# AN ANALYSIS OF EX-ANTE SAVINGS DATA: SOME PRELIMINARY RESULTS

F. Thomas Juster and Paul Wachtel
National Bureau of Economic Research*

## INTRODUCTION

For the past several years the National Bureau of Economic Research, in conjunction with the U.S. Bureau of the Census, has been conducting an experimental survey designed to test a number of hypotheses about the possible usefulness of ex-ante data on consumer behavior. The experimental survey, known as the Consumer Anticipations Survey (CAS), began in May 1968 with a sample of roughly 4,400 households in three suburban areas of the country (San Jose, Minneapolis, and Boston). The sample selection was non-random and purposive, both features designed to reduce survey costs; neither constituting a serious interpretative or methodological shortcoming. Sampling was restricted to moderately high to high income Census tracts, in order to get a high frequency of "positive" readings on activities like saving, spending on durables, vacation outlays, etc. The survey design called for five waves of interviews, each six months apart. The fifth interview was not conducted precisely on schedule because of budgetary problems, but was carried out some four to five months later than originally planned. The final interview has not yet been completely processed, hence results in this paper consist of data from the first four waves.

The survey yielded information on a wide range of questions concerning household decision-making. One central element in the survey design was the testing of specific question forms about prospective expenditures on a wide range of discretionary outlays including automobiles, home appliances, furniture, home improvements, vacations, recreation, and housing. Another was a test of the usefulness of ex-ante data on savings. A second set of hypotheses concerned the effects of family income on spending and saving decisions, with special attention to the composition of family income between earnings of the household head, earnings of supplementary members of the labor force, non-wage income from a variety of sources, capital gains, and so forth. Thus we obtained data on annual earnings for a number of past years, hours worked, multiple job holdings, labor force participation on the part of the wife and other adult family members beside the principal earner, variations in hours for supplementary earners, and so on. The idea was to examine the effects on expenditure and savings patterns of both long run and more transitory aspects of family income.

A third component of the survey design focussed on a wide range of questions of peripheral interest to the analysis of cyclical variability in spending and saving, but of substantial and growing interest for analysis of household decision-making generally. Thus we collected extensive data on educational level of all household members, on schooling status and schooling plans for children, on family size and expected family size, and on a number of basic demographic characteristics of the household. In conjunction with the cyclically oriented analysis, we obtained data on a number of expectational and attitudinal variables similar to those used by the Survey Research Center to construct the Index of Consumer Sentiment. Other expectational variables include judgments about the probability of changes in family income and the likelihood of changes in earnings, multiple job holding, labor force participation, and so on.

Other papers at this session will concentrate on family decision-making models of a more general sort; both Michael and Landsberger rely extensively on data from the CAS for their empirical analysis. The usefulness of the CAS for examination of these questions represents an unexpected but sizeable bonus from the survey.

One interesting by-product of this paper, and perhaps it may represent more of an embarrassment than anything else, is the possibility of comparing the analysis of ex-ante durables expenditures in this paper and in the Stoterau and McNeil papers. The last two will focus entirely on the ex-ante discretionary expenditure variables for durables and vacations, and should in principal show identical results for identical empirical tests. The difference is that McNeil and Stoterau have based their results on a tape prepared at the Census Bureau, while the results in this paper are based on a different tape prepared at the NBER. We have not, unfortunately, had much chance to compare allegedly identical results, and thus all of us may learn more about the sensitivity of results to differences in editing and tape-making procedures than about the substantive questions about consumer anticipations that the CAS was designed to answer.

This paper will concentrate on the analysis of the ex-ante savings data and will attempt to assess its possible usefulness for short-run forecasting of consumer behavior. For a variety of ex-ante measures relating to discretionary expenditures, results are presented for comparison with already available data from operating Census Bureau and other surveys.

One fact that should be kept in mind in interpreting the results, and the survey design that produced them, is that the focus of the experimental CAS survey was on providing possible inputs into an operating survey. That is, the ex-ante measures from the CAS were specifically designed for their possible use as ex-ante variables on an operating Census Bureau survey such as the CBE. Thus we have constructed and tested variables which could be used within the framework of the Census Bureau's household

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*This paper has neither been reviewed nor approved by the Board of Directors of the National Bureau of Economic Research, and represents only the personal judgments of the authors.

surveys which are subject to constraints on interview time and on total resources. In short, the experimental survey, so far as the ex-ante data are concerned, is not designed to answer the question: Is it possible to explain spending and saving behavior from ex-ante data reported by households? Rather, the question is: Is it possible to structure relatively simple and easily handled questions that can improve our understanding of the likely future course of household spending and saving? These are obviously not the same questions.

The available data tape contained information, as noted above, from the first four waves of the survey. A total of approximately 3,500 completed interviews are available for the full four waves, and these constitute the basic sample for the results presented here. Responses have been deleted for various reasons: families reporting no family income at all have been eliminated, as have those where the household head is past the age of 65 and those which are not husband and wife families. Other responses have been deleted because of errors or probable errors on the part of respondents, and one group of responses have been eliminated from the analysis based on a measure of "response quality" for the asset and asset change questions. Total deletions amount to about 23 per cent of the available sample. The error deletions were for households reporting ex post or ex-ante changes in savings of less than $-12,500 or more than $+37,500; both responses seemed more likely to represent errors than real changes. The quality code deletions represent families that, on the basis of responses to the asset questions, should have provided responses to other asset questions and failed to do so. Any household reporting less than 75 per cent of the number of responses that should have been reported has been eliminated from the sample. Some comparisons are made between the sample without quality deletions and the truncated quality control sample.

## HYPOTHESES

Experience with the Consumer Buying Expectations survey now conducted by Census have been quite unsatisfactory as regards the usefulness of data on expected purchases of household durables. The CBE contains a single global expected purchase estimate for a category of products described as household durables and appliances, furniture, home improvements, and so forth. No specific quantity information is obtained in the survey, but only a single dollar value for total expected purchases. The CAS survey contains that version on the B half of the sample, but on the A half, respondents are asked about the likelihood of purchasing any one of a specified collection of household durables and appliances, about the likelihood of spending money on furniture, on home improvements, on vacations, and on recreation. The question posed by this design was whether or not disaggregation of the discretionary outlay variable results in better forecasts of total discretionary outlays. If there are offsetting errors in the forecasts for individual components of discretionary outlay, the aggregate forecast of outlay would be better than the sum of the component forecasts.

Relationships are estimated for both single-time cross sections, and from a first difference version of the cross section. The latter uses changes between second and fourth wave data to measure actual change, and between the first and third waves to measure the corresponding expected change. In most cross-section regressions, first wave ex-ante measures are associated with behavior variables measured from the second wave and thus corresponding to a six-month period. In first difference form, the dependent variable is the difference between the first and third six-month periods. In principal, it would be desirable to relate ex-ante first wave data to actual behavior obtained from the second and third waves, thus covering a twelve-month period, but the counterpart first difference comparisons would not be possible at this writing because we do not have actual behavior data from the fifth wave.

Regression estimates of the association between alternative ex-ante variables and the corresponding ex-post value use a standard set of supplemental variables. These include three family status and two education-level dummy variables, family income, expected and actual change in family income, an attitude variable comprising two of the relatively volatile components in the SRC Index of Consumer Sentiment (expectations about future business conditions and opinions about whether the present is a good or bad time to buy durables), and expected price change. To this standard collection of variables is added the test variable on expected purchases; the corresponding actual expenditure variable is regressed on the full set of independent variables.

The standard set of variables for the first difference equations are similar to those in the single-time cross sections. Exactly the same set of family status, education and income variables is used. The latter are unchanged because complete information on actual and expected family income were not collected in each wave. The attitude variables is the first difference of the corresponding variable, as is the price change variable. The level of expected price change is also included.

The first difference equations do not correspond exactly to the specification obtained when one cross-sectional equation is subtracted from the previous one. The expected and actual income change and actual income variables from the second single-time cross section are omitted. The remaining income variables appear with the opposite signs from those in the single-time cross section because of the differencing. Thus estimates of the first difference equations are subject to omitted variables bias if omitted and included variables are correlated, although the predictions are unbiased. If actual change reported on the fourth wave minus expected change reported on the third wave were uncorrelated with the actual and expected change variables included, or with the first difference of expected purchases, the

estimated coefficients are unbiased estimates of the true coefficients.

For evaluation of the potential forecasting value of the ex-ante variables, it can be argued that the most relevant comparisons involve the first difference specification, where changes in the ex-ante variables are used to explain changes in the counterpart ex-post variables. In the past, analysis of micro relationships have often been limited to examination of single-time cross-sectional differences. A serious problem with such comparisons is that the observed differences among households in a cross section largely reflect differences in the permanent (structural) characteristics of the families involved, less so differences in transitory phenomena that are of major interest in the analysis of cyclical behavior. Thus we can be sure that expected purchases will have very strong correlations with actual purchases in single-time cross sections, as both are largely determined by the same structural factors. For example, families whose automobile has just been wrecked in an accident will report high probabilities of car purchases, and are quite likely to report having purchased a car, while families who bought cars the day before the survey are quite likely to report zero or low probabilities of future purchase and equally likely not to purchase. Hence the powerful cross-section association between ex-ante and ex-post behavior does not necessarily tell us very much about the potential usefulness of the data in time-series predictions. By contrast, the empirical relationships observed in the first difference comparisons come much closer to resembling the time-series world, and that is the world in which these survey data are designed to be used.

The set of supplementary variables are not without interest themselves. Some are included mainly to standardize for obvious and easily measurable influences in order to determine the net contribution of the ex-ante data--family income level, family structure, and the educational level variables fall in this category. Others are of potential forecasting use in an ex-ante model, since they represent information relevant to the interpretation of the ex-ante spending and saving measures. Variables in this category are expected income change, actual income change, the attitude variable, and expected price change. The analysis of the ex-ante data should be largely unaffected by the choice of other variables used; except for income the simple correlations with the ex-post and ex-ante data of the other variables is always small.

In the model, household investment is explained by the combination of expected investment, expected income change, and actual income change. Holding constant expected investment and actual income change during the purchase period, expected income change should be negatively associated with actual investment because it represents a favorable or unfavorable income surprise variable. That is, given expected investment and actual income change, the higher is expected income change the less favorably surprised the household or the more disappointed--and the lower investments should be. And conversely for families reporting low expected income change.

For the attitude variable, one expects either a nil or a net positive association with investment, since this variable may reflect an additional dimension of consumer optimism than the expected investment variable itself. For expected price change, we do not have an a priori conviction about the appropriate sign. One could argue that families would expand purchases relative to expected purchases if actual price change turned out to be larger than expected, since they would have misread the strength of inflationary forces and would expand purchases to protect themselves against the anticipated further price rise. On the other hand, some families might feel poorer as a result, causing a contraction of actual investment relative to expectations.

The equations are all estimated by Ordinary Least Squares. Heteroscedasticity in the error terms is possible because the majority of households report zero ex-post expenditures. Of course, the problem is not as serious as it is in many other cross-section demand studies because the ex-ante data may adequately explain the concentration of expenditures around zero.

Finally, we should note that the model specified for these empirical tests clearly represents a minimal exploitation of the available data in the CAS. Preparation of the data tape, as usual, took substantially longer than we had hoped or expected, and we have been forced to restrict the scope of the empirical analysis severely. Thus we are able to test only the simplest hypotheses regarding alternative versions of expectational variables, hypotheses which by and large have been built into the basic survey design. Even here, our results must be viewed as preliminary and exploratory, since the comparisons across expectational variables obviously could be influenced by the specification of the equations.

## EMPIRICAL RESULTS

The basic empirical results are presented in Tables 1 through 10, below. Table 1 summarizes the means values of variables used in the analysis. Some of these values are worth comment. First, we have obviously selected a sample with well above average mean income, roughly $17,000 per family in 1967. Actual purchase levels for durables and actual savings amounts are correspondingly higher than one would find in a random population sample. Next, there are modest differences in the mean values of expected expenditures on durables when measured by a single global question than when measured by a series of questions about specific components. Building from the components arrives at an expected expenditure level larger than that yielded by the single variable, and probably closer to the level implied by the corresponding actual expenditure variable. In passing, we should note that there is a seasonal problem in comparing expected and actual levels; the actual expenditure or saving data cover a six months span, while the expected values are for a twelve-month period. Thus expected outlays for vacations are only slightly larger than actual outlays, but the six-month actual span covers the summer months.

Finally, there are marked differences in means for the two alternative versions of the expected savings variable. One of these, labeled $S_1^*$, is obtained from responses to a series of questions about expected changes in specified types of asset holdings. The second, $S_2^*$, is obtained from asking households whether their "expenses" (undefined), are likely to exceed or fall short of their income, and by how much. The levels of expected savings are about 50 per cent larger for the latter than the former; the level of actual savings (when annualized) is between the two. And the very high education level in the sample is worth noting--about half the respondents are college graduates or above.

Table 2 shows regression coefficients in a cross-section analysis for a variety of expected outlay variables for discretionary expenditure. The regressions relate ex-ante and ex-post data for individual expenditure components, and for an increasingly broad aggregate of total discretionary outlays. These data answer the question: How much ex-ante information must be included in a consumer survey in order to get the maximum usefulness in explaining variability in expenditure, and indirectly, in savings?

For individual expenditure components, the ex-ante variable does about as well in one category as another with the apparent exception of vacation outlays, where the contribution of the ex-ante variable is perceptibly larger. But there is no evidence that aggregation of individual variables for appliances, furniture and home improvements produces a better forecast of total outlays than implied by the simple addition of forecasts for the components. That is, there is no evidence of negative correlation in the error terms across components, hence no evidence of canceling out of errors as the ex-ante variable covers an increasing range of expenditures. This is a disappointing result, in a sense, since we already know (or think we know) from the CBE operating survey that there is very limited forecasting value in the household durables expenditure variable included on that survey.

One curious feature of these results, which is similar to those found in an experimental survey conducted three or four years ago by Census in conjunction with NBER, is the apparent lack of difference in the cross-sectional results between equations designed to explain expenditures for automobiles and those for household durables. Neither the general structure of the equations, the contribution of the ex-ante variables, nor the proportion of variance explained differ when cars or household durables are the dependent variable. Hence one would infer that time-series predictions with ex-ante household durables variables would be about as successful as with ex-ante automobile variables. But all of our experience with time-series data suggests that this is not the case: In the most clear-cut comparison, the simple time-series correlation between ex-ante household durables outlays and actual household durables outlays appears to be virtually nil, while ex-ante automobile expenditures have always been an important part of automobile demand models whenever they have been tested.

We had hoped that the data summarized in Table 3, where the first difference form of the equation is estimated for the same relationships as summarized in Table 2, would resolve that particular issue. But that turns out not to be the case either. Taking first differences in actual and expected outlays for either individual components of household durables outlays or various subaggregates, it continues to be true that aggregation has no apparent payoff and that the relation is about the same for automobiles as for any of the household durable categories or any of the subaggregates. Thus we are still left with a puzzle, at least on the level of the relatively simple specification of the Tables 2 and 3 equations.

One rather striking result in these data, and one that constitutes the most convincing evidence that we have yet seen on the point, concerns the behavior of the actual and expected income change variables. As argued earlier, a rational decision-making model calls for positive regression coefficients on actual income change and negative ones for expected income change. It ought also to be true that, excluding actual income change from the regression, one might get either positive or negative coefficients on expected income change; the result is not predictable a priori. While the latter test has not been carried out because of time pressure, the regression coefficients in Table 2 are systematically significant, with the alternate positive and negative signs predicted by the rational decision model. This is more true for the subaggregates than for the individual components on household durables, but it is consistently true throughout. Just on a signs test, for example, 9 of the 10 actual income change coefficients have positive signs in Table 2, all 10 expected income change coefficients have negative signs. In Table 3, the pattern of signs on actual and expected income change variables is exactly reversed. This is as expected, considering that the first difference version of the equation can be obtained by subtracting one cross-sectional equation from the preceding one. On balance, the results shown in Tables 2 and 3 are remarkably consistent with the hypothesis that the combination of expected purchases and an income surprise variable is the appropriate model with which to explain household investment decisions.

Before turning to the ex-ante savings data, some brief comment on Tables 4 and 5 is in order. A more specific test of the CBE version ([B] survey) of household durable expenditures with the experimental CAS version ([A] survey) is shown in Table 4. The results show little evidence of improvement with the more elaborate CAS version. However, the CAS regressions have all the correct signs and most of the t-ratios are larger than in the CBE version. In addition, Table 1 shows that the mean of the experimental ex-ante durables variable is of about the same magnitude as ex-post expenditures, whereas the CBE version substantially underpredicts expenditures on average.

Another test built into CAS was to determine whether the ex-ante automobile expenditure variable would be improved by attempting to get ex-ante information on multiple purchases of cars within a single period, and also to determine whether omission of vehicular purchases like trailers had any influence on the accuracy of the ex-ante, ex-post automobile comparisons. Thus we designed a question which asks about the probability of buying "more than one car" during a given time span. In Table 5, actual purchases of cars (which of course include multiple purchases) is regressed on ex-ante expenditures for one car (the present CBE version) and on ex-ante purchases for one or more cars (the experimental CAS version). The differences are quite noticeable, and they go in the appropriate direction both in the cross-sectional and first difference equations. Thus, even though ex-ante purchases of more than one car are a very small part of the total, their inclusion does make a contribution to explanation of the variance in observed automobile purchases, and inclusion of a multiple ex-ante question on the operating CBE survey would apparently represent an improvement in accuracy. Incidentally, in this sample about 10 per cent of the ex-ante purchases represent those reported by households under the "more than one" variable, as indicated by the mean values shown in Table 1.

Results from the ex-ante savings data are shown in Tables 6, 7, and 8. Table 6 tests alternative specifications of the ex-ante variable against alternative definitions of savings. $S_1^*$ represents ex-ante asset change, while $S_2^*$ represents the difference between income and expenses ex-ante. S represents changes in savings in the form of savings accounts, saving bonds, common stock equity (excluding capital gains), and investments in property and land, while L represents the first three categories only but excludes the fourth. Cross-section results are shown in Table 6, first difference equations in Table 7.

The cross-section results in Table 6 suggest that ex-ante savings questions are about as useful as the ex-ante questions on household durables and appliances. The ex-ante variables are always significant, actual and expected income change have the expected positive and negative signs, and income level is also significant. Explanations of S are a little better than explanations of L with either of the ex-ante variables, and the asset change form of the ex-ante variable looks to be slightly better than the income less expenses version. The regression coefficients of the ex-ante variables are significantly higher for the asset change version, and the t-ratios are also higher as is the explained variance. Hence the ex-ante variable looks promising; more precisely, it looks about as promising as the household durable expenditure ex-ante variables.

This promising look evaporates when we turn to Table 7, where the first difference form is shown. Here we appear to be looking at essentially random numbers except for the actual and expected income change variables, which have the same sign pattern as discussed earlier. The ex-ante variable, representing the difference between two consecutive ex-ante estimates, always has a negative sign and is never significant. On a preliminary view, therefore, the results are discouraging but not necessarily hopeless. That the ex-ante responses bears some resemblance to actual behavior is clearly shown by the cross-sectional results in Table 6, and the first difference form may be quite sensitive to equation specification.

Another test of the ex-ante savings variable is shown in Table 8, where we estimate a saving regression which include either ex-post or ex-ante expenditures on durables as an additional independent variable. It is a well documented fact that savings and at least some types of durable goods expenditures are close substitutes for each other, and that both are appropriately included in a household investment function. Thus the inadequacy of the savings function might be due to the effect on actual saving of variation in expenditures on durables.

The first two equations in Table 8 contain ex-post and ex-ante measures of total outlays for durables, including household durables, vacations, and automobiles. The last two equations contain only the automobile expenditure variable in ex-post and ex-ante form. We expect to find a negative correlation between actual savings and expenditures on durables.

The only equation form where the expected negative sign emerges is the last equation, which has actual expenditures on automobiles as an additional dependent variable. The effect is not very strong, since the regression coefficient is only .14; but in all other equations the durables variable has a positive rather than a negative sign. Thus total durables outlay appears to be complementary rather than competitive with savings. Even for cars, only the ex-post expenditure variable contributes significantly to the explanation of savings behavior. In forecasting equations, one would have to make use of either the ex-ante variable or of some kind of predicted value for automobile expenditures, hence even these results are not as encouraging as they might appear.

Two further tests of the savings data are shown in Tables 9 and 10. In Table 9, a typical equation is shown for the (A) and (B) samples. The variables are the same; the differences, due solely to sampling variability, are not small. In Table 10, a series of equations with alternative dependent variables are shown. S is the total savings variable used in the previous tests, respondents with poor financial quality information are eliminated. S' is total savings for 1,537 observations including 150 eliminated from the S regressions. The coefficients are essentially the same in the two sets of regressions. The probable reason is that "poor quality" relates mainly to refusal or non-response on particular questions about actual asset change. Non-response would be translated into zero asset change, and a similar non-response on expected asset change, which is not

unlikely, would also be translated into zero expected asset change.

The coefficients on the standard collection of family structure, education, attitude and expected price change variables show few consistent and significant effects. This is not unexpected for the dummy variables representing the age of the head and the presence of children in the household and the education of the head. Net of the household's plans there are no significant shifts according to household type. The attitude and price variables appear significantly in some of the single cross-section equations but not in the first difference equations. The attitude variable has a positive sign in many of the expenditure equations but is insignificant in savings equations. The expected price change variable is positive in many savings equations. However, neither variable exceeds its standard error in the car expenditure equations.

## SUMMARY

On the whole, we find some results in the experimental survey which are promising and warrant further examination, while others do not appear to be worth pursuing much further. Perhaps the most discouraging feature of the results is the apparent lack of difference between the current CBE version of expected household durable outlays and the much more precise and hopefully improved version of that variable on the CAS experimental survey. The regressions yield no evidence that the experimental version is better than the existing version, and since we know that the existing version doesn't help much in time-series predictions, that does not auger well for the experimental version. But perhaps the explanation lies in our failure to examine more carefully the role of the existing CBE version in time-series prediction models. There are only a limited number of observations available with the CBE durables expenditure variable, and the negative judgments about its value are largely a consequence of the casual observation that it clearly does not predict movements in actual outlays when taken by itself. In a more fully specified demand model, perhaps even the present version might make some contribution, and the CAS version should turn out to be a bit better since its mean is much closer to mean expenditures in the cross section.

On the encouraging side, one would have to put the results on ex-ante vacation outlays and on multiple plans for purchasing cars. Both in cross sections and first differences, the strongest ex-ante, ex-post relationship in this batch of survey results concern expenditures for vacation. This is clearly a major discretionary outlay, and it looks as if one might well be able to predict changes in its level from an ex-ante survey variable. On multiple plans to purchase cars, the results suggest that a consumer survey would be substantially improved simply by the addition of questions designed to find out if households expected to buy more than one car during the purchase period.

On the "in-between" side, we would put the savings results. This paper is, after all, a very preliminary report based on results which have been obtained within the last week. There are significant cross-sectional associations between ex-ante and ex-post saving, as measured on the survey. And there are clearly enormous measurement error problems when dealing with both ex-ante and ex-post savings. Despite these problems, there are some limited positive results, and the subject is worth pursuing further. The first difference results are discouraging, and it may turn out that those results are accurate. Finally, there are several additional variables concerned with expected savings that appear on the CAS questionnaire, and these have not been examined at all.

TABLE 1
Mean Value of Variables[a,b]

| | Twelve-Month Expected (1A) | Twelve-Month Expected (1B) | Six-Month Actual (2) |
|---|---|---|---|
| Appliances = App | 196.34 | | 109.03 |
| Home improvements = HI | 242.92 | | 119.75 |
| Furniture = F | 280.63 | | 154.02 |
| Vacations = V | 352.85 | | 235.67 |
| Total cars = C | 1090.94 | 1027.15 | 582.15 |
| First car = $C_1$ | 999.57 | | |
| Household durables = D | 719.89 | 337.20 | 382.80 |
| D + V | 1072.74 | | 618.47 |
| D + V + C | 2163.68 | | 1200.62 |
| Actual savings = S | | | 660.08 |
| Actual savings, excluding land = L | | | 526.86 |
| Expected savings = $S_1^*$ | 1404.00 | 1372.87 | |
| Expected income less expenditures = $S_2^*$ | 1990.37 | 1915.63 | |

First Differences

| | Twelve-Month Expected (3A)-(1A) | Twelve-Month Expected (3B)-(1B) | Six-Month Actual (4)-(2) |
|---|---|---|---|
| App | -6.37 | | 1.06 |
| HI | -25.83 | | 31.46 |
| F | 8.23 | | -1.03 |
| V | 54.66 | | 21.14 |
| C | -62.41 | -50.33 | 83.05 |
| $C_1$ | -48.18 | | |
| D | -23.96 | | 31.48 |
| D + V | +30.76 | | +52.62 |
| D + V + C | -31.65 | | +135.67 |
| S | | | 247.80 |
| L | | | -158.76 |
| $S_1^*$ | 151.21 | 130.69 | |
| $S_2^*$ | -178.48 | -78.98 | |

| Family Structure | Per Cent |
|---|---|
| Head 25, children | 22.9% |
| Head 45, children | 26.7 |
| Head 35-44, children | 39.4 |

| Head's Education | Per Cent |
|---|---|
| 0 - 12 years | 25.1% |
| 13 - 15 years | 20.5 |
| 16 or more | 54.4 |

| | Mean of Attitude Variables (1) | Mean of Attitude Variables (3) |
|---|---|---|
| Attitude index | .661 | .504 |
| Expected rate of price change | 2.286 | 2.301 |

| | Income Variables[c] (1) | Income Variables[c] (3) |
|---|---|---|
| Y | 17019.33 | 18623.98 |
| $\Delta Y^a$ | .146 | |
| $\Delta Y^e$ | .066 | |

[a] Data are in dollars, except as noted. Interview and sample are in parentheses. The (A) sample has 1,410 observations and (B) 1,312.

[b] Variable name is followed by the symbol used in following tables. An asterisk is added to the symbol to refer to ex-ante data.

[c] Y = Family income.
$\Delta Y^a = (Y(3) - Y(1))/Y(1)$ = actual income change.
$\Delta Y^e = (\text{Expected income} - Y(1))/Y(1)$ = expected income change.

TABLE 2
Aggregation Tests for Household Durables and Vacation Outlays, Cross-Sectional Data, A Sample

| Dependent Variable | Y | $\Delta Y^a$ | $\Delta Y^e$ | Ex-Ante Variable | SE | $R^2$ |
|---|---|---|---|---|---|---|
| App | .0016(2.5) | 24.71(1.5) | -15.83 (.6) | .2298 (9.6) | 203.4 | .079 |
| F | .0021(2.1) | 19.47 (.8) | -14.24 (.4) | .2917(14.5) | 314.6 | .147 |
| HI | .0024(2.3) | 81.95(3.1) | -101.2 (2.5) | .2090(11.7) | 329.9 | .106 |
| V | .0029(2.2) | -2.932 (.1) | -4.932 (.1) | .3842(17.6) | 372.4 | .255 |
| C | .0108(2.7) | 257.8(2.6) | -298.9(1.9) | .3248(13.2) | 1,238.6 | .137 |
| App + HI | .0040(3.1) | 107.0(3.3) | -117.7(2.4) | .2158(11.4) | 400.9 | .106 |
| App + HI + F = D | .0057(3.3) | 129.4(3.1) | -142.7(2.2) | .2741(15.2) | 526.7 | .171 |
| D + V | .0104(4.6) | 136.9(2.6) | -154.7(1.9) | .2971(15.8) | 660.6 | .225 |
| D + V + C | .0202(4.2) | 391.7(3.5) | -457.8(2.6) | .3220(15.3) | 1,406.7 | .202 |
| App + C | .0127(3.1) | 281.5(2.8) | -312.2(2.0) | .3125(12.9) | 1,260.8 | .134 |
| HI + C | .0166(3.7) | 386.1(3.6) | -440.7(2.6) | .3052(14.0) | 1,343.3 | .163 |

TABLE 3
Aggregation Tests for Household Durables and Vacation Outlays, First Difference Data, A Sample

| Dependent Variable | Y | $\Delta Y^a$ | $\Delta Y^e$ | Ex-Ante Variable | SE | $R^2$ |
|---|---|---|---|---|---|---|
| App | -.0016(1.6) | -20.50 (.8) | -20.4 (.5) | .2879 (9.7) | 306.5 | .074 |
| F | .0015(1.1) | -7.415 (.2) | 24.09 (.4) | .3294(12.8) | 449.6 | .114 |
| HI | .0005 (.3) | -50.87(1.3) | 110.5(1.9) | .2784(13.3) | 481.2 | .122 |
| V | -.0062(3.5) | -51.93(1.2) | 73.54(1.1) | .4154(16.9) | 549.5 | .179 |
| C | .0063(1.0) | -356.8(2.3) | 532.4(2.2) | .3936(13.8) | 1,930.4 | .128 |
| App + HI | -.0011 (.6) | -73.88(1.6) | 93.53(1.3) | .2962(13.3) | 587.1 | .123 |
| App + HI + F = D | .0004 (.2) | -85.21(1.4) | 123.2(1.3) | .3232(14.3) | 778.1 | .141 |
| D + V | -.0055(1.8) | -134.0(1.7) | 195.3(1.6) | .3304(14.2) | 980.7 | .141 |
| D + V + C | .0006 (.1) | -485.5(2.8) | 718.5(2.6) | .3572(13.4) | 2,191.1 | .122 |

TABLE 4
Tests of Alternative Household Durables Variables, (A) and (B) Surveys

| Sample | Y | $\Delta Y^a$ | $\Delta Y^e$ | Ex-Ante Variable | SE | $R^2$ |
|---|---|---|---|---|---|---|
| (A) | .0057(3.3) | 129.4(3.1) | -142.7(2.2) | .2741(15.2) | 526.7 | .171 |
| (B) | .0098(5.5) | 45.84(1.2) | 99.19(1.3) | .3458(14.6) | 554.3 | .197 |
| (A) | .0166(3.7) | 386.1(3.6) | -440.7(2.6) | .3052(14.0) | 1,343.3 | .163 |
| (B) | .0215(4.9) | 240.3(2.6) | -95.26 (.5) | .2871(11.3) | 1,327.9 | .137 |

TABLE 5
Tests of Alternative Expected Car Purchase Variables, A Sample

| Ex-Ante Variable | Y | $\Delta Y^a$ | $\Delta Y^e$ | Ex-Ante Variable | SE | $R^2$ |
|---|---|---|---|---|---|---|
| $C^*$ | .0108(2.7) | 257.8(2.6) | -298.9(1.9) | .3248(13.2) | 1,238.6 | .137 |
| $C_1^*$ | .0152(3.7) | 251.5(2.5) | -254.1(1.6) | .2865(10.7) | 1,263.5 | .102 |
| | | | First Difference Data | | | |
| $C^*$ | .0063(1.0) | -356.8(2.3) | 532.4(2.2) | .3936(13.8) | 1,930.4 | .128 |
| $C_1^*$ | .0033 (.5) | -361.8(2.3) | 532.3(2.2) | .3331(10.9) | 1,975.6 | .086 |

TABLE 6
Alternative Ex-Ante Savings Functions, A Sample

| Dependent Variable | Y | $\Delta Y^a$ | $\Delta Y^e$ | Ex-Ante $S_1^*$ | Ex-Ante $S_2^*$ | SE | $R^2$ |
|---|---|---|---|---|---|---|---|
| S | .0347(3.3) | 960.0(4.2) | -799.1(2.2) | .2759(6.8) | | 2,865.6 | .081 |
| L | .0319(3.1) | 767.2(3.4) | -581.0(1.7) | .2701(6.8) | | 2,799.9 | .077 |
| S | .0455(4.3) | 959.8(4.1) | -765(2.1) | | .1040(4.1) | 2,894.8 | .062 |
| L | .0436(4.2) | 766.1(3.4) | -535.0(1.5) | | .0962(3.9) | 2,830.4 | .057 |

TABLE 7
Alternative Ex-Ante Savings Functions, First Differences, A Sample

| Dependent Variable | Y | $\Delta Y^a$ | $\Delta Y^e$ | Ex-Ante $S_1^*$ | Ex-Ante $S_2^*$ | SE | $R^2$ |
|---|---|---|---|---|---|---|---|
| S | .0127 (.8) | -360.9 (.9) | 404.6 (.7) | -.0182(.4) | | 4,795.1 | .008 |
| L | -.0138(1.1) | -738.1(2.4) | 572.6(1.4) | -.0339(.9) | | 3,881.2 | .012 |
| S | .0098 (.6) | -365.0(1.0) | 376.1 (.6) | | -.0451(1.4) | 4,792.0 | .009 |
| L | -.0147(1.2) | -767.5(2.5) | 687.3(1.4) | | -.0182 (.7) | 3,881.8 | .011 |

TABLE 8
Ex-Ante Savings Functions with Durable Goods Expenditure Variables, S is Dependent Variable

| Y | $\Delta Y^a$ | $\Delta Y^e$ | $S_1^*$ | D | D* | SE | $R^2$ |
|---|---|---|---|---|---|---|---|
| .0316(3.0) | 961.2(4.2) | -847.5(2.4) | .2700(6.6) | | .2324(2.4) | 2,860.9 | .085 |
| .0330(3.2) | 937.6(4.1) | -784.7(2.2) | .2752(6.7) | .1750(1.3) | | 2,864.9 | .082 |
| | | | | C | C* | | |
| .0337(3.2) | 962.4(4.2) | -812.5(2.3) | .2735(6.7) | | .0383 (.7) | 2,866.2 | .081 |
| .0375(3.6) | 993.6(4.3) | -824.8(2.3) | .2782(6.8) | -.1424(2.4) | | 2,860.5 | .085 |

TABLE 9
Survey Sampling Test, S Dependent Variable

| Sample | Y | $\Delta Y^a$ | $\Delta Y^e$ | $S_1^*$ | SE | $R^2$ |
|---|---|---|---|---|---|---|
| (A) | .0347(3.3) | 960.0(4.2) | -799.1(2.2) | .2759(6.8) | 2,865.6 | .081 |
| (B) | .0428(4.1) | 710.0(3.5) | -102.1 (.3) | .1094(2.8) | 2,881.5 | .045 |

TABLE 10
Test of Financial Asset Quality Editing in Savings Functions, A Sample

| Dependent Variable* | Y | $\Delta Y^a$ | $\Delta Y^e$ | $S_1^*$ | $S_2^*$ | C | SE | $R^2$ |
|---|---|---|---|---|---|---|---|---|
| S | .0347(3.3) | 959.9(4.2) | -799.1(2.2) | .2759(6.8) | | | 2,865.6 | .081 |
| S' | .0366(3.8) | 809.1(4.0) | -509(1.6) | .2684(7.3) | | | 2,794.5 | .085 |
| S | .0375(3.6) | 993.6(4.3) | -824.8(2.3) | .2782(6.8) | | -.1424(2.4) | 2,860.5 | .085 |
| S' | .0392(4.0) | 836.4(4.2) | -527.2(1.7) | .2702(7.4) | | -.1390(2.5) | 2,789.6 | .089 |
| S | .0455(4.3) | 959.8(4.1) | -765.4(2.1) | | .1040(4.1) | | 2,894.8 | .062 |
| S' | .0488(4.9) | 813.1(4.0) | -463.7(1.5) | | .0970(4.1) | | 2,827.8 | .063 |
| S | .0483(4.5) | 991.4(4.3) | -787.9(2.2) | | .1042(4.2) | -.1341(2.3) | 2,890.5 | .066 |
| S' | .0514(5.1) | 839.5(4.1) | -480.8(1.5) | | .0977(4.1) | -.1341(2.4) | 2,823.3 | .066 |

*S = Total savings with observations eliminated if financial asset information of poor quality (1,387 observations).

S' = Total savings, no financial asset quality eliminations (1,537 observations).