

BEFORE THE
POSTAL RATE COMMISSION
WASHINGTON, D.C. 20268-0001

EXPERIMENTAL PREMIUM
FORWARDING SERVICE

Docket No. MC2005-1

RESPONSES OF UNITED STATES POSTAL SERVICE
WITNESS BETH B. ROTHSCHILD TO INTERROGATORIES OF
THE OFFICE OF THE CONSUMER ADVOCATE
(OCA/USPS-T2-1-7)
(December 27, 2004)

The United States Postal Service hereby files the responses of witness Beth B. Rothschild to the following interrogatories of the Office of the Consumer Advocate: OCA/USPS-T2-1-7, filed on December 13, 2004.

Each interrogatory is stated verbatim and is followed by the response.

Respectfully submitted,

UNITED STATES POSTAL SERVICE

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OCA/USPS-T2-1. Please turn to Library Reference USPS-LR-1/MC2005-1. Please turn to pages 1 and 2, wherein you indicate that a telephone interview was used to query respondents on potential usage of the Premium Forwarding Service, obtaining a likelihood of usage as a function of price.

- (a) Have you conducted or can you cite any studies which relate consumer responses on the likelihood of using a service or product to their actual subsequent usage of the service or product. If so, please explain your study or provide the reference to the relevant studies.
- (b) Based on studies which you have conducted or, alternatively, are available in the marketing, economics, statistical, psychological, sociological, or other professional literature, is subsequent product or service usage higher, lower, or identical to projected usage based on consumers' hypothesized behavior as indicated by their perceived likelihood of using a product? Please explain the basis for your response.
- (c) What level of confidence in this approach does the relevant professional literature assign to this market estimation approach, based on a screening questionnaire with subsequent questionnaire follow-up?

RESPONSE:

(a) I have conducted numerous studies for both commercial clients and the Postal Service which forecast likely consumer response to the introduction of new products and services or the addition of new product or service features. Several of these studies have supported Postal Service requests to the Postal Rate Commission. While these studies support estimates of customer use or preference, it has not been my responsibility to determine the relationship between consumers' responses to their likelihood of using the service or product to their actual subsequent usage of this product or service. Information on the specific products or new product features that were actually introduced into the marketplace and the demand that resulted for them can be researched on the Postal Rate Commission website.

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Stated preference methods in survey research are often used for measuring demand for new products and services, as well as the public's preferences towards different policies and regulations. Common areas of application include environmental valuation (Mitchell and Carson, 1989), health care (McDowell and Newell, 1996), marketing (Louviere, 1994), political science (King 1989), and transportation (Hensher, 1994).¹ In marketing, prominent methodological evaluations of research methods for measuring purchase intentions, and that also summarize applications of these techniques, include Warshaw (1980) and Kalwani and Silk (1982).²

(b) One major finding in the literature examining the relationship between expressed purchase intent or usage and subsequent purchase is that the relationship tends to vary depending upon the product or service under investigation (Kalwani and Silk (1982), p. 278). As a result, it is not possible to generalize across products and services regarding the direction, and particularly the magnitude, of potential biases associated with using intentions as a measure of subsequent purchase or usage. One conclusion from this research that

¹ See Mitchell, R.C. and R. T. Carson (1989) *Using Surveys to Value Public Goods: The Contingent Valuation Method*, Baltimore: Johns Hopkins University Press, McDowell, K. E. and C. Newell (1996) *Measuring Health; A Guide To ratings Scales and Questionnaires*, 2nd ed., New York: Oxford University Press, Louviere, J. J. (1994) *Conjoint Analysis*, in *Handbook of Marketing Research*, R Bagozzi, ed., Oxford: Oxford University Press, King, G. (1989) *Unifying Political Methodology; The Likelihood Theory of Statistical Inference*, New York: Cambridge University Press, and Hensher, D. A. (1994) *Stated Preference Analysis of Travel Choice – The State of Practice*, *Transportation*, 21, 107-133.

² See Warshaw, P.R. (1980) *Predicting Purchase and Other Behaviors from General and Contextually Specific Intentions*, *Journal of Marketing Research* 12 (February), 26-33. Kalwani, M. and A. J. Silk (1982) *On the Reliability and Predictive Validity of Purchase Intention Measures*, *Marketing Science* 1, 243-286.

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supports the stated preference approach (see Kalwani and Silk (1982), p. 280) is that “across a broad range of conditions, such measures do possess a statistically significant degree of predictive validity.”

Nevertheless, there are several compelling external factors that often explain why actual demand may be higher or lower than that which is forecasted in survey research. First, in a survey situation, potential customers or users are made completely aware of the product or service. They are educated fully about its characteristics and price. In the real world, the level of awareness and knowledge that emerges is often a function of the amount of awareness building activities undertaken (e.g., advertising, customer notification, etc.). In instances where considerable dollars are invested to “educate” the public and word-of-mouth spreads quickly, survey estimates may underestimate demand. In cases where there is little or no attempt to build awareness, the survey may overestimate demand.

Second, it is often the case that the product brought to market differs in subtle, but nevertheless meaningful, ways from the product that was tested in the research. Under these conditions, differences between forecasted and actual demand may result – both under- and over-estimates may emerge depending upon the nature of the changes.

Third, changing circumstances may cause the behavior of respondents to differ from the expectations reflected in survey responses; that is, those who believed they might make use of it do not, while others who had no need or inclination actually do. In the case of Premium Forwarding, it may be that a

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portion of those who indicated no likelihood of using the service this year may find they need to use it because of an unexpected extended trip, while others who did believe they would use it find they will not need to do so. The nature of these changes may result in higher or lower demand.

Fourth, sometimes individuals participating in surveys overstate their intentions to use a new product or service. To guard against serious overstatement, survey researchers design samples with individuals in the best position to gauge their likely behaviors (i.e., who have a level of familiarity and can more appropriately determine their intended use), and, hence, diminish the amount of overstatement. For example, the groups of individuals included in the Premium Forwarding study had either used similar (but not identical) forwarding services or forecasted an extended period away from their homes within a reasonable time period, and, as such, represented individuals who were in the best position to estimate their future use of this new product. In addition, adjustments are made to the raw survey estimates to produce more conservative demand forecasts and to take account of possible reasons for overstatement.

(c) The approach used in the Premium Forwarding research is one that is commonly employed and accepted as a sound basis for producing demand forecasts under different pricing options. In fact, it has been used in many previous studies conducted by the Postal Service and submitted to the Postal Rate Commission. Kalwani and Silk, for example, find support for the argument that the probability of purchase appears to be quite small for intentions below a

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threshold level. In these situations, “top box” scoring rules (like those employed in this research) that relate responses concerning likelihood to purchase or use to subsequent purchase or use are quite appropriate.³

Based upon my more than 33 years in the survey research business, I have complete confidence in the market estimation approach used here. The research protocol, questioning and data collection approach, quality control measures, and analytical efforts undertaken here are all exemplary. Had the survey used a single-stage telephone approach (i.e., performing a telephone screening and interviewing eligible respondents in the same contact) one could argue that respondents might not have been fully informed about the new product, and, therefore, not in the best position to indicate their intended future behaviors. Rather, the approach used – telephone screening, providing detailed information about the new product, and subsequently recontacting respondents for interview – allowed respondents time to digest relevant product information prior to the interview. Furthermore, the product literature sent to respondents in advance of the interviews was reviewed during the interview and price levels were randomized such that one-half the respondents were asked about the low price point first and the other half were asked about the high price point first. Subsequently adjustments were made to the raw survey estimates to produce a well-grounded estimate of likely usage.

³ Kalwani, M. and A. J. Silk (1982) On the Reliability and Predictive Validity of Purchase Intention Measures, *Marketing Science* 1, 243-286.

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OCA/USPS-T2-2. Please turn to Library Reference USPS-LR-1/MC2005-1. On page 2 you indicate that "...approximately 25 postal districts" were used for developing a list of Snowbird program users.

- (a) How did you determine that the number to use at this point in the analysis should be 25 postal districts?
- (b) How did you select which 25 districts to use?
- (c) Do you have any analysis of whether this decision to limit the coverage at this point in the study to 25 postal districts biased the results? If so, please provide your analysis. If not, please explain.
- (d) Apparently, contact was effectuated via telephone; do you have an analysis of whether excluding individuals not having telephone numbers biased the results? Please explain your response.

RESPONSE:

(a) As noted on pages 1 and 2 of the Library Reference "a reshipping service dubbed 'Snowbird' was offered on various terms by local postal officials in some locales." The number of districts offering such a service was not provided to me. Rather, the Postal Service provided us with the Snowbird sample and, based upon the information provided to us, we determined that names of users from 25 postal districts had been included. Therefore, we did not do any analysis to determine the number of postal districts to use.

(b) We did not select any districts. As mentioned in (a) above, the information was provided to us by the Postal Service.

(c) We do not have any analysis regarding the postal districts included and not included in this research. We used all of the information provided to us and did not take a sample of the districts.

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(d) As referenced in our response to interrogatory OCA/USPS-T2-3(b), approximately 97.6 percent of U.S. households now have "telephone service available from which they can make and receive calls", as estimated by Census 2000. This is an increase from the 1990 figure of 94.8 percent.¹ Current national estimates also suggest that this rate varies by geography and socio-economic status.² We have no evidence to suggest that non-telephone households are more or less favorably disposed towards Premium Forwarding. Given the small percentage of non-telephone households, my opinion is that it is unlikely that the absence of non-telephone households in the sample represents a significant source of bias.

More specifically, among the Snowbird sample, 8,918 names were provided to us and 7,269 were matched to telephone numbers, as noted on page 3 of the Library Reference. While the residual were not explicitly included in the Snowbird sample, they had a chance of being sampled as part of the RDD (random digit dial) stratum. Hence, unlisted Snowbird users were covered in this research.

¹ Survey Sampling Inc., (2002) SSI Updates Household Estimates, Telephone Penetration Up, The Frame, December.

² Frankel, M. R., Srinath, K. P., Hoaglin, D. C., Battaglia, M. P., Smith, P. J., Wight, R. A., and M. Khare (2003) Adjustments for Non-telephone Bias in Random-Digit-Dialing Surveys, StatMed, May 15;22(9):1611-26.

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OCA/USPS-T2-3. Please turn to Library Reference USPS-LR-1/MC2005-1. Please turn to page 3, where you indicate that in the case of Temporary Forwarding Users you selected a random sample of 40,000 records, which were subsequently sent for telephone look-up.

- (a) What was the statistical basis for determining a sub sample of 40,000.
- (b) Did the lack of a telephone number by a temporary forwarding user bias the sample? Please explain your response.

RESPONSE:

(a) The size of the sub-sample (40,000 records) was chosen to ensure that the number of records with matched telephone numbers would be large enough to obtain a sufficient number of interviews from the Temporary Forwarding stratum. The survey schedule did not allow time for undertaking additional telephone number matching activities, and, as such, we wanted to match a very large number of records to guard against having to do it again.

(b) There are two possible sources of bias that could be associated with coverage of telephone numbers on the Temporary Forwarding list, but, I do not believe that they are of such a magnitude to have caused the sample to be biased.

According to 2000 Census data, 97.6 percent of U.S. households now have "telephone service available from which they can make and receive calls." This is an increase from the 1990 figure of 94.8 percent.¹ Current national estimates also suggest that this rate varies by geography and socio-economic

¹ Survey Sampling Inc., (2002) SSI Updates Household Estimates, Telephone Penetration Up, The Frame, December.

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status.² There are no external sources of information concerning the proportion of households on the Temporary Forwarding list that do not have telephones. However, there is some evidence suggesting that the proportion of non-telephone households within Temporary Forwarding users may be less than the national average. Of the 40,000 sampled records selected for telephone matching, 30,909 could be matched to a listed telephone number. The estimated listed rate (77 percent) significantly exceeds current estimates of the national listed rate (70 percent)³. This suggests that the proportion of non-telephone households on the Temporary Forwarding list may actually be less than the national average.

Overall, given the small percentage of households without telephones and the likelihood that the percentage of non-telephone households on the Temporary Forwarding list may be lower than the national rate, it is unlikely that the absence of non-telephone households represents a significant source of bias for the sample.

A second potential source of bias in the Temporary Forwarding sample concerns the process of using what is called “directory matching” to produce telephone numbers for the list of addresses sampled prior to the telephone survey. It might appear that this focuses the sample exclusively on directly listed Temporary Forwarding users, and that this might, therefore, be a potential source

² Frankel, M. R., Srinath, K. P., Hoaglin, D. C., Battaglia, M. P., Smith, P. J., Wight, R. A., and M. Khare (2003) Adjustments for Non-telephone Bias in Random-Digit-Dialing Surveys, StatMed, May 15;22(9):1611-26.

³ Survey Sampling Inc.’s current estimate of the percentage of telephone households that have listed numbers is approximately 70 percent. See www.worldopinion.com.

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of bias for the sample. However, as noted on page 14 in the Library Reference, individuals who were sampled in the RDD stratum who reported that they had used Temporary Forwarding and could be matched, via name/address, to the Temporary Forwarding list, were included in the survey. This provided coverage for the unlisted telephone households on the Temporary Forwarding list.

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OCA/USPS-T2-4. Please turn to Library Reference USPS-LR-1/MC2005-1. On page 4 you indicate that your final telephone sample was composed of Snowbird, Temporary Forwarding and a RDD strata, and that you subsequently drew a sample across the three sample sources to obtain an overall sample of 1,600 with sub samples of 800.

- (a) Please discuss how you arrived at the samples sizes of 1,600, 800, and 800.
- (b) Please discuss how your sampling techniques from the three strata resulted in an overall statistically valid sample. Please delineate all assumptions used, statistical techniques, and references in textbooks or the literature justifying your approach.

RESPONSE:

(a) Several factors were used to determine the sample sizes for the proposed research. These factors included: 1) overall project schedule; 2) budgetary constraints; 3) overall likely eligibility rates; and 4) desired level of statistical precision. In the absence of design effects and assuming that 10 percent of those surveyed would be likely to use the service, half-widths of 95 percent confidence intervals were estimated at approximately plus or minus 2 percent with the proposed design. This precision was deemed acceptable.

(b) From a sample selection perspective, the three sample sources can be viewed as a mutually exclusive partition of the RDD (random digit dial) frame of telephone numbers. As a result, the sample follows a simple stratified design (Cochrane, W. (1963), Sampling Techniques, New York: John Wiley and Sons, Chapter 5). Within each RDD stratum (note that high and low density RDD strata were constructed and used in this research – see page 4 of the Library Reference for strata definitions), independent samples of unique telephone numbers were selected with equal probabilities (within strata). For the Snowbird

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and Temporary Forwarding samples, the physical residence was sampled first, and only sampled residences with telephone numbers were included. For these strata, an equal probability sample of residential addresses was selected using a systematic random sample (see SAS Proc SurveySelect, for specific details). For the RDD strata, telephone numbers were selected with equal probabilities from Survey Sampling Inc.'s (SSI's) list-assisted sampling frame. The specific sampling procedures employed by SSI are referred to as 'Random A' with a total active blocks frame; these procedures are documented on www.surveysampling.com. A discussion of the properties of list-assisted RDD frames in sampling households for telephone surveys is contained in Brick, J. M., Waksberg, J., Kulp, D., and Starer, A. (1995) Bias in List-Assisted Telephone Surveys, *Public Opinion Quarterly*, 59(2), 218-235.

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OCA/USPS-T2-5. Please turn to Library Reference USPS-LR-1/MC2005-1. On page 5 you indicate that “Respondents specifically sampled from the Snowbird and Temporary Forwarding strata had to indicate during the screening that they had used their respective service in order to be considered eligible for interview.” Did this requirement introduce any bias to the conclusions? Please explain your response.

RESPONSE:

Individuals who were sampled from the Snowbird and Temporary Forwarding strata who indicated that they did not use their respective service were considered ineligible for the survey, and the estimated size of the eligible population was reduced accordingly. The estimated number of ineligible households that was excluded using these criteria (19 percent from the Temporary Forwarding stratum and 23 percent from the Snowbird stratum) represents a very small proportion of the overall population of households (less than ½ of one percent). To the extent that any bias has been introduced, the survey estimates will be conservative.

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OCA/USPS-T2-6. Please turn to Library Reference USPS-LR-1/MC2005-1. On page 10 you report the number of completed interviews.

- (a) Is the sample of completed interviews statistically accurate on a sample and sub sample basis? Please explain your response.
- (b) You list eligibles and non-eligibles. Please discuss the number of individuals who declined to participate in the study when contacted. Did you control the analysis for declines? If not, please explain why not.
- (c) Please provide all statistical analyses indicating whether the non-eligibles being excluded from the final resulting interviews resulted in any statistical bias or lack of accuracy in the conclusions.
- (d) Please explain why the number of completed interviews is less than the number of eligibles, indicating the various reasons for the elimination of eligibles.
- (e) The number of completed interviews is less than the number of eligibles in the completed screenings. Please provide all statistical analyses indicating whether the exclusion of eligibles from the final sample of completed interviews resulted in any statistical bias or lack of accuracy in the conclusions.

RESPONSE:

(a) I believe that the sample of completed interviews is statistically accurate, if “statistically accurate” means that the sample produces unbiased estimates of population characteristics, and measures of statistical precision can be estimated. Of course, as the size of each of the sub-samples (unweighted) decreases, the precision of the statistical estimates for that domain will typically decrease as well. The Library Reference provides estimates of the standard errors for each of the reported statistics. These appear on pages 18 and 19.

(b) There are four stages at which individuals could have declined to participate in the study: 1) when first contacted for a telephone screening; 2) at some point during the telephone screening before eligibility could be determined; 3) following successful completion of the screening when eligible respondents

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were invited to participate in the follow-up interview; and 4) when recontacted for the follow-up interview. The numbers of declines at each stage for each sampling stratum are shown below.

Type of Decline	Total	Snowbird	Temporary Forwarding	RDD
Upon screening contact	18,985	1,304	2,586	15,095
During screening	4,237	309	738	3,190
After screening (e.g., eligible, non-cooperators)	1,074	128	295	651
Upon recontact for follow-up interview <i>(includes both those with whom actual contact was made as well as those not reached)</i>	834	95	181	558
Total	25,130	1,836	3,800	19,494

The survey results were weighted to take account of the eligibility rates and non-response within each sampling stratum.

(c) The largest percentage of respondents who were identified as ineligible and excluded from participating in the main survey were individuals in the RDD (random digit dial) strata who indicated that they had not moved to another residence for a month or more in the past five years, and were not planning to do so in the near future. The decision to exclude these respondents from the survey, which effectively assumes that their demand for Premium Forwarding would be zero during the test year, produces a conservative demand estimate. While it is possible that a very small portion of these individuals might actually use the service, their inclusion would have significantly increased the survey timetable and budget for very little additional value. It is not possible to analyze

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the size of potential biases associated with excluding these individuals. I anticipate that any bias would be small, since these individuals explicitly stated they had not used forwarding type services and would be highly unlikely to do so in the future within the stipulated timeframes.

(d) As noted above, there are two instances in which eligible respondents may have declined to be interviewed – either at the end of the screening when they were invited to participate in the follow-up interview or at the time they were re-contacted for the follow-up interview itself. Actual reasons (e.g., illness, inability to keep appointment, etc.) are not specifically tracked. Nevertheless, it should be noted that data collection occurred during January and February, 2004 when numerous ice and snow storms and severe flu epidemics were quite prevalent contributing to the rate of “no-shows” for the follow-up interviews or declines once eligibility had been established.

Overall, 3,523 individuals were identified as eligible for the survey. Of these, 2,449 initially agreed to cooperate with the follow-up interview and 1,615 completed the follow-up interview (after voids).

(e) Two types of analyses were performed to ensure that exclusion of identified eligibles in the screening stage from the final sample of completed interviews did not generate any statistical bias or lack of accuracy in the conclusions. First, survey responses from some of the questions in the completed screenings were compared for those respondents who completed the

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follow-up interview with those who completed the screening but did not complete the follow-up interview. Second, demographic information associated with the ZIP Codes of the primary residences of individuals in the Snowbird and Temporary Forwarding strata were also compared, for those screened eligibles that completed the follow-up interview and those that did not.

For example, the mean response to S.5D (the number of times a temporary reshipping service was used) was very similar for Snowbird incompletes and completes (4.89 vs. 5.52, $p=0.19$) and Temporary Forwarding incompletes and completes (5.13 vs. 5.02, $p=0.77$). For RDD respondents, the proportion of eligible respondents who indicated in S.5A that they had spent one or more continuous months at a location other than their primary residence was very similar for Low stratum RDD incompletes and completes (51 percent vs. 50 percent, $p=0.70$) and High stratum RDD incompletes and completes (55 percent vs. 57 percent, $p=0.74$). In general, differences in screening question data between screened eligibles that completed the survey, and screened eligibles that did not complete the survey, were not statistically significant. This also applied to comparisons of ZIP Code demographic data for Snowbird and Temporary Forwarding respondents, for median household income and median home value.

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OCA/USPS-T2-7. Please turn to Library Reference USPS-LR-1/MC2005-1. Please turn to page 17, wherein you indicate that you applied two adjustments based upon instructions from the Postal Service.

- (a) Please confirm that these adjustments bias the conclusion that would have been derived from the survey, absent the adjustments. If you do not confirm, please explain.
- (b) Please provide any rationale for the application of the adjustments.
- (c) Please confirm that the application of “Only those who were aware of either Temporary Forwarding or Bundled Reshipping in the screening were eligible to be counted in our estimates as potential users of Premium Forwarding” is not the type of assumption that one would normally make in a market research study. If you do not confirm, please explain.

RESPONSE:

(a) Absent any adjustments, the survey does produce unbiased estimates of characteristics of the distribution (e.g. mean, median, etc.) of respondents’ stated likelihood to purchase Premium Forwarding. Without adjustments, these estimated characteristics do not, by themselves, provide an estimate of demand for Premium Forwarding. The purpose of the adjustments is to transform the stated measures of likelihood to purchase into a more accurate estimate of demand for the new service.

(b) Adjustments were applied to take into account possible factors that would produce overstatements regarding customers’ future Premium Forwarding behaviors had the “raw” survey results been used. As noted earlier, surveys produce complete awareness and knowledge about the product. Thus, to produce a more “real-world” estimate that takes into account the likelihood that not all possible users will be aware of the product, a so-called “awareness” adjustment was applied. In addition, a further adjustment was applied to take

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into account potential users' probability of using Premium Forwarding. To produce a conservative estimate, only those individuals who indicated they were 70 percent or more likely to use the product in the next 12 months were included. This percentage takes into account both the need for and possible usage of the product. This adjustment is in keeping with the industry's "top box" approach for low incidence occurrences which is supported in the literature by Kalwani and Silk.¹

(c) Not confirmed. As noted above, an "awareness" adjustment was deemed necessary to produce a real-world estimate of the demand for Premium Forwarding. Typically, current awareness of existing products is used when new features are being added. In this instance, because Premium Forwarding is a new product, straightforward awareness could not be used. It was decided to include only those who were aware of existing forwarding or hold-type services because, as I understand it, the Postal Service intends to launch this product at retail without directed communications. As such, intensive efforts to educate customers who are currently unaware of the Postal Service's temporary forwarding services would not be undertaken. Rather, those who are currently aware of temporary forwarding services would be more likely to pay attention to information about these product offerings that are provided in the retail setting (e.g., written or window communications), and, therefore, be among those from

¹ Kalwani, M. and A. J. Silk (1982) On the Reliability and Predictive Validity of Purchase Intention Measures, Marketing Science 1, 243-386.

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whom potential users would be obtained. For this reason, the application of the adjustment noted above was considered appropriate for this research, and, therefore, was undertaken.