been limited use of multimodal surveys as reported in the literature.

In a discussion of building data collection systems, Dillman (1978) discusses the use of different data collection methods by noting:

Whereas one method of surveying may produce an unfavorable reaction from certain people, another may not. People who refuse to let strangers into their households may be more willing to respond to a telephone interview. Other people who are uncomfortable with their ability to write answers to a mail questionnaire may respond enthusiastically if someone else does the writing. Still others may be frustrated by the intensity of concentration required for responding to a telephone interview and find greater comfort with the more relaxed nature of

a face to face interview or a mail questionnaire that can be completed at their own pace. Further, the persistence suggested by following refusals with attempts by another method effectively emphasizes to respondents the importance of a study; thus no matter how they react to specific methods, response may be improved. (p. 289)

Goudy (1976) used the total survey design method to raise a 78 percent mail response rate to 96 percent with a personal interview follow-up. Groves (1979) discussed the differences between telephone and personal interview surveys, reporting lower response rates on a telephone survey than by personal interview. Few respondents interviewed by telephone preferred the telephone modality for answering questions, but the in-person method was preferred by respondents receiving a personal interview. A study of crime victimization by Woltman, Turner, and Bushery (1980) found that fewer victimization reports were made in a telephone survey than in personal interview visits when the two methodologies were compared. Improvements in response rates using a telephone survey followed by a mail survey and an in-person interview were cited by Battaglia and Hassol (1993) in a survey on influenza immunizations and related health risks and behaviors. Gains in response rates were noted as a result of the multimodal methodology, but only the addition of an in-person follow-up effort attained the objective of a 90 percent response rate in the survey.

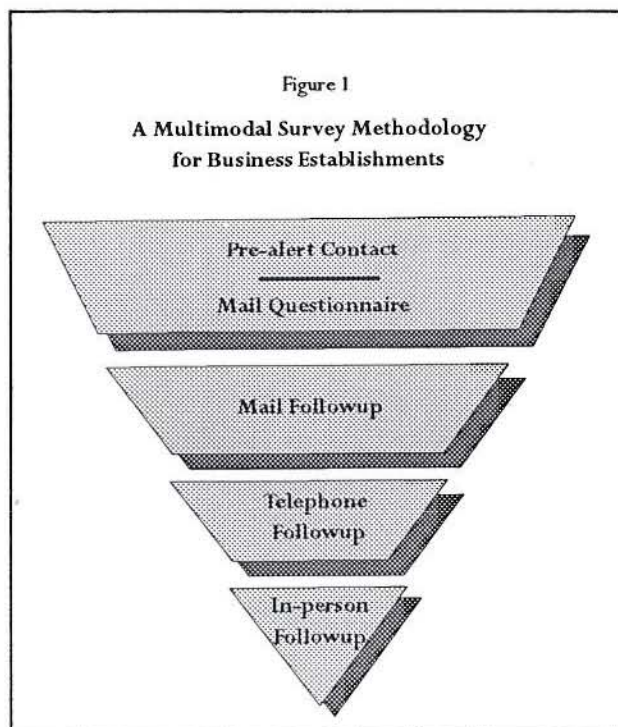
These research efforts and comments deal exclusively with multimodal surveys of residential populations. One effort to examine the use of multimodal surveys for establishments is provided by Werking and Clayton (1991). The Bureau of Labor Statistics conducted an extensive research effort addressing the use of computer assisted telephone interviewing (CATI) and computer assisted self-interviewing (CASI) compared with traditional mail survey methodology. These approaches seemed to offer promise in fulfilling data users' needs for high quality estimates.

Multimodal surveys have been used at the Tennessee Valley Authority since the late 1970s to obtain information from both residential and business consumers. Multimodal surveys were initially

implemented in order to assure a high response for survey efforts which provided data for the system load forecast. Historically, the cost of implementing a multimodal survey has been considered small in comparison with the possibility of making an error in the load forecast due to incomplete or inaccurate survey data. Multimodal data collection strategies have been used with residential consumers to collect information about space conditioning, major appliances, and energy source preferences, and also with commercial/ industrial consumers where the emphasis has been upon obtaining information about various energy end-uses and energy related decision-making. TVA multimodal surveys of both residential and business consumers have consistently yielded response rates of 90 percent or better.

A Multimodal Methodology for Business Surveys

Similar multimodal approaches to data collection have been used in each of the surveys of commercial and industrial consumers conducted by TVA. The strategy has been to use the most cost effective approach initially, followed by successively more costly means to reach additional respondents. As illustrated in Figure 1, the following components have been used in the surveys.



Pre-alert letter. A pre-alert letter is sent to advise respondents to expect a questionnaire in the mail. The purpose of the survey is described and the importance of a reply is emphasized in the pre-alert letter. Some respondents also receive a telephone call prior to the pre-alert letter. These latter consumers include chain accounts such as Wal-Mart, Golden Gallon, Hardees, and school boards, where a single individual may receive questionnaires for several different locations selected in the sample. The best means of obtaining the necessary information is discussed with the respondent and possible concerns about respondent burden are also addressed. A preliminary phone call is also placed to sampled establishments where it appears that it might be difficult to locate an appropriate respondent. For example, a plant engineer may be identified in a preliminary telephone call as the most knowledgeable respondent about energy use at a sampled manufacturing establishment, and all subsequent correspondence about the survey is sent directly to that individual. Finally, a preliminary telephone call is also made to all establishments selected in the sample with certainty. These are the largest businesses which use a significant amount of energy. The pre-alert letter also has the advantage of providing TVA with advance notice about post office returns and vacancies which, while not as problematic as in residential surveys, nevertheless require special handling.

Mail questionnaire. About 7 to 10 days after the pre-alert letter is mailed or a telephone contact is made, a copy of the questionnaire is mailed to sampled businesses. The questionnaire is designed to be physically attractive to the respondent and to be easy to complete. A toll free telephone number is provided for the respondent to call in case of any questions or if further clarification is needed. The questionnaire is accompanied by a cover letter explaining the purpose of the survey and soliciting the respondent's cooperation. The mail questionnaire and cover letter communicate the legitimacy of the survey effort even to respondents who may not participate until the telephone or in-person follow-up. The mailing conveys that TVA has a sincere and legitimate interest in obtaining information from the consumer and is not interested in soliciting money or business.

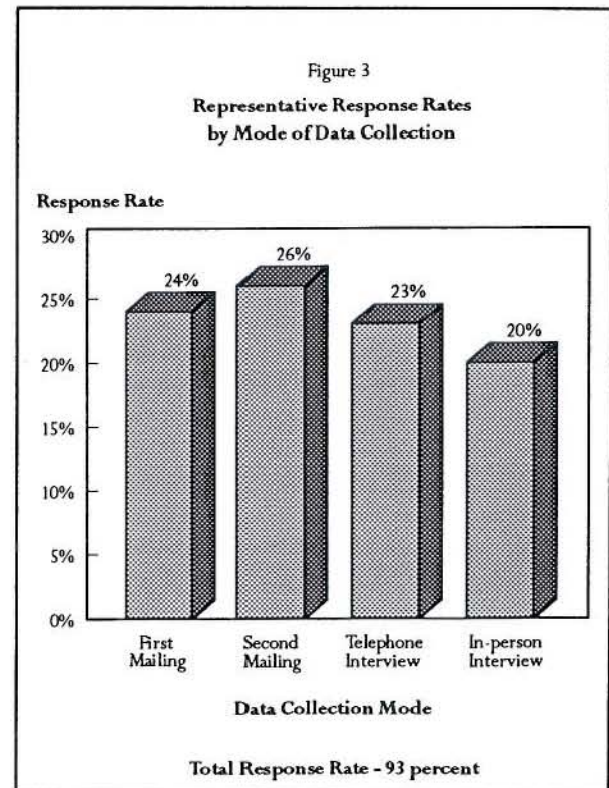
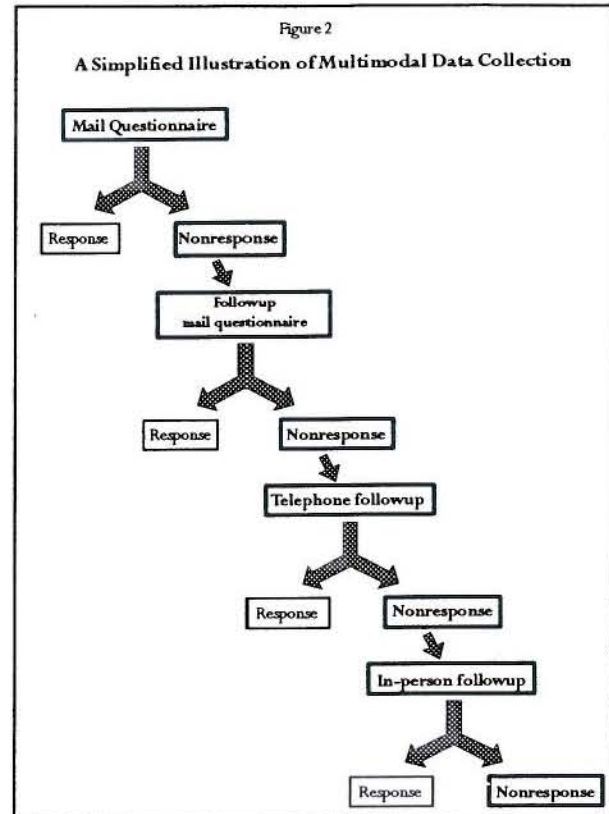
Mail follow-up. Approximately 10 to 14 days after the first mailing, a second copy of the questionnaire is sent to nonrespondents. A revised cover letter is included which again explains the purpose of the survey and explains the importance of receiving a reply from each sampled establishment.

Telephone follow-up. After allowing approximately 3 weeks for response to the second mailing, a telephone interview is attempted with the remaining nonrespondents. Since a telephone number is not a part of the billing record from which the sample is selected, an attempt is made to obtain a telephone number from directory assistance, a commercial matching service, or a state industrial directory. The mail version of the questionnaire is translated into a CATI program, and telephone interviewers are trained in the specifics of the survey. Three to four weeks are allocated for the telephone data collection effort.

In-person follow-up. As final follow-up, an in-person interview is attempted with a randomly selected one-half sample of nonrespondents after the two mailings and attempted phone interviews. Included in the pool from which the sample is selected are all those who could not be reached during the telephone component of the survey or for whom telephone numbers were unavailable. The questionnaire is translated into a format appropriate for in-person interviewing and personal interviewers are recruited to conduct the survey. Often, retired TVA engineers who also have interviewing experience are used for this task. A two-day training session is held to prepare interviewers to conduct the interviews prior to the commencement of the field period.

Although extremely simplified, Figure 2 illustrates the multimodal data collection methodology used at TVA as a series of choice points for the potential respondent. Establishments which fail to return a mail survey are subsequently contacted by telephone and, in the absence of a completed telephone interview, an attempt may be made to complete an in-person interview with them.

As shown in Figure 3, the use of a multimodal data collection for the TVA commercial and industrial surveys has yielded overall response rates of approximately 90 percent. Approximately 24 percent of sampled establishments respond to the first mailing, while an additional 26 percent return their questionnaires after a mail follow-up. The multimodal method has yielded a 23 percent response from the telephone follow-up effort. Finally, 20 percent of the responses are obtained by in-person interviews, weighted to reflect the random one-half sampling methodology used in this component of the survey.



Advantages of the Multimodal Approach

There are three principal advantages to the multimodal data collection approach. First and most obviously, the use of a multimodal approach ensures the achievement of a high response rate. In surveys of business consumers conducted by TVA, response rates of 90 percent or better have been routinely obtained. It is normally impossible to attain a comparable response rate using a mail-only survey. Similarly, it would be problematic to achieve this level of response in a telephone survey, especially where telephone numbers are not initially associated with the population list. Finally, a 90 percent response could probably be achieved using in-person interviewers, but the cost would be prohibitive for most organizations, including TVA.

The issue of cost leads into the second advantage of multimodal surveys, which is the cost effectiveness of using various data collection strategies to reach businesses. In the multimodal model used at TVA, the least cost survey method, mail, is used initially to collect data. As previously indicated, a response rate of approximately 50 percent is achieved from the mail and mail follow-up components of the survey. It should be noted, however, that a data retrieval system is utilized to ensure data quality for the mail responses. Prior to undertaking data collection, approximately 6 to 8 "key" items are identified for which data must be obtained. Respondents to the mail survey are asked for a telephone number where they can be reached in case of any questions about their answers, and then a telephone call is made to clarify any missing or inconsistent responses to these key items.

Once sufficient time has elapsed for the receipt of the returns from the mail survey effort, then the telephone survey effort is undertaken. Interviews completed by telephone are of course more expensive than mail efforts, requiring the development of a CATI system, training of interviewers, and interviewer and supervisory services. The telephone can, however, be an effective means of reaching businesses which did not respond to either copy of the mailed questionnaire. Finally, the most expensive of the survey modalities, in-person interviews, is used to collect information from a randomly selected one-half sample of the remaining nonrespondents. In addition to the costs of questionnaire development and training of interviewers and supervisors, there is also the additional cost of interviewer travel to sampled sites. Often, business consumers are willing to complete an interview when someone arrives at their place of business even if they

have not responded to an earlier mail questionnaire or telephone survey. The in-person methodology provides a means of reaching the last remaining nonrespondents, who have failed to participate during the mail or telephone efforts.

The third advantage of multimodal surveys is the opportunity for respondents to have a choice of how to respond as the survey progresses. Anecdotal evidence from TVA surveys of business and industrial consumers indicates that some respondents for many offices and chain accounts prefer to respond to the mail version of the survey, while retail establishments are more likely to respond to the telephone or in-person versions of the survey. In view of secular declines in response rates that have been observed in some settings, the opportunity for business consumers to participate in various ways may increase in importance as time passes. As the TVA 1993 Commercial and Industrial Survey approaches, plans are being made for the collection of detailed information about the characteristics of establishments for which survey responses are obtained through each data collection modality. Respondents in the telephone and in-person components of the survey will be asked about their reasons for not responding to the mail questionnaire, paralleling recently completed research in the residential sector (Boyle and Jackson, 1993).

Conclusion

Multimodal surveys are clearly not appropriate to all survey situations. Where a survey must be completed quickly or survey funds are limited, then a multimodal approach is probably impractical. Multimodal surveys can be used effectively where scheduling and funding permit, reducing the potential for nonresponse bias by ensuring the achievement of a high response rate.

Future research efforts at TVA relating to multimodal surveys will focus upon the detailed analysis of the type of establishments responding most readily to the various survey modalities. It is anticipated that this information can be incorporated into succeeding rounds of data collection activities as part of TVA's ongoing research with commercial and industrial consumers. Particular attention will be accorded to determining the type of establishments for which each survey modality appears to be most salient.

It is hoped that these modest efforts could contribute toward the development of a theory of multimodal surveys, which might be used to determine the selection of the most appropriate data collection methodology in

a particular setting. Information about establishment survey responses must of necessity be linked with a theory of overall survey response which includes the overall business climate, establishment characteristics, and data collection efforts.

Such information is also related to the implementation of efforts to employ technological improvements in survey research with establishments. For example, the proliferation of facsimile machines has added yet another potential vehicle for sending and receiving questionnaires. There may be certain types of establishments to which the facsimile machine is particularly attractive as a response mode. Similarly, the availability of personal computers in many types of businesses provides opportunities for the use of computer assisted self interviewing for some survey applications.

There seems to be some progress in recent years toward the development of a theory of survey participation for the residential sector. For example, Goyder (1987) explores various sociological concepts which can be used to explain survey nonresponse. Groves, Cialdini, and Couper (1992) and Groves and Couper (1993) have attempted to develop a theory of nonparticipation, looking at both respondent demographics and sociological theories. But there appear to be no comparable efforts to examine survey response from the business population in a systematic manner. Until advances are made in explaining establishment response, efforts to develop a theory of multimodal surveys will remain somewhat circumscribed.

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