

**First-Class Mail Destination-Entry
Quantitative Market Research Study
Draft Final Report**

PURPOSE AND SCOPE OF STUDY

From May to September 1999, PricewaterhouseCoopers developed and conducted a quantitative market research study to help determine mail depositor reaction to a proposed worksharing discount for discounted First-Class Mail deposited at its Destination Sectional Center Facility (DSCF). To evaluate the proposal for this discount, the Postal Service commissioned market research to quantify and evaluate mailer reaction to two possible discount scenarios. The data collected from this study are used to estimate the proportion of 1999 discounted First-Class Mail volume that mailers would expect to send under two discount rates.

The Postal Service and PricewaterhouseCoopers developed a screening questionnaire, mailout package, and a telephone survey questionnaire for this study. The screening questionnaire was designed to determine whether mailers have sent or plan to send any mail under the sampled First-Class Mail permit in calendar year 1999. The screening questionnaire was also designed to identify the appropriate respondent and obtain their addresses and telephone number for use in the survey questionnaire. We mailed an advance package to each respondent who passed the screening questionnaire. The mail package contained a description of the discount and its requirements and a worksheet to be completed in preparation for the interview. We designed the survey questionnaire to collect quality data while minimizing the burden on respondents. The final survey instruments are included in Appendix C.

PRETEST SCREENING QUESTIONNAIRE

The purposes of the screening questionnaire were to: (1) obtain the name, title, and telephone number of the person most responsible for making decisions about mail sent under the sampled permit, (2) determine the eligibility of the business establishment for the survey, and (3) verify the respondent's address at the establishment. An establishment was eligible and qualified to participate in the survey if it sent or planned to send any discounted First-Class Mail under the sampled permit in calendar year 1999. The screening questionnaire that was used for the pretest is in Section I of Appendix A.

We pretested the screening questionnaire with representatives from 22 business establishments. As a result of the pretest, we made the screening questionnaire more concise and added script to the interviewer training manual in order to prepare the interviewers for dealing with questions or concerns that the respondent may have during the interview. This and other minor adjustments are described in Section IV of Appendix A.

PRETEST MAILOUT PACKAGES

The mailout package contained: (1) a cover letter from the Postal Service describing the study's purpose and a confidentiality pledge, (2) a worksheet with the establishment's 1998 mail volumes under the sampled permit, (3) instructions for completing the worksheet, (4) definitions and requirements for receiving the potential discount, and (5) a list of DSCFs where mail could be deposited as part of this potential worksharing discount (see Section II of Appendix A).

For the pretest, we mailed 22 packages to respondents who passed the screening questionnaire. After the pretest, we revised the mailout package to make the description of the discount and instructions on the worksheet clearer. These revisions resulting from the pretest are detailed in Section IV of Appendix A.

PRETEST SURVEY QUESTIONNAIRE

The survey questionnaire asked the respondent about the sampled permit's expected mail volume for three rate groups under the following scenarios:

- Mail expected to be sent in calendar year 1999
- Mail expected to be sent destination-entry in 1999 at a 0.3 cent discount per piece
- Mail expected to be sent destination-entry in 1999 at a one cent discount per piece.

For the pretest, we completed 12 interviews. We made minor changes to the questionnaire in order to lessen the burden on the respondent and to explain the discount more clearly. In addition, to the changes made as a results of the pretest, a change was made by the Postal Service to the discount levels. The first discount rate changed from a 0.3 cent discount to a 0.4 cent discount. We programmed the final questionnaire for use in our Computer Assisted Telephone Interviewing (CATI) system. Details about the questionnaire revisions are explained in Section IV of Appendix A.

SAMPLE DESIGN

The universe for this survey was all discounted First-Class Mail permits with positive mail volume in calendar year 1998. The sample frame was developed using an extract from the PERMIT data system that contained one record for each First-Class Mail permit that was active in 1998. Table A presents detailed information on the sample frame.

The frame was divided into four strata based on each permit's total discounted First-Class Mail volume. A certainty stratum was created for the highest volume permits in the frame where each permit was sampled with certainty. The remaining permits were divided into three strata whose boundaries were determined using the Dalenius and Hodges method.¹ From these three strata, a random sample of permits was drawn according to sample sizes calculated using Neyman allocation.²

All permits to be surveyed were brought together into one file. This file was merged against two other databases to add additional information regarding the issuing post office and the contact name associated with the permit. Because some of the customer data were missing, the customer contact and telephone number for each permit to be sampled were collected from the issuing post office. Appendix B presents detailed sample selection programs.

TABLE A: STRATIFIED SAMPLE DESIGN

Stratum	Boundary (Volume of 1998 FCM)	Permits	Total Volume	Permits Sampled-Stage 1	Permits Sampled-Stage 2
1	0 – 1,000,000	37,739	3,356,802,058	216	99
2	1,000,000 – 16,500,000	2,688	10,634,550,403	342	139
3	16,500,000 - 127,000,000	421	18,858,663,739	396	186
4	Over 127,000,000	41	9,852,161,769	41	41
	Total	40,889	42,702,177,969	995	465

¹ Cochran, *Sampling Techniques*, John Wiley & Sons, 1977, pp. 127-130.

² *Ibid.*, pp. 98-99.

SURVEY ADMINISTRATION

We conducted telephone interviews from July 1999 to September 1999. The protocol was to contact respondents to complete the screening questionnaire, mail packages to eligible respondents, and call the respondents to complete the survey questionnaire.

CATI PROGRAMMING OF FINAL SURVEY INSTRUMENTS

We programmed the final screening questionnaire and final survey questionnaire for use in our Computer Assisted Telephone Interviewing (CATI) system. The comprehensive CATI system we use provides complete control over all technical aspects of the interview process. Questions, responses, alternatives and interviewer instructions are all controlled precisely by software; hence skips and branching are managed automatically, as are the behind-the-scenes calculations and validity checks. By using CATI, data are captured as the interview progresses. If an invalid response is keyed (e.g., out of the specified range for the question), the computer will display an error message and the interviewer can re-ask the question. The CATI system can check an answer's consistency with prior answers and facilitate the interviewer's resolution of the discrepancy through built-in probes. This eliminates the need for certain edit checks because the data are checked as they are entered into the computer.

In addition, CATI automates call scheduling, improving the effectiveness and efficiency of sample management. For example, a business with a West Coast area code is not called outside preset business hours for that time zone. The system also schedules callbacks. For instance, a call that results in a busy signal will be rescheduled for 5 minutes later, while a morning no-answer call will be rescheduled for the afternoon.

SCREENING QUESTIONNAIRE

We conducted the screening interviews from July 12, 1999 to August 16, 1999. We completed 345 screening interviews with eligible respondents for a response rate of 90.1%. Refer to Table B for a disposition of the screener sample.

While screening, we attempted to reach the contact name provided by the issuing post offices. If that person was no longer the appropriate contact or a contact name was not previously identified, then the interviewer asked to speak with the person most responsible for making decisions about the sampled permit to complete the interview. In order to obtain the screening information, it was occasionally necessary to contact a respondent at a location other than the address in the PERMIT database. This occurred when a local establishment's mailing decisions were made at the headquarters or regional level.

Our effort was only to accept information from the individual expected to complete the survey questionnaire. For contacts who remained unreachable throughout the screening period, interviews were completed with an alternate respondent who could respond to the screening questions.

MAILOUT PACKAGES

We mailed 345 packages to business establishments that qualified for the study after completing the screening questionnaire. The last two mailout groups, consisting of 25 cases, were faxed their mailout materials. This was done to maximize the amount of time that these respondents would have to participate in the study.

**TABLE B: SURVEY ADMINISTRATION STATISTICS
SCREENING QUESTIONNAIRE**

Final Screening Interview Status	Count
Eligible	383
Completed Interviews	345
Small	65
Medium	106
Large	138
Certainty	36
Unresolved at End of Data Collection	26
Refused	12
Ineligible	72
Screened Out	34
Number Not Available	21
Not Respondent's Permit Number	12
No Longer in Business	4
Pretest Participant/USPS Competitor	10
Respondent Replacement Not Yet Identified	1
Sample Size	465
Response Rate	345 / 383= 90.1%

When contacted for the survey questionnaire, respondents who indicated that they had not received or had misplaced their mailout packages were faxed a copy of their package contents and interviews with these respondents were rescheduled.

SURVEY QUESTIONNAIRE

The telephone interviews were conducted from July 28, 1999 to September 3, 1999. We completed 241 questionnaire interviews for a response rate of 71.7%. Refer to Table C for a disposition of the survey questionnaire sample.

Interviewers contacted the respondents about one to two weeks after sending the mail package. If the contact was not ready to complete the questionnaire interview during the initial call, interviewers attempted to schedule a more convenient time to conduct the interview.

Interviewer training for the survey questionnaire included role-playing with experienced interviewers and supervisors. We also monitored live interviews to ensure that the survey was being administered accurately. In order to answer questions posed by respondents, interviewers drew upon information provided in the training manuals or by supervisors.

More difficult cases, such as refusals, were referred to specially trained interviewers. In these cases, the specially trained interviewers called the respondents to clarify the purpose of the survey, reiterate the confidentiality of responses, reemphasize the importance of the respondent's participation, or answer any of the respondent's questions.

**TABLE C: SURVEY ADMINISTRATION STATISTICS
SURVEY QUESTIONNAIRE**

Final Survey Interview Status	Count
Eligible	336
Completed Interviews	241
Small	51
Medium	71
Large	89
Certainty	30
Unresolved at End of Data Collection	72
Refused	23
Ineligible	9
Number Not Available	2
Not Respondent's Permit Number/Should Have Failed Screener	5
No Longer in Business	1
Respondent out of the Country or on Extended Travel	1
Sample Size	345
Response Rate 241 / 336 = 71.7%	

PREPARATION FOR ESTIMATION

The respondents were asked to provide the following 1999 estimated mail volumes for a specific permit for each of the rate groups:

- Mail expected to be sent in calendar year 1999
- Mail expected to be sent destination-entry at a 0.4 cent discount per piece
- Mail expected to be sent destination-entry at a 1 cent discount per piece.

Three rate groups were considered:

- Nonautomation presort letters, flats and parcels
- Automation letters and flats
- Cards (bulk nonautomation presort and automation).

All responses were reviewed for consistency before being included in the final analysis. Inconsistencies were clarified by follow-up contact with the original respondent.

Respondents were re-contacted if they provided survey responses that resulted in any of the following situations:

- The total 1999 estimated volume differed from the sum of the 1999 volumes for the three rate groups.
- The total estimated volume under the 0.4 cent discount differed from the sum of the 0.4 cent discount volumes for the three rate groups.
- The total estimated volume under the one cent discount differed from the sum of the one cent discount volumes for the three rate groups.
- For any of the three rate groups, the estimated discount volume under the one cent discount was lower than the estimated volume under the 0.4 cent discount.
- For any of the three rate groups, the estimated discount volume (either under the 0.4 or one cent scenario) was greater than the corresponding 1999 estimated volume.
- The respondent answered 'Don't Know' or 'Refused' to whether they would take advantage of the discounts under either scenario.
- The estimated 1999 total volume differed by more than +/-25% of the 1998 total volume.
- The estimated 1999 total volume was zero.
- Respondent said 'Don't Know' or 'Refused' for any volume.

A total of 105 verification call backs were made. At the end of the verification call back period, five cases remained unresolved because the respondent could not be reached. One of these five cases was deleted because the data from that business establishment was illogical (i.e., it would send more mail destination-entry under the 0.4 cent discount than the one cent discount). The four other cases were retained because the respondents' answers were not inconsistent based on the results of the other verification calls.

A total of 68 cases required edits resulting from the verification call backs, and ten cases required edits resulting from interviewer identified problems.

The edited survey data are then used to calculate the following estimates:

1. The proportion of the 1999 volume of nonautomation presort letters, flats, and parcels that would be sent destination-entry for a 0.4 cent discount per piece.
2. The proportion of the 1999 volume of automation letters and flats that would be sent destination-entry for a 0.4 cent discount per piece.
3. The proportion of the 1999 volume of cards (bulk nonautomation presort and automation) that would be sent destination-entry for a 0.4 cent discount per piece.
4. The proportion of the 1999 volume of nonautomation presort letters, flats, and parcels that would be sent destination-entry for a one cent discount per piece.
5. The proportion of the 1999 volume of automation letters and flats that would be sent destination-entry for a one cent discount per piece.
6. The proportion of the 1999 volume of cards (bulk nonautomation presort and automation) that would be sent destination-entry for a one cent discount per piece.

We performed an influence analysis on the responses to each question. The influence of each individual response on the final estimates was calculated by removing each response one at a time from the dataset and recalculating the estimates. The relative difference between an overall estimate and the estimate after removing a response is a measure of the influence of the response on that estimate. The amount of influence is calculated by taking the absolute value of the difference between the estimators and dividing this value by the overall estimator.

Each respondent who affected any estimate by more than ten percent was removed from its stratum, placed in an "influential" stratum and given a weight of one. There were eight such cases.

WEIGHTING AND ESTIMATION

The formulae described in this section were applied to each rate group and discount scenario combination in order to compute the ratio and variance estimates.

Stratum weights are calculated by dividing the total number of permits in the frame stratum, N_h , by the number of completed interviews contributing non-missing values, n_h . This weight reflects each record's inverse probability of selection in the sample as well as the adjustment for survey non-response. As described previously, cases in the influential stratum are given a weight of one.

For stratum h , the weight is:

$$W_h = \frac{N_h}{n_h}$$

where:

h = stratum (small, medium, large, certainty, influential)

N_h = number of permits in the sample frame in stratum h

n_h = number of completed questionnaire interviews contributing non-missing values in stratum h

For each case, the estimated 1999 volumes and discount scenario volumes are multiplied by their corresponding stratum weights as follows:

$$WSV_{hi} = W_h SV_i$$

$$WEV_{hi} = W_h EV_i$$

where:

WSV_{hi} = weighted scenario volume for respondent i in h^{th} stratum

SV_i = scenario volume for respondent i

WEV_{hi} = weighted estimated 1999 volume for respondent i in h^{th} stratum

EV_i = estimated 1999 volume for respondent i

For each rate group and discount scenario combination, the weighted scenario volumes are summed and the weighted 1999 volumes are summed. Then, each total weighted scenario volume is divided by the total weighted 1999 volume. This is the estimate of the proportion of 1999 volume that would be sent using a specific discount and is computed as follows:

$$\hat{R} = \frac{\sum_h \sum_i WSV_{hi}}{\sum_h \sum_i WEV_{hi}}$$

JACKKNIFE VARIANCE ESTIMATION

"Jackknifing" is a common non-parametric technique that employs a repeated-replications approach for estimating a variances. Replicates are formed by dropping one record at a time, re-weighting the remaining cases to account for the dropped unit, and re-calculating the overall weighted ratio estimator (the "replicate ratio"). The dropped case is then returned to the data and the next case is dropped. This cycle is repeated until all records have been dropped once and the weighted ratio estimator has been recalculated each time. We apply this technique to calculate the variance estimates for each rate group and discount scenario combination.

The jackknife variance estimator used for each rate group and discount scenario combination is³:

$$v(\hat{R}) = \sum_h \frac{w_h}{n_h} \sum_i (\hat{R}_{(hi)} - \hat{R}_{(h\cdot)})^2$$

where:

$\hat{R}_{(hi)}$ = the replicate ratio within stratum h with observation i dropped

$\hat{R}_{(h\cdot)}$ = the mean of the replicate ratios within stratum h

w_h = a pseudo factor

The replicate ratio is:

$$\hat{R}_{(hi)} = \frac{\sum_{h' \neq h} \sum_i W S V_{h'i} + \frac{N_h \sum_{j \neq i}^{n_h} S V_j}{(n_h - 1)}}{\sum_{h' \neq h} \sum_i W E V_{h'i} + \frac{N_h \sum_{j \neq i}^{n_h} E V_j}{(n_h - 1)}}$$

The mean of the replicate ratios within stratum h is:

$$\hat{R}_{(h\cdot)} = \frac{\sum_{i=1}^{n_h} \hat{R}_{(hi)}}{n_h}$$

The pseudo factor is:

$$w_h = (n_h - 1) \left(1 - \frac{n_h}{N_h} \right)$$

The coefficient of variation for each ratio estimator is calculated by dividing the jackknife variance estimator by the ratio estimator:

³ Wolter, *Introduction to Variance Estimation*, 1985, pp. 181.

$$CV = \frac{\sqrt{v(\hat{R})}}{\hat{R}}$$

The six final estimates along with their corresponding coefficients of variation are in Table D.

TABLE D: FINAL RESULTS

	Percentage of 1999 mail volume that would be sent under a 0.4 cent discount	CV*	Percentage of 1999 mail volume that would be sent under a 1 cent discount	CV*
Nonautomation presort letters, flats and parcels	28.59%	18.5%	32.87%	15.6%
Automation letters and flats	17.76%	13.9%	26.61%	11.0%
Cards (bulk nonautomation presort and automation)	10.99%	30.3%	23.18%	27.5%

*CV = Coefficient of variation