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survey is able to extract information that is not obtainable from intentions surveys.

The mean value of the distribution obtained from a survey of purchase probabilities can be viewed as a forecast of the purchase rate. The evidence suggests that it is likely to be a biased forecast (probably an underestimate), but the evidence also suggests that mean probability will be a better predictor than either the proportion of households reporting intentions to buy or any weighted average derived from the various intender categories.

2. PREDICTIONS BASED ON CONSUMER SURVEYS

There is by now a fair accumulation of data with which to assay the usefulness of anticipations surveys in predicting purchases of durables. These data have been intensively examined in a number of studies.[1] Despite some differences based on time periods, research methods, and the particular variables used to measure anticipations, it has generally been found that measures of both buying intentions and attitudes reduce the unexplained time-series variance in consumer purchases of durables after account is taken of the influence of such factors as income and income change. But neither intentions nor attitudes reduce unexplained variance to the extent that consistently reliable forecasts are obtainable either from survey variables alone or from survey variables in conjunction with observable financial variables.[2]

Numerous studies have investigated the explanatory power of anticipatory variables in cross sections, that is, in predicting differences among households during a particular period of time. Here any type of buying intention

[1] Extensive references to this literature, which deals both with time-series and cross-section analysis, are provided in my *Anticipations and Purchases: An Analysis of Consumer Behavior*, Princeton University Press for National Bureau of Economic Research, 1964. Among the major contributors and important works in the field are George Katona, *The Powerful Consumer*, New York, 1960; Eva Mueller, "Ten Years of Consumer Attitude Surveys: The Forecasting Record," *Journal of the American Statistical Association*, December 1963; Arthur Okun, "The Value of Anticipations Data in Forecasting National Product," in *The Quality and Economic Significance of Anticipations Data*, Princeton for NBER, 1960; and James Tobin, "On the Predictive Value of Consumer Intentions and Attitudes," *Review of Economics and Statistics*, February 1959. See also the *Reports of Federal Reserve Consultant Committees on Economic Statistics* in Hearings before the Subcommittee on Economic Statistics of the Joint Committee on the Economic Report, Congress of the U. S., 84th Congress, First Session, and *Consumer Survey Statistics*, Report of Consultant Committee on Consumer Survey Statistics, July 1955, organized by the Board of Governors of the Federal Reserve System. My own work in this field, besides *Anticipations and Purchases*, includes "Prediction and Consumer Buying Intentions," *Papers and Proceedings of the American Economic Association*, May 1960, and *Consumer Expectations, Plans, and Purchases*, Occasional Paper 70, New York, National Bureau of Economic Research, 1960.

Recent additions to the literature include F. Gerard Adams, "Consumer Attitudes, Buying Plans, and Purchases of Durable Goods," *Review of Economics and Statistics*, November 1964; Richard F. Kosobud and James N. Morgan (eds.), *Consumer Behavior of Individual Families Over Two and Three Years*, Survey Research Center, Ann Arbor, n.d.; and Irwin Friend and F. Gerard Adams, "The Predictive Ability of Consumer Attitudes, Stock Prices, and Non-attitudinal Variables," *Journal of the American Statistical Assn.*, December 1964.

[2] See the studies by Mueller, Okun, and *Consultant Committees Reports*, cited earlier. Mueller's results indicate that, for the period 1952–61, attitudes explain more of the time-series variance in durable goods purchases than either income or buying intentions. Intentions provide quite a weak explanation of purchases and provide no incremental explanation when attitudes are held constant. Okun's results, which relate to an earlier period (1948–55), indicate that intentions are significantly related to purchases of durables, while attitudes are much less useful and are hardly related to purchases at all. The *Consultant Committees Reports* came to basically the same conclusions as Okun, again for an earlier period than that covered by Mueller.

Some recent calculations that I have made suggest that the strong relation between the attitude index and purchases found by Mueller for 1952–61 deteriorates considerably when the data are extended to 1965. Other calculations, some of which are reported in *Anticipations*, indicate that the Census Bureau's quarterly buying intentions data provide quite good forecasts of purchase rates over the period 1959–65. On the whole, my judgment is that no one has yet shown that either consumer attitudes or buying intentions can do a consistently good job of predicting durable goods purchases.

variable has always shown a strong relation to subsequent household purchases, while the influence of attitude variables has been much less pronounced and, in some investigations, virtually nil.

Analysis of attitude surveys has been extensively pursued elsewhere and will not be discussed here. For intentions surveys, one of the major problems—which may well be the chief reason for their unimpressive forecasting record—becomes readily apparent from a careful look at the structure of the data. All intentions surveys now in use adopt some variant of a methodology in which respondents are asked whether they "plan" or "intend" or "expect" to buy a specified list of durables "during the next (six, twelve, etc.) months." Responses are usually open-ended and are typically coded by the interviewer into a classification such as "definitely," "probably," "don't know," "no," and so forth. The usefulness of the survey is then gauged by relating, for time-series analysis, variations in the fraction of one or more groups of intenders (households reporting that they definitely will, probably will, or may buy) to variations in the fraction reporting purchases. For cross-section analysis, the purchase rates of intenders are compared with that of nonintenders, other differences among households being held constant.

For analysis of time-series data, it is convenient to express the purchase rate for the population as a whole (defined as x) as a weighted average of the purchase rates of intenders and nonintenders (r and s, respectively); the weights consist of the proportions of both groups in the population (p and $1-p$, respectively). Thus, $x \equiv pr+(1-p)s$. The values of p, r, and s evidently depend on the particular questions used to distinguish intenders from nonintenders, and the values of r and s (as well as x) also depend on the length of the time span over which purchases are measured.[3]

The expression can be thought of as a way of distributing total purchases into two components—purchases made by intenders, pr, and those made by nonintenders $(1-p)s$. In general, intenders' purchases tend to be both small in absolute size relative to those of nonintenders, and to have much less variance over time. Both the bulk of actual purchases, therefore, and most of the time-series variance in purchase rates are accounted for by households classed as nonintenders.[4]

The fact that intenders account for only a relatively small fraction of total purchases neither necessarily precludes intentions surveys from providing good forecasts of the population purchase rate nor necessarily demonstrates that these surveys provide a poor ex-ante measure of purchases. Whether an intentions survey forecasts well or poorly turns out to depend largely on the degree of correlation between p, the proportion of intenders in the sample, and s, the purchase rate of nonintenders. And whether or not the high proportion of total purchases made by nonintenders is a reflection of the fact that intentions surveys provide an inadequate measure of purchase prospects depends on the im-

[3] The analysis here is essentially a summary of the argument set out in *Anticipations and Purchases*.

[4] Evidently, the more classes included as intenders (definite vs. definite plus probable vs. definite plus probable plus maybe, etc.), the larger the proportion of total purchases made by intenders. It is also demonstrable empirically that the longer the forecast period, the smaller tends to be the proportion of total purchases accounted for by any specified intender classification. See *Anticipations and Purchases*, Table 2.

portance of unforeseen (and, to the consumer, unforeseeable) events that cause actual purchase behavior to depart from prospective behavior.

On the record, the performance of intentions surveys has not been impressive as measured by their contribution to explained variance in purchase rates. But whether or not this performance can be improved depends on other considerations. If purchase prospects are measured accurately but there is a substantial deviation between ex-ante prospects and ex-post behavior, improving the ex-ante measure will accomplish little. But if intentions surveys provide a poor measure of ex-ante prospects and deviations are not of great importance, predictive performance can be much improved by developing a better ex-ante measure.

3. WHAT DOES AN INTENTIONS SURVEY MEASURE?

Any consumer survey simply records the answers of respondents to a set of questions. Sometimes the questions deal with facts, i.e., "Do you have any instalment debt?" and it can be presumed that the answers are precisely responsive to the question provided the respondent knows what "instalment" means and has no reason to hide the true situation. Responses to forward-looking questions such as "Do you expect to have more or less income next year than this?" are not so easily analyzed. If the respondent thinks there are three chances in ten that income will go up slightly and one chance in ten that it will go down considerably, what is he supposed to answer? It might be conjectured that the possible changes would be weighted in accord with their associated probabilities in order to arrive at a single-valued answer, and this conjecture would doubtless be correct in some cases. An equally plausible conjecture is that a "don't know" response would be forthcoming. Or the respondent might just be bored with the whole procedure and say either that he doesn't know or he doesn't expect any change. It can be assumed that each of these types of responses are to be found in the population, along with others for whom the question has yet another interpretation.

Let us now examine the typical survey question about intentions to buy. The respondent is asked whether he "expects" or "plans" to buy a car during the next six or twelve months, and the interviewer codes the answer into categories such as definitely will buy, probably will buy, don't know, no, etc. What are we to make of these responses?

In the first place it seems reaonable to suppose that answers to questions about car-buying intentions take at least some account of the factors that bear on the respondent's purchase decision, i.e., present and prospective financial situation, age and condition of car, and so on. Second, it is likely to be true that the answers of at least some respondents reflect what they would like to do rather than what they are likely to do. Some will report that they "definitely plan to buy within six months," meaning that they have every intention of buying provided everything works out—but it is highly unlikely that everything will work out within six months. The fact that this kind of interpretation may seem whimsical to some readers is no guarantee that it does not exist.

Finally, a question about plans or intentions is apt to convey to many—