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1. BACKGROUND

In the summer of 1979 the two parties in the lawsuit, Byrnes v. IDS Realty Trust, 4-75-Civ. 223,224, were preparing to go to trial. This lawsuit is a class action in which the class is defined as "all persons who purchased shares in the IDS Realty Trust during the period August 16, 1974 through April 15, 1975, and suffered damage." Whether the allegations of wrongdoing were correct will never be determined--the case has been settled before trial, largely due to the information provided by the survey discussed in this paper--but it is an empirical fact that during the period in suit many investors suffered dollar losses because of the dramatic decline in the price of their shares.

As is usual in these cases, the Federal Court had issued an order prohibiting either side from communicating with absent class members. Nevertheless, the defendants requested permission to send out a form to all class members. The form would provide information on the amount of claimed losses. Defendants also requested that failure to return this pre-trial claim form be considered a basis for exclusion from further claims. Not unexpectedly, the Court denied these requests, considering them to be in conflict with the noncommunication order, but in its response the Court suggested that both parties retain an independent research group in order to determine the total losses incurred by class members. Thus, the Court would grant permission to the outside research team to obtain from class members information that would benefit both parties, but that neither plaintiffs nor defendants were allowed to obtain unilaterally.

In August 1979 the Court approved a proposal from the research group to (1) identify and locate a high percentage of the beneficial holders and purchasers of IDS Realty Trust stock during the period in suit, and (2) select a probability sample from that population to determine the extent of losses suffered by the class members and their interest in pursuing their claims in the lawsuit. The design and implementation of the survey are discussed in the following sections of this paper.

Although information obtained through survey sampling has been considered to be admissible evidence in many legal actions (and inadmissible in others)--see, e.g., Zeisel, H., "The uniqueness of survey evidence," 45 Cornell Law Quarterly, 322--it is believed that the use of a pretrial survey in order to aid possible settlement in a class action lawsuit is rare, if not unique. American Law Reports, Annotated (ALR2d) was carefully reviewed and the only case that comes close to the present application is United States v E.I. Du Pont De Nemours & Co. (1959, DC Ill) 177 F Supp 1. In that situation

a previous Supreme Court decision had necessitated a decree that the holdings of the Du Pont Company in the stock of the General Motors Company be disposed of. The defendants opposed the particular form of the decree suggested by the government, and presented evidence from a probability sample of shareholders designed to demonstrate the adverse tax consequences to the holders of the stock resulting from the proposed method of disposal. The Court overruled a government motion to exclude expert testimony based on the survey, citing "the evident care and objectivity with which the survey was conducted..." and the fact that "various agencies of the Government itself have used surveys of this type, and indeed have employed this same research organization."

Most other examples of survey applications in legal actions tend to involve either consumer confusion in trademark cases or surveys of public opinion related to requests for change of venue.

2. FRAME CONSTRUCTION

From a review of the "Fitch Reports", i.e., Daily Market Report--Individual Stock Sales on the New York Stock Exchange, published by F.E. Fitch, Inc. for the dates August 16, 1974 through April 15, 1975, it was possible to establish that a total of 1,764,100 shares were traded on the NYSE during that period. Since no other market has been discovered, the figure of 1,764,100 is used as the total number of shares purchased during the period in suit. The goal in frame construction was to obtain a list of shareholder names that would cover as large a proportion of the total shares as possible. The problem was complicated by the fact that a majority of shares were purchased and held in the name of nominees (usually brokerage houses) who were holding for the benefit of a third-party purchaser (the potential class member). Furthermore, many of the nominee holders used the Depository Trust Company (Cede) and the certificates were listed in the name of Cede rather than the nominee.

The Court had already issued an order entitled "Order to All Persons Holding Record Ownership of Shares of IDS Realty Trust on Behalf of Others". The order directed nominee holders to prepare lists of individuals for whom they held or purchased stock during the period in suit. By checking stock transfer records, owner lists, mailings of proxy materials of Georgeson Co., and records of Cede, it was possible to identify (in 1977) 512 potential nominee holders who should receive the order. Only 121 responded, supplying approximately 1000 shareholder identities, and no further attempt was made at that time to augment the list. The responses to the Court Order accounted for approximately 900,000 shares out of the target 1,764,100.

In preparation for the survey, the nonrespondents were brought into sharper focus by identifying from stock transfer records each apparent nominee holder who had more than one thousand shares transferred to its name during the period. Additional nominees holding IDS Realty Trust shares in their accounts were identified from monthly reports published by Cede. The nominees on the list from these two sources who had not already responded to the 1977 Order of the Court were requested by a letter from the Court that they supply the necessary information on individual shareholders immediately. These letters were followed up by mailgrams and telephone calls. For those who were particularly slow or recalcitrant, the threat of an "Order to Show Cause" was very effective in speeding up response. This effort brought the total of responding nominee holders up to 167. They supplied names of individual purchasers covering 1,562,994 shares.

The final step was to check the stock transfer records for names of individual purchasers, and the additional number of shares from that list resulted in a total of 1,738,194 out of the target 1,764,100. The number of beneficial shareholders for whom numbers of shares purchased were known was 3,189. In addition, the nominee holders supplied 188 names for which the number of shares was not known. These were added to the list with known share numbers and a final frame of 3,377 individuals was obtained.

Before sample selection could be applied, however, it was necessary to exclude some names from the list. Ninety-six persons on the list had opted out, i.e., requested exclusion from the lawsuit. These purchasers represented 86,454 shares, and they were removed from the frame. Named defendants, including a trust of one of the defendants, were also removed, accounting for another 23,759 shares. Named plaintiffs were also excluded. Some had already opted out, but others had not formally requested exclusion from the class action lawsuit. Discussion with the lawyers for both parties resulted in the agreement that an additional 70,000 shares would be excluded from the frame. In summary, the total shares represented by the excluded opt-outs, named defendants, and named plaintiffs was 180,213.

Finally, the largest single purchaser of stock during the period in suit was Speer, Leeds & Kellogg, which purchased 291,400 shares for its personal account. Since S, L & K is a specialist in the stock and arguably different from the other purchasers, it was agreed by both sides that its transactions would be treated separately and the estimation of its losses analyzed apart from the rest of the class members. Thus the frame from which the probability sample to be surveyed would be selected consisted of 3,257 purchasers who were reported to have purchased 1,292,487 shares of IDS Realty Trust stock.

3. SAMPLING DESIGN AND METHODOLOGY

Out of the 3,257 names in the frame, 103 had purchased 2000 or more shares, accounting for 463,900 shares or 36 percent of the total. Con-

sequently, it was decided that purchasers of 2000 shares or more would constitute a separate stratum to be selected with certainty. The remaining shareholders who purchased fewer than 2000 shares, or whose purchase amounts were unknown, were subjected to systematic sampling at a rate of 1 in 8. To be precise, the design called for ten random starts and, consequently, ten systematic replicated subsamples. The replicated or interpenetrating design was chosen in order to facilitate the estimation of standard errors of estimates. Before selection, the shareholders in the second stratum were sorted according to the number of shares purchased in order to take advantage of any reduction in variance of estimators that might result from that implicit stratification by size.

A thoroughly pretested questionnaire with a cover letter signed by Judge Miles W. Lord of the United States District Court was sent to each selected purchaser. In explaining the purpose of the survey and urging cooperation, the letter stated that the individual would be telephoned within a week unless the respondent were to avoid the necessity of the call by mailing in the questionnaire containing information on purchases, sales, profits, losses, and intentions to file a claim. Out of 504 persons receiving the questionnaire, 93 returned the questionnaire before further contact.

Telephone numbers were obtained wherever possible, and telephone interviewing began on September 17, 1979. Skilled legal personnel were employed as telephone interviewers, and if any problems arose during the interview, the Special Master of the Court was usually on hand to resolve them. Mailgrams asking recipients to call collect were sent to persons for whom telephone numbers could not be obtained, and repeated telephone calls and mailgrams were used in follow-up procedures for nonrespondents. There were 46 cases for which no telephone could be found and for which the Post Office returned the letters as undeliverable.

The research team was under pressure to produce a report of estimated losses by the middle of October 1979 so that settlement talks could get underway. Hence it was necessary to shut off interviewing for analytical purposes on October 9, 1979. On that date there were 68 completed responses from the upper stratum of large shareholders--a completion rate of 66 percent--and 340 responses from the lower stratum, yielding a completion rate of 85 percent. In the upper stratum 8 interviews were terminated by the respondent; there were 6 terminations in the lower stratum. Four persons were determined to be deceased (all in the lower stratum) but they were not excluded in the calculation of response rates. An average of 2.5 telephone calls were made for each completed case.

All questionnaires were edited to determine completeness, to determine whether the information on opening and closing balances matched the purchase and sales information, and to determine whether stated prices were within the known range of prices for the period in suit. A number of callbacks were made to clear up discrepancies before final editing in preparation for

TABLE 1

ESTIMATES AND 95 PERCENT CONFIDENCE RANGES (relative to estimate) FOR
SELECTED ITEMS OF INTEREST IN THE STUDY

	ESTIMATES USING	
	Combined Ratio	Separate Ratio
Number of shares purchased, less purchases to cover short sales	1,259,575 (+ 0.94) ^a	1,261,366 (+ 0.94)* ^b
Number of shares purchased and sold at a profit (shorts excl.)	128,470 (+22.39)	128,677 (+22.37)*
Purchase \$ of shares sold at a profit (shorts excl.)	\$1,564,308 (+22.51)	\$1,567,929 (+22.49)*
Number of purchasers who sold at a profit	331 (+27.19)	353 (+26.11)*
Number of shares purchased by class members	1,131,104 (+ 2.36)	1,132,689 (+ 2.34)*
Number of shares purchased by class members and held	926,421 (+ 3.16)	942,517 (+ 3.34)*
\$ of shares purchased by class members	\$15,173,640 (+ 2.73)*	\$15,166,880 (+ 2.74)
\$ of shares purchased by class members and held	\$12,219,069 (+ 3.92)	\$12,419,291 (+ 3.98)*
Number of shares purchased by class members and sold at loss	204,684 (+15.98)*	190,172 (+18.88)
\$ of shares purchased and sold at a loss	\$2,954,570 (+16.62)*	\$2,747,589 (+19.58)
\$ loss on shares sold at a loss by class members	\$461,415 (+16.58)*	\$428,979 (+20.19)
Number of class members who sold at loss	202 (+44.56)	214 (+40.17)*
Mkt. value on 18 April 75 of shares held	\$5,037,413 (+ 3.16)	\$5,183,845 (+ 3.34)*
\$ loss on shares purchased and held	\$7,181,657 (+ 4.56)	\$7,235,446 (+ 4.56)*
Total \$ loss on shares sold or held	\$7,643,072 (+ 3.76)	\$7,664,425 (+ 3.68)*

a

Relative confidence range computed by multiplying estimated standard error by 2.262
($t_{.975}$ for d.f. = 9) and dividing by the estimate of the item.

b

Asterisk indicates larger of two estimates (combined vs. separate ratio).

keypunching.

4. ESTIMATION OF LOSSES

In estimating losses, the shares covered by the frame were divided into four categories:

1. Shares purchased during the period and held at the end of the period.
2. Shares purchased during the period and sold during the period at a loss.
3. Shares purchased during the period and sold during the period at a profit.
4. Shares purchased during the period to cover short sales.

Since the class is defined as those who purchased shares during the period and suffered damage, the shares in the third category are excluded from calculations of loss. The first and the fourth categories describe shares that incurred loss, but for which the exact method of computing loss is debatable. Only in the second category can the actual loss at time of sale be used.

For shares in the first category--those purchased during the period and held until the end of the period--a "theoretical" loss is calculated by subtracting the market value of the shares on April 18, 1975, the date that trading was re-opened, from the total dollar value expended in purchasing the shares. To compute the market value, the number of shares held is multiplied by \$5.4375, the average of the high and low price on April 18. Short sales are not included in this calculation.

Of course the dollar amounts used in the loss calculations must be estimated from the sample data. Because of the expected association between dollar values and the number of shares, the method of ratio estimation was used throughout the analysis, with number of shares as the concomitant variable and the totals obtained from the Fitch reports as multipliers. Estimates of various items of interest in the lawsuit are displayed in Table 1. The figures in parentheses are the estimated 0.95 confidence interval widths, expressed as percentages of the estimated item. It can be seen that some of the confidence ranges are quite large--a result of the rarity of occurrence in the population of events such as sales at profit or loss. The most important estimates, however, have standard errors that are acceptably small. For example, the final figure in the table--total dollar loss on shares sold during the period or held until the end--is the sum of the loss on shares sold and the loss on shares held. Although the confidence range for the combined ratio estimate of loss on shares sold is ± 16.58 percent, the range for the final estimate of total loss is only ± 3.76 percent, less than that for shares held alone. The reason for this is doubtless the negative covariance between loss on shares sold and loss on shares held for a given shareholder--i.e., they tended to either hold until the end or else dispose of their holdings.

Both combined and separate ratio estimates are reported in Table 1. In most cases the latter method yields an estimate that is higher than the combined estimate, but the discrepancy

is slight for the large dollar amounts of importance. The possible effects of nonresponse in the certainty stratum are still under investigation, but preliminary analysis suggests that the root mean square errors are not more than 10 percent greater than the standard errors. Thus, to be conservative, one can inflate the 0.95 confidence ranges reported in Table 1 by 10 percent. The margins of error are still acceptably small for the purposes of this study.

One of the nice things about the replicated design, à la Deming, is that one can show the estimates for the various subsamples to the person who is skeptical about the precision of sampling estimators and he will usually be impressed by the degree of agreement among them. (They may, of course, be uniformly biased.) In the present survey it was also possible to compare the time profile of share purchases in the sample with the known behavior of price and volume obtained for the Fitch Reports during the period in suit. Although not shown in this paper, the distribution of the number of shares traded over time in the sample is in close agreement with the actual relative volumes for IDS Realty Trust stock, thus alleviating concerns about "overrepresentation" of certain subperiods, and "underrepresentation" of others.

In addition to estimation of losses in order to provide a starting point for settlement talks, another aim of the survey was to estimate the percentage of the class members who would file a claim in the event of a refund to cover at least a portion of their losses. The sample estimate of the proportion who would not file if there were a recovery is 11.9 percent, with a standard error of less than 3 percentage points. Table 2 shows the reasons for not filing reported by those who said that they would not file.

In response to the question about filing a claim, an estimated 16.2 percent said that they do not know whether they would file. The respondents in this category were asked to state factors that would influence their decision. (Evidence of this type could be very useful in the design of a claim form and associated publicity and advertising in the event of a recovery.)

Table 3 shows that the single most important factor is the amount of recovery. The respondents who stated that reason were subsequently asked to give the minimum amount that would make it worth their while to file a claim, but only thirteen would state a figure--thus no estimates were made.

Finally, a question that is of great concern in all class actions is that of the effectiveness of the notices that are sent by the Court. It is suspected by many that these notices are ignored, or if read, not well understood by most recipients because of the complexity of the language and the legal issues involved. For example, a survey of the claimants in the Antibiotic Antitrust Action (almost one million) revealed that even after examining the document during the interview, 56.2 percent either denied have received it or did not remember. Other questions showed confusion and lack of understanding of the contents. In the present

TABLE 2

REASONS FOR NOT FILING A CLAIM

REASON	PCT.
Employee of defendant	5.5
Made a profit or broke even	46.5
Amount of time required	5.5
Wanted to leave company alone	3.2
Loss is a normal business risk	8.3
Not interested	4.1
Amount of recovery too small	11.1
Attorney's costs	5.5
Need more information	11.1
Total	100.8 ^a

a

A few gave more than one reason.

TABLE 3

FACTORS THAT WOULD INFLUENCE DECISION TO FILE

REASON	PCT.
Amount of time required	15.3
Degree of harassment of company	6.5
Not interested	6.2
Amount of recovery	78.6
Attorney's costs	39.3
Need more information	2.2
Total	159.0 ^a

a

Some respondents gave more than one reason.

survey, the respondents were asked if they recalled the notice of pendency of the action sent to them in 1976. It is estimated that 62 percent of the population would report having received the notice, 7 percent would say that they had not received it, and 31 percent would be unable to recall one way or the other.

5. CONCLUSION

This paper has briefly described the design and execution of a survey of the members of the plaintiff class in a class action lawsuit. The survey employed probability sampling with call-backs, and in view of the time pressures for quick reporting, fairly high response rates were achieved. It is believed that because the survey was agreed to and funded by both parties during the pretrial period, it is a rather unusual case. Although there was considerable apprehension on both sides before the study was done, the results were satisfying to both. It is fair to state that the supplying of hard information where only speculative guesses existed beforehand was a strong contributing factor in the final settlement of the case before trial, thus saving both parties additional costs of litigation. The survey also demonstrated the feasibility of gaining necessary information about a potential class without the tremendous expense of a total enumeration. Indeed, the sample sizes would have served just as well if the population had consisted of millions of persons (although frame problems would have been greater.)

The success of this survey suggests that there are other opportunities for the effective use of survey sampling in litigation, especially during the pretrial period. It is hoped that this study will serve as a prototype for further applications requiring rapid, accurate, and economical methods.