

This PDF is a selection from an out-of-print volume from the National Bureau of Economic Research

Volume Title: Anticipations and Purchases: An Analysis of Consumer Behavior

Volume Author/Editor: F. Thomas Juster

Volume Publisher: Princeton University Press

Volume ISBN: 0-87014-079-5

Volume URL: <http://www.nber.org/books/just64-1>

Publication Date: 1964

Chapter Title: Multivariate Analysis of Aggregate Purchases and Buying Intentions

Chapter Author: F. Thomas Juster

Chapter URL: <http://www.nber.org/chapters/c1035>

Chapter pages in book: (166 - 221)

CHAPTER 7

Multivariate Analysis of Aggregate Purchases and Buying Intentions¹

Introduction

IN THE preceding chapters a selected set of relations between consumer purchases of durable goods and consumer anticipations has been examined. The focus has been mainly on analysis of intentions to buy durable goods: in Chapters 2, 3, and 4 an interpretation of buying intentions as representing judgments about subjective purchase probability was developed and tested; in Chapter 5, the possibility was investigated that the strong statistical association between aggregate intentions and purchases was due to the common influence of other factors; and in Chapter 6, the relations among intentions, expectations, surprises, and purchases were explored.

The data available in the Consumers Union surveys permit a test of the simultaneous influence of a number of factors on household decisions to purchase durable goods. It has been argued earlier that buying intentions reflect judgments about *ex ante* purchase probability for a given forecast period. A wholly accurate measure of purchase probability would in principle be perfectly correlated with subsequent purchases except for the influence of events that were either not foreseen or imperfectly foreseen by the respondent. I designate such unforeseen events as intervening variables. On the other hand, the set of factors underlying the household's (wholly accurate) estimate of purchase probability would have no net relation to purchases, their influence being accounted for in purchase probability. I designate such factors as initial-data variables.

Consider a multivariate model in which household purchases during period t are a function of (1) *ex ante* purchase probability measured at the beginning of t ; (2) nonanticipatory, or objective, variables, such as household income, stocks of durable goods, etc., measured at the beginning of t ; (3) anticipatory variables, such as expectations about income measured at the beginning of t ; and (4) intervening variables, reflecting partly or wholly unforeseen events that occur during period t . This model would show that only *ex ante* probability and intervening events—variables in the first and fourth categories—have a net association with purchases.

¹ The basic line of analysis pursued in this Chapter—that an interesting test of the probability hypothesis would contrast the influence of buying intentions on the partial correlation of purchases with initial-data variables, on the one hand, and with intervening variables on the other—grew out of a suggestion by Jacob Mincer. The dearth of intervening variables that could be measured led to construction of the classification variables for house-buying intentions and housing purchases.

The initial-data variables in the second and third categories would be completely unrelated to purchases net of purchase probability. And intervening variables would be more strongly associated with purchases, holding initial-data variables constant, than otherwise. For example, a given change in income would have more influence on purchases if expected change in income were held constant, since the intervening variable "unexpected change in income" is more accurately measured by the difference between actual and expected change than by actual change alone.

The relation of both purchases and purchase probability to the expectations, attitudes, and financial situation of the household is relevant for the analysis of consumer behavior quite aside from the question of whether the latter variables are useful for prediction. The probability variable is, after all, simply a convenient short cut for measuring the influence of the underlying factors associated with purchases; the short cut may or may not be the most accurate way to make predictions about the future, but it tells us nothing per se about the basic reasons for differences in behavior. However, an analysis of factors associated with purchase probability ought to yield insights into the fundamental determinants of behavior. And it may turn out that the probability short cut has inherent limitations that make it desirable to build a predictive model incorporating the major determinants of purchase probability but not the probability variable itself.²

Given a precise measure of purchase probability, the above analysis suggests that initial-data variables will be associated with both purchases and purchase probability but that the association with probability will be stronger. In the absence of intervening events, initial-data variables would show the same association with both purchases and probability because the two would be identical. If intervening events have any importance, actual purchases will differ from purchase probability, and the initial-data variables will be less strongly associated with the (*ex post*) variable purchases than with the (*ex ante*) variable purchase probability.

² The above analysis fits the general framework developed by Franco Modigliani and outlined in the introduction to "*The Quality and Economic Significance of Anticipations Data*, Princeton for NBER, 1960. Modigliani speaks of an expectation function, a planning function, and a realization function. The planning function relates purchase probability (buying intentions or plans) to the initial-data variables. It answers the question "why do households have certain probabilities or plans?" The realization function relates purchases to initial probability and intervening variables. It answers the question "why do households purchase what they do, given their plans and the difference between expected and actual events?" The initial-data variables, in principle, are redundant in a realization function because such variables are presumably embodied in purchase probability.

ANALYSIS OF PURCHASES AND INTENTIONS

On the other hand, intervening variables will be associated with purchases while having no direct relation to purchase probability.

Data Limitations

From preceding chapters it is quite clear that the data do not contain a precise measure of *ex ante* purchase probability. The household's reported intentions to buy durables—basically a classification into dichotomous (or trichotomous) probability groups—constitute a proxy variable. Not only is the intentions variable discontinuous while probability itself is not, but it is known that many of the intender-nonintender classifications are inefficient in the sense that some intenders appear to have lower purchase probabilities than some nonintenders.³ As a consequence, use of buying intentions as a proxy for purchase probability will mean that a number of these relations may either not be observable at all, or will be weaker than predicted. For example, initial-data variables might not be wholly redundant to probability as measured by intentions, although these variables ought to be more strongly associated with intentions than with purchases. Similarly, intervening variables may not be more strongly associated with purchases when initial-data variables are held constant, nor may intervening variables be independent of buying intentions. It would be supposed, however, that intervening variables ought to be more strongly associated with purchases than with intentions.

Description of Variables

Fifteen independent variables are used in the multivariate regression analysis. Seven are classified as initial-data variables, five as intervening variables,⁴ and three are the buying-intentions variables used to represent purchase probability. Two dependent variables are examined—durable goods purchases and intentions to buy durable goods, aggregated for each household. The designation and description of these variables follows.

INDEPENDENT VARIABLES

Objective Initial-Data Variables

$X_1 = Y$ Normal family income before taxes, scaled:

| | |
|-----------------------|--------------------------|
| under \$3,000 = 2.0 | \$7,500 — \$9,999 = 8.8 |
| \$3,000—\$3,999 = 3.5 | \$10,000—\$14,999 = 12.5 |
| \$4,000—\$4,999 = 4.5 | \$15,000—\$24,999 = 20.0 |
| \$5,000—\$7,499 = 6.2 | \$25,000 and over = 40.0 |

³ See above, Chapters 2 and 3.

⁴ With one exception, all the intervening variables represent events that are only partly unforeseen (see below).

ANALYSIS OF PURCHASES AND INTENTIONS

Normal income is essentially the income bracket reported for a period that includes the forecast period (April 1958–October 1958), with some adjustment in particular cases.

The data indicate the bracket into which actual family income fell for 1957 (from the April 1958 questionnaire) and the bracket for actual 1958 income (from the October 1958 reinterview survey). It is also known whether these income figures were regarded as being “unusually high” or “unusually low.” In cases where the income bracket was the same in both surveys and was not regarded as unusually high or low in either case, I assigned the bracket midpoint as the normal income level. In cases where the bracket differed and one year was unusual while the other was not, I assigned the income for the normal year as the normal income. In cases where the bracket was the same and both years were unusually high (low) I took the midpoint of the next lower (higher) bracket as normal income provided that the family expected a decrease (increase) in income for 1959. In cases where the bracket differed but both years were regarded as normal I used 1958 income. Finally, in cases where the reported pattern of income, unusually high or low income, and income expectations did not make any sense, the household was excluded from the sample.

$X_2 = \Delta L_{-1}$ Change in liquid assets during the twelve months ending April 1958, scaled:

| | |
|-----------|------|
| increase | = +1 |
| no change | = 0 |
| decrease | = -1 |

$X_3 = \Delta Y_{-1}$ Change in family income over the twelve months ending April 1958, scaled:

| | |
|---------------------------------------|-----|
| increased substantially (20% or more) | = 6 |
| increased somewhat (5 to 20%) | = 4 |
| no change | = 3 |
| decreased somewhat (5 to 20%) | = 2 |
| decreased substantially (20% or more) | = 0 |

$X_4 = S'$ Durables stock adjustment. Respondents were asked in April 1958 whether any of a list of nine items in their durable goods inventory “need to be replaced.” It is assumed that the weighted sum of such responses (autos = 4, other durables = 1 each) represents a difference between the household’s actual and desired stock of durable goods.

ANALYSIS OF PURCHASES AND INTENTIONS

The procedure is tantamount to assuming that a durable that "needs replacing" has a value equal to zero, one that does not need replacing a value equal to original cost. The S' variable is obviously a crude measure of desired change in current inventory, but is the best measure available from the CU survey.

Anticipatory Initial-Data Variables

$X_6 = \hat{E}$ Index of the household's April 1958 expectations with regard to changes in their own income, Y , and changes in general business conditions, B . The data in Chapter 6 suggest that only extreme expected changes are related to behavior, hence \hat{E} is scaled:

| | |
|--|-----|
| expect substantial increase (improvement) in both Y and B or substantial increase in one and moderate in the other | = 2 |
| expect substantial decrease (deterioration) in both Y and B or substantial decrease in one and moderate in the other | = 0 |
| all other combinations | = 1 |

$X_6 = 0$ The household's April 1958 opinion about current buying conditions for durable goods, scaled:

| | |
|--|-----|
| good time (for respondent) to buy durables | = 2 |
| pro-con, other, don't know | = 1 |
| bad time (for respondent) to buy durables | = 0 |

$X_7 = \hat{E}_5$ The household's April 1958 expectations about financial prospects for a five-year forward period, scaled:

| | |
|--------------------------------|-----|
| expect substantial improvement | = 2 |
| expect moderate improvement | = 1 |
| all other responses | = 0 |

This variable was originally reported on a nine-point scale—expect substantial, moderate, or slight improvement (deterioration), expect no change, too uncertain to say, and other. Preliminary tests indicated that the truncated scale shown above was more closely associated with behavior, possibly due to the erratic behavior of the very small cell size groups that were combined into the "all other" category. (About two-thirds of the sample fall into the 2 and 1 scales shown above.) In addition

ANALYSIS OF PURCHASES AND INTENTIONS

some *ex post* (October 1958) data were used to assign scales, although the basic scale is *ex ante* (April 1958). Households that expected "substantial improvement" in April 1958 but only "slight improvement" or worse in October 1958 were assigned scales of 0 rather than 2, while those expecting "moderate improvement" in April 1958 and "no change" or worse in October 1958 were assigned scales of 0 rather than 1. These shifts must be due either to the respondent's misunderstanding of the question in the April survey or to a drastic downward revision in the respondent's long-term financial expectations. In my judgment, the number of cases with a legitimate downward revision of this magnitude would be trivial, hence it was assumed that all such cases represented misinterpretation of the original question.

Intervening Variables

$X_8 = \Delta Y$ Change in family income during the forecast period, scaled:

| | |
|------------------------------------|-----|
| substantial increase (20% or more) | = 6 |
| moderate increase (5 to 20%) | = 4 |
| no change | = 3 |
| moderate decrease (5 to 20%) | = 2 |
| substantial decrease (20% or more) | = 0 |

$X_9 = \Delta Y_t$ Transitory income during the forecast period, scaled:

| | |
|---------------------|------|
| positive transitory | = +1 |
| no transitory | = 0 |
| negative transitory | = -1 |

This variable was constructed from several pieces of information. Households classified as having a positive (negative) transitory income component are those reporting that their incomes were "higher (lower) due to unusual circumstances" (see the description of normal income, X_1 , above). Some exceptions were made, based on a comparison of responses to the transitory income question with responses to questions dealing with 1957 and 1958 income, April 1958 income expectations, and October 1958 income expectations. For example, households reporting that their April-October income was "unusually" high, that 1958 income was higher than in the previous year, and (in October 1958) that they expected their incomes to rise even more during the coming year, were reclassified as having a zero transitory income component, since these households apparently could not distinguish between "unusually higher" and "higher." Similarly, households reporting that their incomes were

ANALYSIS OF PURCHASES AND INTENTIONS

unusually low but expecting further declines were reclassified as not having transitory income components during the forecast period.⁵ Households reporting wholly inconsistent information were eliminated completely from the sample, as noted above in the description of normal income.

$X_{10} = H_{01}$ Unanticipated purchase of a house during the forecast period, scaled:

| | |
|--|-----|
| households not reporting intentions to buy a house in April 1958 but purchasing between April and October 1958 | = 1 |
| all other households | = 0 |

$X_{11} = H_{10}$ Unfulfilled April 1958 intentions to buy a house, scaled:

| | |
|--|-----|
| households reporting intentions to buy a house in April 1958 but not purchasing between April and October 1958 | = 1 |
| all other households | = 0 |

$X_{12} = H_{11}$ Anticipated purchase of a house during the forecast period, scaled:

| | |
|--|-----|
| households reporting April 1958 intentions to buy a house and purchasing between April and October | = 1 |
| all other households | = 0 |

The three housing variables constitute different combinations of April 1958 house-buying intentions and purchases between April and October 1958. The April 1958 survey asked whether respondents "intended to buy a house during the next twelve months." The October 1958 survey asked whether respondents had purchased a house during the April-October period. Four possible combinations exist:

- Intended to buy and purchased, designated H_{11}
- Intended to buy and did not purchase, designated H_{10}
- Did not intend to buy and purchased, designated H_{01}
- Neither intended to buy or purchased, designated H_{00} .

⁵ A later questionnaire sent to this same group (not analyzed in the current monograph) indicated clearly that many households reporting such transitory income changes were really talking about normal raises or about reductions in current income due to retirement. Hence, this kind of misinterpretation was known to be fairly common before it was decided to undertake the reclassification described above.

ANALYSIS OF PURCHASES AND INTENTIONS

The H_{00} combination is omitted from the list of independent variables to avoid overdetermining the system.

The first three combinations represent situations that, to some degree, reflect the impact of intervening events—even the H_{11} classification. The mean *ex ante* probability of purchasing a house for those responding “yes” to the question about house buying plans (the H_{10} and H_{11} groups) is obviously less than unity; and *ex ante* probability is likely to have been higher for buyers (H_{11}) than for nonbuyers (H_{10}). *Ex post*, none of the households in H_{10} purchased; hence, unfavorable intervening events must have occurred in some of these households. *Ex post*, all of the households in H_{11} purchased; hence, favorable intervening events must have occurred here, on the average. In a similar vein, those in H_{00} and H_{01} must have had a relatively low (but higher than zero) mean *ex ante* probability of purchasing a house, and it is likely that purchase probability was higher in H_{01} . *Ex post*, everyone in the H_{01} group purchased; hence, favorable intervening events must have been common. In the H_{00} group, on the other hand, unfavorable intervening events must have occurred on balance, since no housing purchases were made in that group. Further, because mean *ex ante* probability must have been higher for house buyers that reported intentions, favorable intervening events must have been more important in H_{01} than in H_{11} . Similarly, because *ex ante* probability must have been higher in H_{10} than in H_{00} , unfavorable intervening events must have been more important in the former than in the latter group.

Buying Intentions Variables

$X_{13} = \hat{P}$ April 1958 “standard” intentions to buy durable goods, aggregated for each household and scaled from 0 to 9. (See Chapter 6, “Introduction,” for description of the aggregation.)

$X_{14} = \hat{P}_c$ April 1958 “contingent” intentions to buy durable goods, aggregated for each household and scaled from 0 to 6. (See Chapter 6, “Introduction,” for description of the aggregation.)

$X_{15} = Z\hat{P}_c$ April 1958 contingent intentions to buy durable goods, aggregated for each household and scaled the same as \hat{P}_c if $\hat{P} = 0$, scaled zero if $\hat{P} > 0$.

That is, X_{15} is the same as X_{14} multiplied by the factor Z , where

$$Z = 1 \text{ when } \hat{P} = 0$$

$$Z = 0 \text{ when } \hat{P} > 0$$

ANALYSIS OF PURCHASES AND INTENTIONS

DEPENDENT VARIABLES

$Y_1 = P$ Purchases of durable goods between April and October 1958, aggregated for each household and scaled from 0 to 9. (See Chapter 6 for description of the aggregation.)

$Y_2 = \hat{P}$ April 1958 standard intentions to buy durable goods; this variable is identical to the independent variable X_{13} .

Other variables in addition to those listed above are utilized in another set of multivariate regressions discussed in Appendix A, where the focus is on the net relation between durable goods purchases and a large number of anticipatory and objective initial-data variables. Included in this analysis are a number of interactions designed to test the proposition that initial-data variables help to scale purchase probability for nonintenders while being essentially redundant for intenders.

Sample Stratification

Separate regressions were estimated for a number of subgroups. As noted earlier, the Consumers Union sample was originally split into five randomly selected subgroups, each of which received a different set of questions about intentions to buy. Four of the five groups contain both a standard and a contingent intentions variable, but one of these variant questions was systematically misinterpreted and has never been fully processed.⁶ Regressions are estimated for three of the original subgroups, with the buying intentions variables obtained from responses to the following questions.

Subgroup A: Standard intentions to buy (\hat{P})—"definitely intend to buy within twelve months"

Contingent intentions (\hat{P}_c)—"probably or possibly may buy within twelve months"

Subgroup B: Standard intentions (\hat{P})—"intend to buy within 6 months"

Contingent Intentions (\hat{P}_c)—"intend to buy later"

Subgroup C: Standard intentions (\hat{P})—"intend to buy within twelve months"

Contingent intentions (\hat{P}_c)—"will buy within 12 months if income is 10-15 per cent higher than expected"

In addition, the sample is stratified by demographic status, designated by

⁶ See Chapter 2, above, and Juster, *Consumer Expectations, Plans, and Purchases: A Progress Report*, Occasional Paper 70, New York, NBER, 1959.

ANALYSIS OF PURCHASES AND INTENTIONS

subscript as follows: 1, husband-wife households, head between 25 and 34; 2, husband-wife households, head between 35 and 44; 3, husband-wife households, head between 45 and 64; 4, husband-wife households, head 65 and over; and 5, all other households.

Only the first three demographic groups are analyzed below, largely because the remaining groups contain relatively few households; hence, a total of nine subgroups are included in the analysis (A_1 , A_2 , A_3 , B_1 , B_2 , B_3 , C_1 , C_2 , and C_3). The demographic stratification is used in preference to the construction of independent variables for age and marital status because it seemed desirable to test the proposition that the influence of many factors, especially anticipatory ones, is not the same for households with relatively young and relatively old heads. For example, it has been argued by many that wealth (discounted future income plus net worth from property) is a more important determinant of consumption behavior than is current income.⁷ If so anticipatory variables, which are likely to be more highly correlated with wealth than with current income, ought to be of greater significance in the purchase decisions of younger than of older households, and vice versa for variables that reflect the current financial situation.

Before proceeding to discuss the hypotheses under test, a brief digression on degrees of freedom is in order. The regressions presented below and in Appendix A were not the first regressions computed during this investigation; as a consequence, some degrees of freedom have been used up. Some of the variables represent the survivors from a more comprehensive list originally tested on one subgroup. Since nine subgroups are available, the results for the other subgroups represent legitimate tests rather than a recomputation omitting variables known to be nonsignificant. In other cases a particular variable was tested with one scale, the scale redesigned on the basis of the results, and the regression recomputed. The redesigned variable is bound to show the appropriate result in the test subgroup, but constitutes an hypothesis to be tested in other subgroups.

On the whole, it is fair to say that the empirical results presented in the text of this chapter are less suspect, because of preliminary investigation, than are the regressions shown in Appendix A. At a fairly late stage in the project the focus of the regression analysis was altered to concentrate

⁷ This view, or variations of it, underlies much of the recent theoretical and empirical research on consumer behavior. See, for example, Milton Friedman, *A Theory of the Consumption Function*, Princeton for NBER, 1957; and Franco Modigliani and R. E. Brumberg, "Utility Analysis and the Consumption Function" reprinted in K. K. Kurihara (ed.), *Post-Keynesian Economics*, New Brunswick, N.J., Rutgers University Press, 1954.

on the differential impact of buying intentions on the association between purchases and initial-data variables, on the one hand, and purchases and intervening variables, on the other. Also, it was decided to compute regressions with both purchases and standard buying intentions as dependent variables, using a common set of independent variables. The procedure involved selecting (on the basis of the results in Appendix A) the initial-data variables most consistently related to purchases, then adding a number of intervening variables—notably, the dummies for house-purchases and house-buying intentions. As a consequence, the results in this chapter represent tests of hypotheses in the strict sense except that the initial-data variables have been selected partly on the basis of a preliminary investigation.

Hypotheses Under Test

The hypotheses being tested mainly constitute implications of the basic thesis of the monograph—that buying intentions are a reflection of the household's subjective purchase probability, and that the distribution of these purchase probabilities is a continuous function. As already noted, initial-data variables are expected to be more closely related to buying intentions than to purchases, intervening variables are expected to be more closely related to purchases than to intentions, and the introduction of intentions into a regression of purchases on variables in both categories should reduce the net influence of initial-data variables more than that of intervening variables.

It has been noted above that intentions are a relatively crude proxy for purchase probability.⁸ The consequences of this fact are worth examining more carefully. For illustration, take the relation between family income and purchases. If purchase probability is not standardized, income and purchases will be positively related, since families with relatively high incomes tend to buy more, other things equal, than families with relatively low incomes. But if purchase probability is held constant, there is no a-priori reason why income should have any net influence on purchases; high-income families will tend to have higher purchase probabilities than low-income ones; and the full effect of income differences ought to be included in probability differences because families know their incomes at the time they report probabilities. Income might continue to show a net influence on purchases if favorable intervening events were more common in relatively high-income families, but even here income and pur-

⁸ See "Data Limitations," above.

chases would show no net association provided variables reflecting these intervening events were also included in the analysis.

However, suppose that a precise measure of purchase probability is not available. Buying intentions serve as a proxy for probability in that intenders have higher mean probabilities than nonintenders. But further suppose that, in the lexicon of Chapter 3, relatively high-income households tend to have systematically higher cut-off probabilities than relatively low-income ones, given the intentions question, or that they have higher mean probabilities in the segment of the distribution either above or below the probability cut-off. In that case intenders and/or nonintenders would have higher mean purchase probabilities if their incomes were high than if they were low; this fact would be reflected in the regression coefficient of income, holding buying intentions constant. Income will be associated with purchases, net of buying intentions, because income is serving as a proxy for purchase probability even after account is taken of the intentions variable. In effect, any variable that tends to be correlated with purchase probability, *given* buying intentions, will tend to show (empirically) a net association with purchases for that reason.

The hypotheses underlying the housing variables can now be discussed more precisely. As noted earlier, three dummy variables related to housing are employed in the analysis; these are designated H_{01} (unanticipated housing purchases), H_{10} (unfulfilled house-buying intentions), and H_{11} (anticipated housing purchases). The regression coefficient of each of these variables measures the difference in average purchases between households in each of the respective housing categories and those in the fourth (neither intended to buy nor purchased a house). Ignoring purchase probability or its proxy, buying intentions, it is clear that those purchasing a house are likely to buy relatively many durable goods whether or not they reported house-buying intentions. As the data will show, those anticipating the housing purchase tend to buy more durables than other house buyers, possibly because a lengthier period of preparation facilitates a more rapid acquisition of the durables with which to furnish and equip the house.⁹ It is not evident, a priori, whether those reporting house-buying intentions but not purchasing will tend to buy more durable goods than those doing neither, although it appears from the results that they typically do.

When buying intentions are introduced into the analysis, it is expected that the regression coefficient of H_{01} will be positive; that of H_{10} , negative.

⁹ This difference in purchases might well disappear if a longer forecast period had been employed in the analysis, say twelve months instead of six months.

On the average, those in H_{01} must have experienced intervening events favorable to purchases; those in H_{10} , unfavorable intervening events; and the coefficients of H_{01} and H_{10} will reflect these influences. By the same token, it appears that households in the H_{11} group should buy more durables net of intentions than those neither intending to buy nor buying a house, since they must, on average, have experienced favorable intervening events. Hence, the regression coefficient of H_{11} should also be positive. But this group should buy fewer durables relative to intentions than those in H_{01} , since they must have experienced favorable intervening events to a lesser degree. Consequently, the regression coefficient of H_{11} , net of buying intentions, should be smaller than that of H_{01} .¹⁰

Finally, the buying-intentions variable constitutes a measure of mean *ex ante* purchase probability for durable goods: more precisely, the regression coefficient of buying intentions is an estimate of the mean difference in *ex ante* purchase probability between intenders and nonintenders; in the terminology of Chapter 3, the regression coefficient of intentions is an estimate of $r' - s'$. The model predicts that this regression coefficient will be relatively large when the cut-off probability associated with the intentions question is relatively high, given the skew in the underlying probability distributions. (See Chapter 3, especially the analysis of the data in Tables 9 and 10.)

Description of Basic Data Tables

The basic correlation and regression data are shown in Tables 42–44, at the end of this chapter; these tables relate to the respective subgroups designated above as A_1, \dots, C_3 . Independent variables are listed in the stub in order of their introduction: objective initial-data variables

¹⁰ This conclusion follows from the facts that households in H_{11} had a higher *ex ante* probability of house purchase than those in H_{01} and that *ex post*, both groups purchased. It should be noted, however, that the analysis holds only on the assumption that the mean *ex ante* probability associated with *durable goods* buying intentions is the same in all housing groups. As will be discussed, the assumption probably does not hold.

To anticipate the argument, mean *ex ante* purchase probability (for durables) among intenders and nonintenders is not likely to be the same for households in the different housing categories. Those intending to buy and buying a house presumably had a higher mean *ex ante* probability of purchasing the *house* than those either intending to buy and not purchasing or those not reporting intentions but purchasing. To the extent that the durable goods buying intentions of H_{11} households are contingent on the purchase of a house, it seems reasonable to assume that the mean *ex ante* probability associated with the durable goods buying intentions of H_{11} households is also likely to be higher than for others. That is to say, intenders in this group are likely to have higher mean *ex ante* probabilities, given their buying intentions, than those in either H_{10} or H_{01} . Statistically, this fact would be reflected in a positive regression coefficient for the H_{11} dummy variable, other things equal.

ANALYSIS OF PURCHASES AND INTENTIONS

($Y, \Delta L_{-1}, \Delta Y_{-1}, S'$) first, then anticipatory initial-data variables (\hat{E}, O, \hat{E}_5), then intervening variables ($\Delta Y, \Delta Y_t, H_{01}, H_{10}, H_{11}$), and finally, buying-intentions variables ($\hat{P}, \hat{P}_c, Z\hat{P}_c$). Columns 1 through 3 show net regression coefficients with standard buying intentions (\hat{P}) as the dependent variable; in column 1 coefficients are shown for the four objective initial-data variables; in column 2, for the three anticipatory and the four objective variables; and in column 3, for the five intervening variables plus the objective and anticipatory initial-data variables. These three regressions are designated as $X_1, \dots, X_4, X_1, \dots, X_7$, and X_1, \dots, X_{12} , respectively, corresponding to the variables included in each. The significance levels for regression coefficients are indicated by asterisks—** = 0.01 level; * = 0.05 level.¹¹ The constant term and the multiple correlation coefficient are shown at the bottom of the table.

In addition to the net regression coefficients, F ratios are shown both for groups of variables and for some individual variables; all these F ratios are net of all variables included in the respective regression equations. In the first column of Table 42, for example, the joint F ratio for objective initial-data variables is 9.0, based on the variance explained by these four variables. In the second column, the joint F ratio for anticipatory initial-data variables is 15.9, based on the (incremental) variance explained by these three variables. A new joint F ratio (7.7) for the objective variables net of the anticipatory ones is also shown in the second column; but this measure is an approximation.¹²

Columns 4–7 show regression coefficients and F ratios for equations having durable goods purchases as the dependent variable. Columns 4, 5, and 6 are comparable to columns 1, 2, and 3, respectively, in that a common set of independent variables is used. Column 7 has net regression coefficients for all fifteen independent variables; thus, columns 6 and 7 differ only in that the latter includes the three buying intentions variables while the former excludes them. The F ratios in columns

¹¹ Because some degrees of freedom have been used up in preliminary regressions, somewhat conservative t tests were used. The 0.05 level thus means a t ratio of at least 2; the 0.01 level, a t ratio of at least 3.

¹² The computer program did not yield the incremental variance explained by, X_1, \dots, X_4 net of X_5, \dots, X_7 . Joint F ratios that could not be computed directly from the incremental explained variance were estimated from t ratios; in the second column of Table 42, for example, the joint F ratio of 7.7 for objective variables is the mean of the squared t ratios for the four variables. This procedure gives a biased estimate of the true F ratio for a group of variables to the extent that intercorrelation exists among the variables in the group; if the within-group intercorrelations are all zero, the mean F ratio, as estimated from the t ratios, is identical to the joint F ratio. Since the relevant intercorrelations are actually quite small, all joint F ratios shown in these tables are close approximations to the true numbers.

4 through 7 are again exact estimates for incremental groups of variables, approximations for groups of variables previously included in the regression. The last two columns show F ratios for each of the fifteen independent variables against both intentions (column 8) and purchases (column 9); these ratios were computed from zero-order correlation coefficients.¹³

Empirical Results

SUMMARY

On the whole the data provide rather impressive support for the basic hypotheses. In all nine subgroups, the partial correlations of both groups of initial-data variables (objective and anticipatory) are stronger with buying intentions than with purchases, measuring the partial correlation by the joint F ratio. The contrast is strongest for the subgroups (C_1 , C_2 , and C_3) with an intentions question that, since it maximizes the correlation between intentions and purchases, is the closest available proxy for purchase probability. Also, about two-thirds of the regression coefficients for the seven initial-data variables are larger when buying intentions rather than purchases are the dependent variable. For the intervening variables, twenty-two of the twenty-seven partial correlations (ΔY and ΔY_i jointly, H_{10} and H_{01} separately, within each of nine subgroups) are stronger with purchases than with intentions, as predicted. The data for H_{11} are less consistent: the partial correlations are about the same with intentions as with purchases, and the regression coefficients are also about the same. Special circumstances are relevant here, and this problem is discussed below. (All these statements are based on comparisons of columns 3 and 6 in Tables 42–44, that is, on regressions that do not include buying intentions as an independent variable but regress both purchases and intentions on a common set of initial-data and intervening variables.)

The data also clearly evidence the predicted differential influence of buying intentions on the relation between initial-data or intervening variables and purchases. Given nine subgroups, the total numbers of observations on (seven) initial-data and (four) intervening variables are sixty-three and thirty-six, respectively, again excluding the H_{11} variable.

¹³ The means of the F ratios in columns 8 and 9 for any group of variables are the joint F ratios that would have been observed if there were in fact zero intercorrelation not only among variables within a group but among all independent variables shown. A comparison of such mean F ratios—for example, as computed from column 8 with the joint F ratio in column 1 for the objective group of variables, or as computed from column 9 with the joint F ratio in column 4—indicates that intercorrelation within this group of variables is in fact close to zero.

ANALYSIS OF PURCHASES AND INTENTIONS

Table 32 summarizes the total number of cases in which variables in these respective categories have the predicted algebraic sign and a significance level of 0.05 or the predicted sign and a significance level of 0.01, before and after buying intentions are held constant. Summary data are shown

TABLE 32
SUMMARY OF RESULTS FROM MULTIVARIATE REGRESSION ANALYSIS: NUMBERS OF STATISTICALLY SIGNIFICANT REGRESSION COEFFICIENTS AND MEAN OF *F* RATIOS

| SUBGROUP | NUMBER OF NET REGRESSION COEFFICIENTS THAT HAVE PREDICTED SIGN AND HAVE <i>t</i> RATIO | | | | | |
|--|--|------------------|-------------------|------------------|-------------------------|------------------|
| | Greater than 2 | | Greater than 3 | | Mean of <i>F</i> Ratios | |
| | Before Intentions | After Intentions | Before Intentions | After Intentions | Before Intentions | After Intentions |
| OBJECTIVE INITIAL-DATA ^a | | | | | | |
| A ₁ , B ₁ , C ₁ | 6 | 3 | 6 | 2 | 9.4 | 4.4 |
| A ₂ , B ₂ , C ₂ | 6 | 6 | 6 | 3 | 11.6 | 4.7 |
| A ₃ , B ₃ , C ₃ | 6 | 4 | 4 | 2 | 7.8 | 4.1 |
| Total or mean | 18 | 13 | 16 | 7 | 9.6 | 4.4 |
| ANTICIPATORY INITIAL-DATA ^b | | | | | | |
| A ₁ , B ₁ , C ₁ | 4 | 3 | 3 | 1 | 8.0 | 4.4 |
| A ₂ , B ₂ , C ₂ | 3 | 3 | 3 | 1 | 7.2 | 3.7 |
| A ₃ , B ₃ , C ₃ | 4 | 2 | 1 | 0 | 4.1 | 2.1 |
| Total or mean | 11 | 8 | 7 | 2 | 6.4 | 3.4 |
| COMBINED OBJECTIVE AND ANTICIPATORY INITIAL-DATA | | | | | | |
| Total or mean | 29 | 21 | 23 | 9 | 8.2 | 4.0 |
| INTERVENING ^c | | | | | | |
| A ₁ , B ₁ , C ₁ | 4 | 5 | 3 | 4 | 8.3 | 7.7 |
| A ₂ , B ₂ , C ₂ | 5 | 5 | 2 | 2 | 5.0 | 5.5 |
| A ₃ , B ₃ , C ₃ | 2 | 3 | 1 | 1 | 3.2 | 3.1 |
| Total or mean | 11 | 13 | 6 | 7 | 5.5 | 5.4 |

SOURCE: Tables 42-44.

^a Variables included are normal family income (*Y*), change in liquid assets (ΔL_{-1}) and in family income (ΔY_{-1}) prior to the survey, and stock adjustment (*S'*).

^b Variables included are expectations index (\bar{E}), opinion about buying conditions (*O*), and long-range financial prospects (\bar{E}_6).

^c Variables included are income change during the forecast periods (ΔY), transitory income (ΔY_t), unexpected housing purchase (*H*₀₁), and unfulfilled plan to buy house (*H*₁₀).

for the three life-cycle groups. The mean of the joint *F* ratios is also shown, both before and after the inclusion of buying intentions.

A number of points stand out clearly. First, the *F* ratios for both categories of initial-data variables decline sharply when buying intentions are included in the regression, while the *F* ratios for intervening variables are hardly affected at all. In fact, the joint *F* ratios for both categories of

initial-data variables decline in every one of the nine subgroups when buying intentions are added to the regression. In only about 10 per cent of the 63 cases does the partial correlation between purchases and any initial-data variable show an increase when intentions are held constant. In contrast, both correlation and regression coefficients for intervening variables increase in about half the cases when buying intentions are held constant.

Secondly, the number of initial-data variables with a statistically significant relation to purchases differs sharply depending on whether or not intentions are held constant; this is not the case for intervening variables. The contrast is most evident from a comparison of the third and fourth columns in Table 32. Before intentions are included in the regression, initial-data variables are significantly related to purchases at the 0.01 level in twenty-three cases (sixteen objective and seven anticipatory); intervening variables have this strong an association with purchases in six cases. After the inclusion of buying intentions, only nine of the original twenty-three cases involving initial-data variables still show significance at the 0.01 level, while seven intervening variables—a net increase—now show an 0.01-level association with purchases.¹⁴

Finally, there is some indication that the relative importance of objective and anticipatory initial-data variables differs among life-cycle groups. The anticipatory variables are clearly more important for households with relatively young heads, judging both from the joint F ratios and from the number of cases that show a statistically significant relation to purchases at the 0.01 level. However, it does not appear from these data that objective variables are more important for households with older heads; rather, there seems to be no pattern at all in this regard. But data to be presented later suggests that objective variables may in fact be more important for households with older heads.

A more detailed summary of results from the multivariate analysis is given by Table 33, which shows the algebraic sign and significance level for each variable in all nine subgroups, based on regressions from columns 3 and 7 of Tables 42–44.

Looking first at the regression with buying intentions dependent, it

¹⁴ Although the intervening variables that show a significant association with purchases at the 0.01 level are all housing dummy variables (H_{01} and H_{10}), the other intervening variables show the same pattern. For example, there are four cases in which income change or transitory income are significantly related to purchases (0.05 level) before inclusion of buying intentions; all four of these cases are still significant at the 0.05 level after inclusion of intentions, and the regression coefficients are practically unchanged.

TABLE 33
SUMMARY OF RESULTS FROM MULTIVARIATE REGRESSION ANALYSIS: ALGEBRAIC
SIGNS OF ALL NET REGRESSION COEFFICIENTS AND *t* RATIOS

| Independent Variables | Subgroup Designation | | | | | | | | | Number of Net Regression Coefficients * or ** | | |
|---|----------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|--|----|----|
| | A ₁ | A ₂ | A ₃ | B ₁ | B ₂ | B ₃ | C ₁ | C ₂ | C ₃ | + | ** | ** |
| REGRESSIONS WITH BUYING INTENTIONS DEPENDENT | | | | | | | | | | | | |
| Initial-data | | | | | | | | | | | | |
| Objective | | | | | | | | | | | | |
| <i>Y</i> | + | ** | + | ** | ** | ** | ** | * | ** | 9 | 7 | 6 |
| ΔL_{-1} | + | 0 | + | + | * | * | + | + | + | 8 | 2 | 0 |
| ΔY_{-1} | + | + | 0 | + | 0 | + | + | ** | + | 7 | 2 | 1 |
| <i>S'</i> | ** | ** | ** | ** | ** | ** | ** | ** | ** | 9 | 9 | 9 |
| Anticipatory | | | | | | | | | | | | |
| \hat{E} | + | 0 | + | 0 | + | * | + | * | 0 | 6 | 2 | 0 |
| <i>O</i> | ** | ** | ** | ** | ** | ** | ** | ** | ** | 9 | 9 | 9 |
| \hat{E}_s | * | + | ** | + | + | + | * | 0 | + | 8 | 3 | 1 |
| Intervening | | | | | | | | | | | | |
| Income change | | | | | | | | | | | | |
| ΔY | 0 | + | + | 0 | 0 | + | 0 | * | + | 5 | 1 | 0 |
| ΔY_t | 0 | + | 0 | + | + | + | + | + | 0 | 6 | 0 | 0 |
| Housing | | | | | | | | | | | | |
| <i>H</i> ₀₁ | * | * | + | + | + | + | * | + | + | 9 | 3 | 0 |
| <i>H</i> ₁₀ | + | ** | 0 | ** | ** | ** | ** | ** | ** | 8 | 7 | 7 |
| <i>H</i> ₁₁ | ** | + | ** | ** | ** | ** | ** | ** | + | 9 | 7 | 7 |
| REGRESSIONS WITH PURCHASES DEPENDENT | | | | | | | | | | | | |
| Initial-data | | | | | | | | | | | | |
| Objective | | | | | | | | | | | | |
| <i>Y</i> | ** | * | ** | ** | ** | ** | + | ** | * | 9 | 8 | 6 |
| ΔL_{-1} | 0 | + | + | + | 0 | + | + | + | 0 | 6 | 0 | 0 |
| ΔY_{-1} | 0 | 0 | + | + | 0 | + | 0 | 0 | + | 4 | 0 | 0 |
| <i>S'</i> | + | * | + | * | ** | * | + | * | + | 9 | 5 | 1 |
| Anticipatory | | | | | | | | | | | | |
| \hat{E} | 0 | 0 | 0 | + | + | 0 | + | + | + | 5 | 0 | 0 |
| <i>O</i> | ** | + | * | + | ** | + | * | * | * | 9 | 6 | 2 |
| \hat{E}_s | 0 | 0 | + | + | 0 | + | * | * | + | 6 | 2 | 0 |
| Intervening | | | | | | | | | | | | |
| Income change | | | | | | | | | | | | |
| ΔY | * | * | + | 0 | + | + | 0 | + | + | 7 | 2 | 0 |
| ΔY_t | + | * | + | + | 0 | * | + | + | + | 8 | 2 | 0 |
| Housing^a | | | | | | | | | | | | |
| <i>H</i> ₀₁ | ** | + | + | ** | ** | ** | ** | ** | + | 9 | 6 | 6 |
| <i>H</i> ₁₀ | 0 | 0 | + | 0 | *(0) | 0 | ** (0) | 0 | *(0) | 1 | 3 | 1 |
| <i>H</i> ₁₁ | ** | ** | * | ** | ** | ** | * | ** | + | 9 | 8 | 6 |
| Buying intentions^b | | | | | | | | | | | | |
| \hat{P} | ** | ** | ** | ** | ** | ** | ** | ** | ** | 9 | 9 | 9 |
| $\hat{P}_c, Z\hat{P}_c$ | ** | ** | + | * | + | 0 | * | + | + | 8 | 4 | 2 |

+ = positive net regression coefficient, *t* ratio < 2

0 = negative net regression coefficient, *t* ratio < 2

* = positive net regression coefficient, *t* ratio > 2

*(0) = negative net regression coefficient, *t* ratio > 2

** = positive net regression coefficient, *t* ratio > 3

** (0) = negative net regression coefficient, *t* ratio > 3

SOURCE: Tables 42-44. Independent variables are defined above, in "Description of Variables."

^a The predicted regression coefficient of *H*₁₀, net of buying intentions, is negative.

^b Algebraic sign for $\hat{P}_c, Z\hat{P}_c$ is taken from the regression that includes \hat{P}_c only and not $Z\hat{P}_c$; significance level is that for \hat{P}_c before adding $Z\hat{P}_c$ or that for $Z\hat{P}_c$, whichever is higher.

ANALYSIS OF PURCHASES AND INTENTIONS

appears that five of the twelve independent variables are significantly related to intentions in almost every subgroup, usually at the 0.01 level. These include normal family income, desired stock adjustment, opinion about buying conditions, unfulfilled plans to buy a house, and anticipated purchases of housing. Four others (income and liquid-asset change prior to the survey, the expectations index, and long-range financial prospects) generally have the predicted algebraic sign and are significant in at least two of the nine groups; these variables, especially the first two, are generally significant at the 0.01 level in a zero-order regression but are redundant to other variables—notably, to opinion about buying conditions. Of the remaining three variables, the hypotheses tested do not predict the sign of one (unexpected housing purchases), although the signs are all positive; the other two (intervening income changes) are predicted not to have any net association with buying intentions. On the whole, therefore, the results accord quite well with the hypotheses.

Turning to the regressions with durable goods purchases dependent, the strongest and most consistent variables are normal family income, unanticipated housing purchases, anticipated housing purchases, and standard buying intentions. Two others—desired stock adjustment and opinion about buying conditions—always have the predicted sign and are generally significant at the 0.05 level, though not at the 0.01 level. The two intervening income-change variables, as well as contingent buying intention, long-range financial prospects, and unfulfilled house-buying intentions, usually have the predicted sign (positive for the first four, negative for H_{10}), and are significant in at least two of the subgroups. Finally, three variables seem to be essentially unrelated to purchases—change in income and change in liquid assets prior to the survey date and the expectations index.

In terms of the classification via initial-data, intervening, and buying-intentions variables, standard buying intentions are clearly the strongest variable of the fifteen; this variable accounts for close to half the total explained variance. The intervening housing variables are consistently significant, and the intervening income-change variables are consistent with respect to algebraic sign though they are generally not statistically significant. Some of the initial-data variables continue to exert a strong influence on purchases net of buying intentions, although in every case their influence is sharply reduced when intentions are included in the regression.

It should be noted that the subgroups differ markedly in the degree to which the respective intentions questions constitute an adequate proxy

ANALYSIS OF PURCHASES AND INTENTIONS

for purchase probability. The regression analysis confirms the earlier finding (Chapter 2) that the intentions questions in the C subgroups are the best of those available in the CU data; both the simple and partial correlation between intentions and purchases is consistently stronger in the C groups. As a consequence, initial-data variables ought to be less strongly associated with purchases net of intentions in the C subgroups than elsewhere, while the influence of intervening variables ought to be about the same. It appears from Table 33 (and from the basic data tables) that this is in fact the case: for example, the net relation between the income or stock adjustment variables and purchases is clearly less strong in C_1 , C_2 , and C_3 than elsewhere, while the intervening housing variables H_{10} and H_{01} are at least as strong net of buying intentions in the C groups as in other groups.

Finally, Table 33 provides an additional test of the proposition that initial-data variables will be more strongly related to buying intentions than to purchases, and that the converse ought to be true with respect to intervening variables. A glance at the summary statistics on the right-hand side of Table 33 confirms that this is the typical pattern. For every variable in the initial-data category the same or more subgroups have the predicted sign in the intentions regression than in the purchases regression, and the same or more subgroups have both the predicted sign and any given level of statistical significance (with one exception—family income, 0.05 significance level). For every variable in the intervening category, the converse is true.¹⁵

The data in Table 33 indicate that a number of variables have a negligible net influence on both intentions and purchases. One last general summary—Table 34—is therefore presented; regression coefficients and F ratios before and after buying intentions are held constant are shown for those initial-data and intervening variables that are significantly related to purchases (0.05 level) in at least two of the nine groups, net of all independent variables. Data from only the A and C subgroups are presented, since the results are about the same in the B groups as in A. The independent variables comprise two objective initial-data variables

¹⁵ There appear to be two exceptions to this statement: H_{10} shows a preponderance of plus signs and coefficients significant at the 0.01 level in the intentions regression; this is as predicted, since those with (unfulfilled) house-buying intentions ought to have relatively more durable goods buying intentions than other households. In the purchases regression, H_{10} generally has negative coefficients, a few of which are significant; but this is again as predicted, since households in this category (planned to buy a house but did not purchase) are expected to buy relatively fewer durables, holding buying intentions constant, than others, because they must have experienced unfavorable intervening events. The other apparent exception is H_{11} , which is analyzed below.

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 34

SUMMARY OF RESULTS FROM MULTIVARIATE REGRESSION ANALYSIS: EFFECT OF ADDING DURABLE GOODS BUYING INTENTIONS TO REGRESSIONS OF PURCHASES ON SELECTED VARIABLES (mean *F* ratios are shown in brackets)

| Independent Variables | Net Regression Coefficients | | | | | | | |
|-----------------------|-----------------------------|----------|----------------|---------|----------------|---------|-------|--|
| | Before | | After | | Before | | After | |
| | A ₁ | | A ₂ | | A ₃ | | | |
| Initial-data | | | | | | | | |
| Objective | [13.4] | [7.7] | [21.1] | [6.3] | [11.0] | [6.2] | | |
| Y | 0.048** | 0.039** | 0.035** | 0.021* | 0.035** | 0.033** | | |
| S' | 0.106** | 0.020 | 0.168** | 0.078* | 0.114* | 0.042 | | |
| Anticipatory | [16.3] | [10.1] | [6.2] | [1.8] | [6.5] | [3.2] | | |
| O | 0.383** | 0.291** | 0.247** | 0.131 | 0.281* | 0.214* | | |
| E _s | 0.043 | -0.010 | 0.030 | -0.022 | 0.262* | 0.166 | | |
| Intervening | | | | | | | | |
| Income Change | [3.7] | [4.3] | [5.8] | [5.8] | [0.6] | [0.4] | | |
| ΔY | 0.126* | 0.125* | 0.152* | 0.148* | 0.100 | 0.077 | | |
| ΔY _t | 0.252 | 0.289 | 0.494* | 0.488* | -0.005 | 0.051 | | |
| Housing | [16.9] | [14.8] | [3.1] | [2.5] | [2.2] | [2.2] | | |
| H ₀₁ | 1.196** | 1.055** | 0.664* | 0.488 | 0.679 | 0.657 | | |
| H ₁₀ | -0.094 | -0.234 | -0.013 | -0.312 | 0.541 | 0.540 | | |
| Housing | [39.7] | [19.4] | [14.4] | [10.2] | [14.4] | [6.8] | | |
| H ₁₁ | 1.519** | 1.053** | 1.253** | 1.027** | 2.038** | 1.388* | | |
| | C ₁ | | C ₂ | | C ₃ | | | |
| Initial-data | | | | | | | | |
| Objective | [15.5] | [2.5] | [24.1] | [9.3] | [12.1] | [2.6] | | |
| Y | 0.038** | 0.022 | 0.041** | 0.032** | 0.030* | 0.020* | | |
| S' | 0.151** | 0.043 | 0.186** | 0.072* | 0.158** | 0.045 | | |
| Anticipatory | [16.2] | [8.4] | [11.9] | [5.6] | [7.3] | [3.2] | | |
| O | 0.308** | 0.192* | 0.334** | 0.190* | 0.324** | 0.212* | | |
| E _s | 0.273** | 0.208* | 0.172 | 0.176* | 0.134 | 0.086 | | |
| Intervening | | | | | | | | |
| Income Change | [2.3] | [1.6] | [1.5] | [0.8] | [0.3] | [0.4] | | |
| ΔY | -0.082 | -0.066 | 0.108 | 0.060 | 0.032 | 0.013 | | |
| ΔY _t | 0.262 | 0.208 | 0.201 | 0.184 | 0.163 | 0.198 | | |
| Housing | [18.8] | [19.9] | [10.2] | [12.8] | [1.2] | [2.8] | | |
| H ₀₁ | 1.387** | 1.100** | 1.274** | 1.320** | 0.448 | 0.396 | | |
| H ₁₀ | -0.397 | -0.893** | -0.060 | -0.402 | -0.456 | -0.859* | | |
| Housing | [24.0] | [7.8] | [24.0] | [11.6] | [0.8] | [0.6] | | |
| H ₁₁ | 1.384** | 0.785* | 1.940** | 1.328** | 0.616 | 0.514 | | |

* = *t* ratio >2.

** = *t* ratio >3.

SOURCE: Tables 42-44; regression coefficients are from columns 6 and 7. The independent variables are defined above, in "Description of Variables."

ANALYSIS OF PURCHASES AND INTENTIONS

(normal family income, Y , and desired stock adjustment, S'); two anticipatory initial-data variables (opinion about buying conditions, O , and long-range financial prospects, \hat{E}_5); two intervening income-change variables (change in income during the forecast period, ΔY , and transitory income, ΔY_t); two intervening housing variables (H_{01} , unanticipated housing purchase, and H_{10} , unfulfilled plans to buy a house); and the one variable that has a pronounced element of both intervening and initial-data considerations (H_{11} , anticipated purchase of a house). Mean F ratios for the four pairs of variables and the F ratio for H_{11} are shown in brackets.

The differential impact of buying intentions on the relation between purchases and initial-data or intervening variables is strikingly evidenced in Table 34. In subgroup A_2 , for example, the objective initial-data variables Y and S' have a mean F ratio of 21.1 before intentions are held constant; the anticipatory initial-data variables O and \hat{E}_5 , a mean F ratio of 6.2. After intentions are held constant, these F ratios fall to 6.3 and 1.8, respectively. But the intervening variables ΔY and ΔY_t have the same mean F ratio (5.8) both before and after. In the subgroup C_1 the same objective and anticipatory initial-data variables have mean F ratios of, respectively, 15.5 and 16.2 before, 2.5 and 8.4 after; the intervening income-change variables, in contrast show a small decline—from 2.3 to 1.6.¹⁶

¹⁶ The difference between the A and C subgroups in the relative influence of buying intentions on the relation between purchases and initial-data variables should again be noted. This difference must be due to the buying intentions questions asked of households in these groups, sampling variation aside. The before-intentions and after-intentions mean F ratios for the specified initial-data variables are:

| | Y, S' | | O, \hat{E}_5 | |
|---------------------|-------------|------------|----------------|------------|
| | Before | After | Before | After |
| A_1 | 13.4 | 7.7 | 16.3 | 10.1 |
| A_2 | 21.1 | 6.3 | 6.2 | 1.8 |
| A_3 | 11.0 | 6.2 | 6.5 | 3.2 |
| Mean of A Subgroups | <u>15.2</u> | <u>6.7</u> | <u>9.7</u> | <u>5.0</u> |
| C_1 | 15.5 | 2.5 | 16.2 | 8.4 |
| C_2 | 24.1 | 9.3 | 11.9 | 5.6 |
| C_3 | 12.1 | 2.6 | 7.3 | 3.2 |
| Mean of C Subgroups | <u>17.2</u> | <u>4.8</u> | <u>11.8</u> | <u>5.7</u> |

On the basis of these data the initial-data variables apparently are somewhat more strongly related to purchases in the C subgroups than in A, *prior* to the introduction of intentions. This is presumably a sampling phenomenon, since these variables are identical in each subgroup and the subgroups themselves were selected at random. Net of buying intentions, however, the Y and S' variables have *less* influence in the C

The two housing variables that are mainly intervening are not influenced much by the inclusion of buying intentions. In three of the six groups the mean F ratio for H_{01} and H_{10} increases when buying intentions are held constant, and in the other three groups the change is either nil or a negligible decline. For H_{11} , which is partly an intervening and partly an initial-data variable, the F ratio declines in all six groups, although in no case does the addition of buying intentions reduce a statistically significant H_{11} coefficient to a nonsignificant one. Nonetheless, the H_{11} coefficients all drop considerably and the F ratios are roughly halved, comparing the situation before and after buying intentions are included in the regression on purchases.

Further, it is clear from both Table 34 and the basic data tables that the regression coefficient of H_{11} (anticipated housing purchases) is generally *larger* than that of H_{01} (unanticipated housing purchases) net of intentions to buy durables. Ordinarily, H_{11} has a much larger regression coefficient than H_{01} before durable goods intentions are included in the regression, a slightly larger one after intentions are held constant; that is, holding intentions constant reduces the H_{11} coefficient much more than that of H_{01} , but not enough more to reverse the direction of difference. Since favorable intervening events must have been more frequent or more important in H_{01} than in H_{11} (see above), this result is inconsistent with predictions of the probability model. Because the problem is complicated, I have deferred further examination of it until the remaining results have been discussed.

DIFFERENCES BETWEEN LIFE-CYCLE CLASSES

It has already been noted that anticipatory initial-data variables are more closely related to purchases in households with younger heads, while objective initial-data variables seemed to have no life-cycle pattern at all vis-à-vis purchases. Table 35 facilitates a more careful examination of this proposition; F ratios from the regression of purchases on anticipatory and objective initial-data variables are shown for each of the nine subgroups, as is the F ratio for durable goods buying intentions. Two sets of these ratios are included: one is the mean of the F ratios calculated from the simple correlation between each independent variable and purchases;

groups; the O and \hat{E}_5 variables just slightly more. A comparison of paired observations in the respective subgroups (A_1 versus C_1 , etc.) suggests that the C intentions question exerts a stronger influence on the initial-data variables in almost every case. The reason presumably is that the intentions question in the C groups is a better proxy for purchase probability than the question in A; hence, the initial-data variables are more redundant to buying intentions in the C groups.

ANALYSIS OF PURCHASES AND INTENTIONS

the other is the mean of the F ratios estimated from the partial correlations in the complete (fifteen-variable) regression.

The hypothesized life-cycle pattern for both anticipatory initial-data variables and buying intentions is clearly in evidence: households with relatively young heads tend to have the highest F ratios based on either the simple or partial correlation with purchases; those with relatively older heads, the lowest F ratios. But there seems to be no discernible life-cycle pattern to the F ratios for objective initial-data variables. However, these observations are based on the relation between initial-data

TABLE 35
MEAN F RATIOS FOR RELATION BETWEEN GROUPS OF INDEPENDENT VARIABLES
AND DURABLE GOODS PURCHASES, BY LIFE-CYCLE CLASS

| SUBGROUP | INITIAL-DATA VARIABLES | | | | Buying Intentions ^a | |
|----------------|------------------------|-----|--------------|-----|--------------------------------|------|
| | Objective | | Anticipatory | | | |
| | Simple | Net | Simple | Net | Simple | Net |
| A ₁ | 10.2 | 4.1 | 20.2 | 6.8 | 133.3 | 80.7 |
| B ₁ | 16.8 | 7.9 | 6.7 | 0.8 | 128.1 | 71.7 |
| C ₁ | 9.8 | 1.2 | 16.0 | 5.7 | 154.8 | 87.0 |
| Mean | 12.3 | 4.4 | 14.3 | 4.4 | 138.7 | 79.8 |
| A ₂ | 12.9 | 3.3 | 6.1 | 1.6 | 91.4 | 61.0 |
| B ₂ | 13.0 | 6.1 | 9.9 | 5.6 | 115.2 | 56.2 |
| C ₂ | 12.4 | 4.8 | 13.8 | 4.0 | 140.2 | 73.3 |
| Mean | 12.8 | 4.7 | 9.9 | 3.7 | 115.6 | 63.5 |
| A ₃ | 9.0 | 3.6 | 9.8 | 2.6 | 48.2 | 24.2 |
| B ₃ | 11.6 | 7.2 | 4.2 | 1.1 | 63.5 | 24.7 |
| C ₃ | 6.6 | 1.6 | 9.4 | 2.6 | 67.5 | 38.8 |
| Mean | 9.1 | 4.1 | 7.8 | 2.1 | 59.7 | 29.2 |

SOURCE: Tables 42-44.

^a Standard buying intentions (\hat{P}) only; contingent buying intentions (\hat{P}_c) and the interaction variable $Z\hat{P}_c$ have a small net effect except in the A groups, although they generally have the predicted signs in other groups as well.

variables and actual purchases. Intervening events may have an important influence on this relation, particularly in view of the relatively short forecast period in the analysis. It can be argued, therefore, that the relation between initial-data variables and *buying intentions* provides a more accurate picture of the relative importance of objective and anticipatory variables in the decision-making process, since intervening events should have little or no influence on this relation.

FACTORS DETERMINING PURCHASE PROBABILITY

The data contain, not one measure of buying intentions, but several; the relation between initial-data variables and buying intentions depends on

ANALYSIS OF PURCHASES AND INTENTIONS

which intentions question is used. For example, buying intentions in the A subgroups constitute responses to a question with a relatively high probability cut-off point and a relatively small proportion of yes responses. The intentions question asked of the C subgroups has a much lower cut-off probability than that asked of A, and the C subgroups show a correspondingly much higher proportion of yes responses. Thus, an analysis of the relation between buying intentions and initial-data variables yields different results in the A, B, and C samples because of differences in the intentions variables themselves. An indication of the extent of these differences is provided by Table 36, which shows the proportion of total variance in buying intentions explained by a common set of independent variables in each of the nine subgroups.

TABLE 36
PROPORTION OF VARIANCE IN BUYING INTENTIONS EXPLAINED BY SEVEN INITIAL-DATA VARIABLES

| <i>Group</i> | <i>Life-Cycle Class</i> | | |
|--------------|-------------------------|------|------|
| | 1 | 2 | 3 |
| A | .073 | .109 | .099 |
| B | .100 | .110 | .148 |
| C | .170 | .201 | .238 |

SOURCE: Tables 42-44.

The intentions variable in the C samples is evidently much more closely associated with initial-data factors than that in the A or B samples, and the same is true for the intentions variable in the B sample relative to that in A. The reason is simple enough. The C buying-intentions variable elicited many more yes responses for each of the commodities included in the aggregate, as noted above. A minority of households in the C samples (about 35 per cent) reported no buying intentions at all; the remaining households reported numbers of intentions ranging from one to nine. Thus "aggregate intentions" is a number greater than zero for most C households, and those reporting no intentions at all presumably constitute a relatively homogeneous subsample with relatively low *ex ante* purchase probabilities.

On the other hand, the A intentions variable elicited relatively few yes responses, although many A respondents, other than the small number reporting that they "definitely" would buy, replied that they "probably or possibly" would purchase. A majority of sample A households (about 65 per cent) reported no definite buying intentions; the remainder, numbers of definite intentions varying from one to nine. But the 65

per cent of the A sample who are nonintenders constitute a relatively heterogeneous group, in that their *ex ante* purchase probabilities have a substantial variance. Although aggregate buying intentions—and *ex ante* probability—among those reporting at least one buying intention is as closely (probably more closely) associated with initial-data factors among A households as among those in C, the variance in *ex ante* probability among those reporting no buying intentions is bound to be much greater in the A groups. Since the intentions variable is evidently unable to explain any of the variance in *ex ante* probability among nonintenders, it will necessarily be unrelated to initial-data factors associated with differences in *ex ante* purchase probability for the nonintenders.¹⁷ In sum, the data suggest that the relation between the observed variable “aggregate buying intentions” and the unobserved variable “aggregate *ex ante* purchase probability” is much stronger in the C samples than in A; although the association between aggregate *ex ante* probability and initial-data factors must be the same in both groups, the association between these factors and aggregate buying intentions would be stronger in C than in A if aggregate C intentions were more strongly correlated with aggregate *ex ante* probability; and this appears to be the case.

These considerations suggest that the relation between initial-data variables and purchase probability is most closely approximated by the relation between initial-data variables and buying intentions for the C samples; the next-best intentions variable for this purpose is that in the B samples.¹⁸ Hence, Table 37 summarizes the net regression coefficients and joint *F* ratios from the regression of aggregate buying intentions on initial-data variables in the B and C samples.

The data indicate that the initial-data variables most closely associated with buying intentions (and, hence, purchase probability) are desired stock adjustment (*S'*), and opinion about buying conditions for durables (*O*). Both variables are significant at the 0.01 level net of all seven

¹⁷ The argument is basically empirical, not a priori. There is no logical reason why the association between aggregate intentions and initial-data variables might not be stronger the higher the cut-off probability of the intentions question.

¹⁸ Both standard and contingent buying intentions are proxies for purchase probability, and the A sample appears to have the best contingent-intentions variable among the three groups. But the regressions were run only on the standard buying-intentions variable in each sample, not on contingent intentions. I would guess that the relation between A contingent intentions and initial-data variables is probably as close as that between A standard intentions and these variables; this statement would not be true for the other samples. Further, it is fairly evident that a combination of standard and contingent A intentions—perhaps even so crude a combination as the sum of the two—would yield results that are not very different from those for the C standard-intentions variable.

ANALYSIS OF PURCHASES AND INTENTIONS

independent variables, and they account for roughly three-fourths of the total explained variance. Before the anticipatory variables are included in the regression, family income (Y) is also significantly related to intentions at the 0.01 level in all subgroups, and liquid-asset change prior to the intentions survey (ΔL_{-1}) is significant at the 0.05 level in all groups. But the anticipatory variables—mainly O —reduce the influence of both these variables considerably. Income is still significant at the 0.05 level

TABLE 37
NET REGRESSION COEFFICIENT AND JOINT F RATIOS FOR INITIAL-DATA VARIABLES
RELATED TO STANDARD BUYING INTENTIONS

| Subgroup | Objective Variables | | | | | Anticipatory Variables | | | |
|--------------------------------------|---------------------|-------------------|-------------------|-------------------|-----------------|------------------------|-------------------|-------------------|-----------------|
| | Y | ΔL_{-1} | ΔY_{-1} | S' | Joint F Ratio | \hat{E} | O | \hat{E}_s | Joint F Ratio |
| OBJECTIVE VARIABLES ONLY | | | | | | | | | |
| B ₁ | .035 ^a | .178 ^b | .053 | .199 ^a | 20.0 | | | | |
| B ₂ | .028 ^a | .284 ^a | -.075 | .208 ^a | 22.3 | | | | |
| B ₃ | .035 ^a | .275 ^b | .095 | .282 ^a | 24.6 | | | | |
| C ₁ | .063 ^a | .232 ^b | .221 ^a | .316 ^a | 34.0 | | | | |
| C ₂ | .038 ^a | .241 ^b | .095 | .375 ^a | 34.2 | | | | |
| C ₃ | .050 ^a | .288 ^b | .264 ^a | .444 ^a | 38.0 | | | | |
| OBJECTIVE AND ANTICIPATORY VARIABLES | | | | | | | | | |
| B ₁ | .028 ^b | .126 | .047 | .205 ^a | 17.6 | -.193 | .326 ^a | .076 | 11.0 |
| B ₂ | .023 ^b | .215 ^b | -.103 | .212 ^a | 19.0 | .167 | .311 ^a | .041 | 9.3 |
| B ₃ | .031 ^a | .239 ^b | .039 | .288 ^a | 24.5 | .702 ^b | .291 ^a | .005 | 8.8 |
| C ₁ | .047 ^a | .141 | .167 ^a | .322 ^a | 29.3 | .656 | .501 ^a | .220 ^b | 20.8 |
| C ₂ | .028 ^b | .113 | .078 | .369 ^a | 31.7 | .852 ^b | .551 ^a | .012 | 20.9 |
| C ₃ | .036 ^a | .149 | .184 ^b | .439 ^a | 35.0 | -.257 | .479 ^a | .234 | 11.0 |

SOURCE: Tables 42-44, columns 1 and 2.

^a = Significantly different from zero at 0.01 level.

^b = Significantly different from zero at 0.05 level.

in all groups; at the 0.01 level, it is significant in only three of the six. In addition, all the income regression coefficients decline markedly. The effect of the anticipatory variables on liquid-asset change is even stronger; only two of the six groups show a significant (0.05 level) relation between (ΔL_{-1}) and buying intentions after the anticipatory variables are included in the regression; and all the coefficients show a noticeable drop. In contrast, the coefficient of S' is completely unaffected when anticipatory variables are included in the regression.

The data in Table 37 exhibit consistent and fairly strong differences among life-cycle classes in the relative influence of objective and anti-

patory variables on buying intentions. In both the B and C samples the joint F ratio for objective variables is larger the older the head of household. All four objective variables contribute to this pattern, although differences in the partial correlation of S' with \hat{P} are mainly responsible. The anticipatory variables follow the opposite pattern with respect to differences among life-cycle classes; the younger the household head, the more closely are these variables related to buying intentions. This result is almost entirely due to differences in the partial correlation of O with \hat{P} ; the other two anticipatory variables behave erratically, although in the C samples both \hat{E} and \hat{E}_5 appear to be somewhat more strongly related to intentions for households with relatively young heads.

The observed differences among life-cycle classes are consistent with the hypothesis that expenditures on durables are more closely associated with wealth (defined to include the discounted value of future income) than with current income. The correlation between wealth and current income is bound to be relatively weak in households with younger heads because the variance of discounted future earnings, current income held constant, is greater the younger the household head. Hence anticipatory variables, which are correlated more closely with wealth than with current income, will have a relatively stronger net influence on purchase probability in younger households. Conversely, objective variables, which reflect differences among households in their current financial situation, will have a relatively stronger net influence on the decisions of older households because they constitute a better proxy for wealth in such a group.

A DIGRESSION ON TASTE VARIABLES

One of the most interesting results in Table 37 is the powerful influence of the stock adjustment variable, S' , on buying intentions.¹⁹ Investigation of the relation between durables stock and purchases (discussed in Appendix A) indicated a weak positive association between the two, instead of the negative relation anticipated a priori. The positive stock-purchases correlation is probably due to the correlation between stock of durables and household tastes, i.e., to what have been called personality correlations. S' , however, contains a strong subjective element; a household may have a large and relatively new stock of durables and yet report that many items need replacement precisely because its members have

¹⁹ S' represents the (weighted) number of durables in the household's inventory that were regarded as "in need of replacement." The statement that a particular item needed replacement was interpreted as indicating a difference between the household's actual and desired stock of durables.

ANALYSIS OF PURCHASES AND INTENTIONS

a taste for durables, while another household with a smaller and older stock may report that no items are in need of replacement for the converse reason. To some extent, therefore, S' tends to standardize for differences in tastes. The data can thus be interpreted as suggesting that the influence of durables stock on purchases, taste for durables held constant, is really quite powerful; the observed correlation between S' and both purchases and buying intentions is positive and quite strong; and S' , while it may standardize tastes, is clearly a very crude measure of the difference between actual and desired stock.

A DIGRESSION ON IDIOSYNCRATIC VARIABLES

The same line of analysis may explain why the opinion variable (O) obtained from responses to the question "Is the present a good or bad time for you to buy durables?" is so strongly related to both purchases and buying intentions in the CU data. Both the form of the question and the intercorrelation between O and other initial-data variables indicate that respondents are essentially saying: "Taking everything into account (our current and prospective income, asset and debt position, etc.), this is a [good, bad, pro-con] time for us to be spending money on durables." Thus, O reflects the household's own judgment about the joint influence of objectively observable factors like income, income change, assets, and debts on its current financial position. Since different households necessarily assign different weights to these factors, the O variable combines them in whatever way is most appropriate for each household. Because it is partly an idiosyncratic variable, it can be argued that O ought to explain more of the variance in purchases or intentions to buy than any simple combination of the underlying factors, and would probably explain more variance than any conceivable combination of these factors.²⁰

²⁰ Several points of interest in connection with this variable should be noted. First, O is not necessarily the same as the apparently identical variable obtained by the Survey Research Center and reported in the annual *Survey of Consumer Finances* or in their own Interim Surveys. The SRC uses a projective question: "Is this a [good, bad, pro-con] time for *people like yourselves* to buy durables?" The responses to this question may thus differ from responses to the similar but personally oriented question asked on the CU surveys. Moreover, the SRC has interpreted responses to the projective question as reflecting judgments about market conditions rather than about the current state of the household's finances. That is to say, the SRC argues that responses to the projective question relate to the household's expectations about current and prospective prices, and this view is supported by responses to a follow-up question, "Why do you say so [that this is a good, etc., time for people like yourselves to buy]?" For further discussion, see Appendix A.

Secondly, the Federal Reserve Board's Consultant Committee on Economic Statistics found that the SRC opinion question was the only attitude variable strongly related to

ANALYSIS OF PURCHASES AND INTENTIONS

BUYING INTENTIONS VARIABLES

One of the most important empirical tests in this chapter concerns the structure of the regression coefficients for durable goods buying intentions. The basic thesis of the monograph is that a classification of households into intenders and nonintenders essentially constitutes a classification into groups with relatively high and relatively low mean *ex ante* purchase probability, drawn from a universe characterized by a continuous distribution of *ex ante* purchase probabilities. The mean probability for both intenders and nonintenders depends on the cut-off probability that respondents assign to the question about buying intentions. As pointed out earlier in this chapter, the constant term in a simple linear regression of purchases on intentions is an estimate of mean probability among nonintenders, while the regression coefficient of intentions is an estimate of the difference in mean probability between intenders and nonintenders.²¹

The data in Tables 42-44 contain six different buying intentions variables; the A, B, and C subsamples contain both a standard and a contingent intentions variable, each of which is constructed from responses to questions with different (implicit) cut-off probabilities. A priori, it is clear that the standard intentions variable in each of these (A,B,C) samples has a higher cut-off probability than the contingent intentions variable in the same sample, and that the standard intentions variable in A has a higher probability cut-off than that in C (see Chapters 2 and 3). On the basis of evidence that is partly a priori and partly empirical (the proportion of households responding yes to the alternative questions), the ordering of the cut-off probabilities for the remaining intentions questions can be fixed with a fair degree of confidence.

Given the variation in cut-off probability for the six intentions ques-

time series changes in expenditures on durables (see *Reports of Federal Reserve Consultant Committees on Economic Statistics*, Joint Committee on the Economic Report, 84th Cong., 1st sess., 1955). Thus these cross-section results are consistent with an analysis of time series changes based on responses (to a roughly similar question) from a random sample of the population.

²¹ The fact that the empirical data relate aggregate intentions for each household to aggregate household purchases makes little difference in principle. The linear regression coefficient of aggregate purchases on intentions is still an estimate of the difference in mean probability between intenders and nonintenders, except that it constitutes a weighted average of intender-nonintender probability differences for all commodities included in the aggregate. The constant term, however, becomes the probability that a nonintender will purchase *any* of the commodities in the aggregate. Dividing the constant by the number of commodities aggregated will produce an estimate of the weighted mean probability that nonintenders will purchase the "average" commodity.

tions, it is anticipated that there will be relatively little difference in mean probability among nonintenders, relatively much among intenders (again, see Chapter 3). As a consequence, differences in mean probability between intenders and nonintenders should be positively (though not linearly) correlated with the cut-off probability. Since the regression coefficients of the respective buying-intentions variables are estimates of the respective differences in mean probability between intenders and nonintenders, the test involves a comparison of the respective cut-off probabilities for the six intentions variables—which can be ordered on partly a priori and partly empirical grounds—with the corresponding coefficients estimated in the multivariate regressions.

Table 38 contains two sets of coefficients for the relevant intentions variables. The upper panel contains data from the regressions analyzed in this chapter, while the lower panel contains data from the regressions discussed in Appendix A.²² The observed regression coefficients follow the predicted pattern closely in all life-cycle classes; the conformity is almost perfect in the youngest age groups, more erratic in the oldest. All coefficients but one are positive, and the size of the differences among coefficients seem generally reasonable. These generalizations apply to the coefficients in either panel, although some of the mean probabilities implied by the Panel B coefficients seem rather large. For example, the mean *ex ante* probability associated with definite buying intentions for households in the 25–34 age group appears to be somewhere around 0.7 or 0.8, judging from the data in the lower panel. The estimated mean difference in observed purchase rates between intenders and nonintenders is calculated as 0.52, and nonintenders must have had purchase rates in excess of zero—say, roughly 0.07; hence, the mean purchase rate for intenders is estimated as roughly 0.6. By implication, mean *ex ante*

²² The upper and lower panels differ in three important respects. First, the number of cases included in each of the regressions is smaller in the lower panel; the Appendix A regressions excluded all households either intending to buy or purchasing a house. Second, the complete set of independent variables—for the regression equation from which the respective intentions coefficients are taken—is not the same in the upper and lower panels; compare X_1, \dots, X_{12} listed in the first part of this chapter with X_{1a}, \dots, X_{13a} listed in Appendix A. Third, interaction between standard and contingent intentions assumes a different form: in the upper panel the interaction variable is $Z\hat{P}_c$, where $Z = 1$ when \hat{P} is zero, $Z = 0$ otherwise; in the lower panel the interaction variable is the cross-product, $\hat{P}\hat{P}_c$.

The most important difference is the third. The cross-product interaction generally tends to increase the coefficients for both standard and contingent intentions to a greater degree than the other ($Z\hat{P}_c$); hence, most of the coefficients in the lower panel are higher than their counterparts in the upper panel. While the ordering is about the same, the differences among intentions variables are somewhat more pronounced in the lower panel.

ANALYSIS OF PURCHASES AND INTENTIONS

probability among intenders should have been considerably higher than 0.6 because of regression bias, and I would doubt that this is the case.

The data in Table 38 also indicate that the regression coefficient of buying intentions is a function of life-cycle status, being systematically larger for groups of households with relatively young heads. It is not

TABLE 38
NET REGRESSION COEFFICIENTS FOR ALTERNATIVE MEASURES OF DURABLE GOODS BUYING INTENTIONS

| Predicted Order of Cut-off Probability | Observed Coefficients, Life-Cycle Class: | | |
|---|---|-------|-------|
| | 1 | 2 | 3 |
| REGRESSIONS FROM TABLES 42-44 | | | |
| 1. \hat{P} in A sample | .375* | .292* | .267* |
| 2. \hat{P} in B sample | .359* | .291* | .220* |
| 3. \hat{P} in C sample | .287* | .316* | .253* |
| 4. \hat{P}_c in A sample ^a | .126* | .139* | .052 |
| 5. \hat{P}_c in C sample ^a | .082 | .067 | .036 |
| 6. \hat{P}_c in B sample ^a | .049 | .021 | -.026 |
| REGRESSIONS FROM APPENDIX A | | | |
| 1. \hat{P} in A sample ^b | .520* | .452* | .179* |
| 2. \hat{P} in B sample ^b | .334* | .416* | .274* |
| 3. \hat{P} in C sample ^b | .406* | .336* | .297* |
| 4. \hat{P}_c in A sample ^c | .147* | .159* | .087* |
| 5. \hat{P}_c in C sample ^c | .136* | .004 | .066 |
| 6. \hat{P}_c in B sample ^c | .055 | .062 | -.004 |

SOURCE: Data in upper panel taken from Tables 42-44, column 7, i.e., from equation that regresses durables goods purchases on all fifteen independent variables. Data in lower panel taken from Appendix A, Tables A-1 through A-9, column 3, i.e., from regressions that do not include the interaction variables— ZS' , ZY , $\hat{E}\hat{P}$, ZO , and $Z_i\hat{P}_c$.

* = Significantly different from zero at 0.01 level.

^a Figure shown is the coefficient of contingent buying intentions when standard intentions are zero. The $Z\hat{P}_c$ interaction behaves erratically and also causes erratic movements in \hat{P}_c ; hence, the combined influence of both variables is a better measure than either taken alone.

^b Figure shown is the coefficient of standard intentions when contingent intentions are zero.

^c Figure shown is the coefficient of contingent intentions when standard intentions are zero.

clear why this is so. The simple correlations between intentions and purchases, as well as the corresponding regression coefficients, tend to be slightly smaller in the older age groups, although the differences are not so pronounced as those shown above and are well within the limits of sampling variability. On the other hand, the association between buying intentions and initial-data variables is typically stronger among households in the older age groups; hence, the partial correlation and regression

coefficients for buying intentions are weaker, relative to the zero-order relationships, in the older age groups. By implication, intervening events (not necessarily those observable in the data) must have been relatively more important as an explanation of differences in purchases among older households. It does not necessarily follow that intervening events were more common—indeed, they may have been less so. But unexpected developments—especially adverse ones—may well result in a greater divergence between intentions and purchases among older than among younger households. For example, younger households faced with unexpected financial adversity may be more willing to make use of both accumulated savings and credit than older households faced with a similar situation; if so, the relation between *savings intentions* and *actual savings* would be closer in older households, that between *spending intentions* and *actual spending* closer in younger ones, other things being equal.

A Re-examination of the Housing Variables

The last section of this chapter is concerned with a re-examination of the three variables representing house purchases or house-buying intentions— H_{10} , H_{01} , and H_{11} . As already discussed, the regression coefficients of these (classification) variables, net of durable goods buying intentions, are presumed to measure the relative importance of intervening events. The events themselves are not directly observable but are inferred from the fact that housing purchases in the respective groups were observed to be more (or less) frequent than indicated by the *ex ante* mean probability of housing purchases. Thus, households who purchased houses but did not report house-buying intentions (H_{01}) are presumed to have experienced favorable intervening events to a greater degree, on the average, than those who purchased houses and had also reported house-buying intentions (H_{11}); similarly, households reporting intentions to buy houses but not purchasing (H_{10}) are presumed to have experienced unfavorable intervening events to a greater degree on average than those neither intending to buy nor purchasing houses (H_{00}). The net regression coefficients of H_{01} , H_{10} , and H_{11} measure the respective differences in average purchases, other things being equal, between households in these three groups and those in H_{00} . Consequently, in an equation of the general form

$$P = b_0 + b_1\hat{P} + b_2H_{01} + b_3H_{10} + b_4H_{11} + \dots + u,$$

where the variables are defined as above, the regression coefficients should be ordered

$$H_{01} > H_{11} > 0 > H_{10}.$$

Instead, the data examined above indicate that, in most subgroups, the net regression coefficients of these variables are ordered

$$H_{11} > H_{01} > 0 > H_{10}.$$

It will be recalled that the regression coefficient of \hat{P} , durable goods buying intentions, is an estimate of the difference in mean purchase probability between (durable goods) intenders and nonintenders. Suppose, however, that \hat{P} has not one value but multiple values, depending on the particular circumstances of groups of households. The evidence in Chapters 3 and 4 suggests that the coefficient of \hat{P} probably varies little (if at all) with household characteristics such as income, age, etc. However, the housing variables are so constituted that differences among H_{01} , H_{10} , H_{11} , and H_{00} in mean *ex ante* purchase probability for intenders are not only possible, but likely.

To begin with, durable goods buying intentions are consistently higher in the H_{11} groups than in H_{10} (both reported house-buying intentions, but only those in H_{11} purchased); on a priori grounds, the *ex ante* mean probability of a housing purchase must have been higher in H_{11} than in H_{10} .²³ In the same vein, intentions to buy durables were consistently higher in H_{01} than in H_{00} (neither group "intended" to buy a house, but those in H_{01} bought); a priori, the *ex ante* mean probability of a housing purchase is likely to have been higher in H_{01} than in H_{00} . It is a reasonable supposition that, in these groups, the mean probability associated with buying intentions for durable goods is related to the mean probability of a housing purchase, given the strong complementarity between purchases of housing and purchases of durables. On this line of reasoning the mean probability associated with intentions to buy durables ought to be substantially higher in H_{11} than in H_{10} , somewhat higher in H_{01} than in H_{00} . Moreover, given the nature of these classifications, the mean *ex ante* probability associated with the durables buying intentions of H_{11} households is likely to have been higher than in either H_{01} or H_{00} , while among H_{10} households the *ex ante* mean is likely to have been lower than in either of these groups. That is to say, it can plausibly be argued that mean durable goods purchase probability among intenders ranks in the order

$$H_{11} > H_{01} > H_{00} > H_{10}.$$

There seems to be no a priori reason to suppose that mean *ex ante* purchase

²³ The question on house-buying intentions asked about "the next twelve months." Households that reported intentions to buy houses and purchased within the six-month forecast period surely had higher *ex ante* probabilities of purchasing houses, on the average, than those who reported intentions but did not buy.

probability among nonintenders would necessarily follow the same pattern; even if it did, it is likely that differences among nonintenders would be much less pronounced than among intenders.²⁴

If purchase probability varies in this way, the probability model no longer predicts that the coefficient of H_{01} will necessarily exceed that of H_{11} in the regressions summarized in Tables 42-44. If the mean *ex ante* purchase probability associated with durable goods buying intentions varies among the housing groups, the regression coefficients of the housing classification variables will reflect this fact as well as the fact of differences in intervening events. Thus, the coefficient of H_{11} might exceed that of H_{01} even though intervening events were more important in the latter group provided that mean *ex ante* purchase probability were higher among H_{11} than among H_{01} intenders by enough to offset the difference.

This possibility can be explored empirically. For the moment, two assumptions must be made: first, that among households in each of the respective housing categories, the incidence of intervening events is independent of the level (number) of reported buying intentions; second, that in each of the respective groups the *ex ante* probability associated with intentions is independent of the level of intentions. Designating favorable intervening events as F , unfavorable ones as U , and durable goods purchases (buying intentions) for households in the respective housing categories H_{01} , H_{10} , H_{11} , and H_{00} as $P_{01}(\hat{P}_{01})$, . . . , $P_{00}(\hat{P}_{00})$, we can write

$$\begin{aligned} \text{within } H_{01}, P_{01} &= c_{01} + a_{01}\hat{P}_{01} + b_{01}(F_{01} + U_{01}) + e_{01}, \\ \text{within } H_{10}, P_{10} &= c_{10} + a_{10}\hat{P}_{10} + b_{10}(F_{10} + U_{10}) + e_{10}, \\ \text{within } H_{11}, P_{11} &= c_{11} + a_{11}\hat{P}_{11} + b_{11}(F_{11} + U_{11}) + e_{11}, \\ \text{within } H_{00}, P_{00} &= c_{00} + a_{00}\hat{P}_{00} + b_{00}(F_{00} + U_{00}) + e_{00} \end{aligned}$$

It is clear that favorable intervening events must have outweighed unfavorable ones in subgroups that purchased houses (H_{01} and H_{11}), and that this must have been true to a greater extent in H_{01} than in H_{11} . Unfavorable intervening events must have outweighed favorable ones in H_{10} ; and the same should be true in H_{00} , although to a lesser extent. It follows that:

$$(\bar{F}_{01} + \bar{U}_{01}) > (\bar{F}_{11} + \bar{U}_{11}) > 0 > (\bar{F}_{00} + \bar{U}_{00}) > (\bar{F}_{10} + \bar{U}_{10})$$

The *ex ante* purchase probability associated with the durable goods buying intentions of households in these four groups is expected to vary as

²⁴ *Ex post*, of course, nonintenders who purchase houses will buy considerably more than other nonintenders; but this is in large part attributable to the influence of intervening events, not to differences in the mean *ex ante* probability associated with durable goods buying intentions.

hypothesized above. The probability associated with intentions to buy any given product is presumably highest among those in H_{11} , lowest among those in H_{10} . And the analysis suggests that the probability associated with intentions to buy durable goods might well be higher in H_{01} than in H_{00} . On this basis, it should be observed that:

$$a_{11} > a_{01}, a_{00} > a_{10} > 0,$$

and it may be that

$$a_{01} > a_{00}$$

Finally, it can be argued that the constant term should be positive, with little if any variation among the groups. Buying intentions, the only available measure of durable goods purchase probability, is basically a dichotomous variable. In an equation of the form

$$P_0 = c_0 + a_0\hat{P}_0 + b_0(F_0 + U_0) + e_0,$$

the a_0 coefficient measures the average difference in the purchase rates of intenders and nonintenders, while the constant is an estimate of the mean purchase rate of nonintenders, other things equal. Since nonintenders have a mean purchase rate greater than zero, c_0 will exceed zero.²⁵ It follows that

$$c_{01} \sim c_{10} \sim c_{11} \sim c_{00} > 0.$$

The empirical data do not, of course, contain variables that represent favorable or unfavorable intervening events per se, but can be fitted only to equations of the form

$$P = c' + a\hat{P} + e',$$

where $c' = c + b(\bar{F} + \bar{U})$

$$e' = e + \text{Var.}(F + U).$$

Thus the constant term in a simple linear regression of purchases on buying intentions is an estimate of the combined influence of intervening events and the mean purchase rate of nonintenders. Since the latter is not expected to show much variation among the groups, other things equal, differences in the constant can be attributed primarily to the differential importance of intervening events.

In sum, the analysis suggests that, designating the constant term in a simple linear regression of purchases on buying intentions as k , the slope

²⁵ Data in Chapter 6, Table 23, indicate that mean purchases among nonintenders are typically greater than 1.0 durables.

coefficient as p , and the respective housing groups H_{01} , . . . , H_{00} by subscripts,²⁶

$$k_{01} > k_{11} > k_{00} > k_{10},$$

and

$$p_{11} > p_{01}, p_{00} > p_{10} > 0;$$

perhaps,

$$p_{01} > p_{00}.$$

Differences in the influence of intervening events on purchases in these four groups ought to show up as differences in the constant term, while differences in the mean *ex ante* probability associated with durable goods buying intentions ought to show up as differences in the slope of the regression coefficient for buying intentions.

Differences among these groups in the correlation between purchases and buying intentions should also be observable. A priori, groups in which the variance of intervening events is relatively large ought to show a relatively weak P, \hat{P} correlation, since the error variance will include the within-group variance of $F + U$. The variance of $F + U$ probably tends to be greater for groups in which intervening events are more important— H_{01} and H_{10} . On that count the intentions-purchases correlation ought to be stronger in H_{00} than in the other three groups, and it can be argued that the P, \hat{P} correlation should be stronger in H_{11} than in H_{01} or H_{10} .²⁷

²⁶ It cannot be determined a priori whether all of the k coefficients will be greater than zero. k_{01} , k_{11} , and k_{00} clearly ought to exceed zero; the balance of intervening events is either favorable or very slightly unfavorable, while the mean purchase rate of nonintenders is considerably above zero and should outweigh the (slight) negative influence of intervening events in the H_{00} group. In H_{10} , however, it is not clear that the negative influence of unfavorable intervening events will exceed the mean purchase rate of nonintenders.

²⁷ The reasoning is as follows. The mean *ex ante* probability of a house purchase among those reporting intentions to buy a house can be roughly estimated as about 0.55; approximately 35 to 40 per cent of all intenders purchased a house, and the regression bias is likely to be fairly strong. The mean *ex ante* probability of a house purchase among those not intending to buy a house is likely to be around 0.05, perhaps less. Mean probability among intenders is the weighted average of the means in H_{10} and H_{11} ; since the former group did not purchase and the latter group purchased, mean *ex ante* probability is presumed to be higher in H_{11} . It might be reasonable to assume that the mean *ex ante* probability of a housing purchase was roughly 0.80 in H_{11} and 0.50 in H_{10} . Similarly, the mean probability of 0.05 for nonintenders is the weighted average of the means for H_{01} and H_{00} . A reasonable set of figures here might be 0.30 for H_{01} and 0.04 for H_{00} .

Now the variance of $F + U$ in any of these groups depends largely on the mean *ex ante* probability of a housing purchase. I would judge that an appropriate measure of the variance involves the assumption that an *ex ante* mean of 0.50 in a group where all purchased houses is tantamount to saying that half of the group experienced favora-

ANALYSIS OF PURCHASES AND INTENTIONS

The empirical results are summarized in Table 39. Because of the small sample sizes of the groups of households that purchased or intended to buy houses, a regression combining the A, B, and C groups in each life-cycle class is shown in addition to separate regressions for each of the groups.

TABLE 39
BUYING INTENTIONS-PURCHASES CORRELATION WITHIN GROUPS CLASSIFIED BY LIFE-CYCLE AND HOUSING STATUS

| | Life-Cycle Group 1 | | | | Life-Cycle Group 2 | | | | Life-Cycle Group 3 | | | |
|---------------------------|--------------------|-------------------|-------------------|-------------------|--------------------|-------------------|-------------------|-------------------|--------------------|----------|-------------------|-------------------|
| | H_{01} | H_{10} | H_{11} | H_{00} | H_{01} | H_{10} | H_{11} | H_{00} | H_{01} | H_{10} | H_{11} | H_{00} |
| A subsamples | | | | | | | | | | | | |
| k | 2.29 | 1.27 | 2.37 | 0.88 | 2.40 | 1.21 | 2.20 | 1.29 | 1.78 | 2.26 | 1.17 | 1.43 |
| ρ | 0.44 ^a | 0.11 | 0.37 ^a | 0.49 ^a | -0.16 | 0.26 ^a | 0.55 ^b | 0.41 ^a | 0.61 ^b | 0.18 | 0.88 ^a | 0.23 ^a |
| r^2 | 0.12 | 0.02 | 0.14 | 0.13 | 0.02 | 0.15 | 0.12 | 0.10 | 0.15 | 0.01 | 0.68 | 0.04 |
| N | 85 | 83 | 61 | 852 | 50 | 54 | 32 | 863 | 20 | 31 | 14 | 559 |
| B subsamples | | | | | | | | | | | | |
| k | 1.98 | 1.62 | 2.08 | 1.19 | 2.18 | 1.07 | 2.06 | 1.17 | 3.09 | 1.64 | 1.80 | 1.19 |
| ρ | 0.31 | 0.20 ^b | 0.44 ^a | 0.41 ^a | 0.35 | 0.11 | 0.53 ^a | 0.38 ^a | 0.11 | -0.13 | 0.57 ^a | 0.32 ^a |
| r^2 | 0.05 | 0.06 | 0.14 | 0.10 | 0.08 | 0.02 | 0.32 | 0.09 | 0.01 | 0.03 | 0.33 | 0.07 |
| N | 60 | 70 | 46 | 866 | 47 | 59 | 32 | 836 | 30 | 20 | 14 | 678 |
| C subsamples | | | | | | | | | | | | |
| k | 2.00 | 1.23 | 1.48 | 0.97 | 0.82 | 1.30 | 0.69 | 0.82 | 0.61 | 0.84 | 1.46 | 1.08 |
| ρ | 0.40 ^a | 0.05 | 0.45 ^a | 0.37 ^a | 1.04 ^a | 0.09 | 0.67 ^a | 0.34 ^a | 0.73 ^a | 0.08 | 0.45 ^a | 0.29 ^a |
| r^2 | 0.14 | 0.00 | 0.28 | 0.14 | 0.41 | 0.00 | 0.43 | 0.14 | 0.32 | 0.00 | 0.62 | 0.10 |
| N | 65 | 94 | 47 | 814 | 44 | 65 | 22 | 691 | 19 | 26 | 8 | 570 |
| A, B, C, samples combined | | | | | | | | | | | | |
| k | 2.13 | 1.36 | 1.95 | 1.14 | 2.11 | 1.16 | 1.92 | 1.13 | 2.21 | 1.81 | 1.34 | 1.24 |
| ρ | 0.39 ^a | 0.09 ^b | 0.42 ^a | 0.37 ^a | 0.29 ^a | 0.15 ^a | 0.52 ^a | 0.34 ^a | 0.30 ^b | -0.07 | 0.71 ^a | 0.27 ^a |
| r^2 | 0.12 | 0.02 | 0.19 | 0.11 | 0.06 | 0.04 | 0.26 | 0.09 | 0.06 | 0.01 | 0.54 | 0.06 |
| N | 210 | 247 | 154 | 2,533 | 141 | 178 | 86 | 2,390 | 69 | 77 | 36 | 1,807 |

SOURCE: Basic data from Consumer Purchase Study, NBER. See accompanying text for description of procedures.

^a = Significantly different from zero at 0.01 level, using t test.

^b = Significantly different from zero at 0.05 level, using t test.

The pattern of the results, though erratic because of small sample sizes, is reasonably consistent with the propositions that mean *ex ante* purchase probability and the influence of intervening events differ along the lines discussed above. The groups that purchased houses (H_{01} and H_{11})

ble intervening events and the other half experienced nothing unforeseen. If "intervening events" are scaled +1, -1, 0, corresponding to favorable, unfavorable, or none, the respective means and variances would be:

| Housing Group | Mean Value of $F + U$ | Variance of $F + U$ |
|---------------|-----------------------|---------------------|
| H_{01} | + .70 | .21 |
| H_{10} | - .50 | .25 |
| H_{11} | + .20 | .16 |
| H_{00} | - .04 | .04 |

generally have larger constants than the nonpurchase groups (H_{10} and H_{00}). But while H_{11} is apt to have a smaller constant than H_{01} , as predicted, there are numerous cases in which the reverse is true; and it is generally not the case that H_{10} has a smaller constant than H_{00} , as the analysis predicts. Further, there are cases in which H_{10} has the largest constant in any of the four groups. The ordering of the slope coefficients is uniformly in accord with predictions, although the size of many of these differences seems unduly large. The regression coefficient of intentions is larger for H_{11} than for H_{00} in eight of the nine subgroups; H_{10} has a smaller slope than H_{00} in all nine subgroups. There is no apparent difference in slope between H_{01} and H_{00} —in five groups, the slope in H_{01} is lower; and in the other four groups it is higher. There are, however, a few cases in which H_{01} has an extremely large slope.

Given these results, it is probable that some of the assumptions do not hold. For example, the slopes in the H_{10} groups are generally very small, and some are negative. It does not seem plausible that these coefficients are estimates of the difference in mean *ex ante* purchase probability between H_{10} intenders and nonintenders. By the same token, some of the slope coefficients in H_{01} and H_{11} seem unreasonably large. If the slope coefficients are seriously biased, it necessarily follows that the constants will be biased in the opposite direction. Thus, an adequate explanation for the observed facts—that H_{10} generally has a larger constant than consistent with the analysis, or that H_{01} and H_{11} frequently have smaller constants than predicted—may simply be that the estimated slope coefficients in these groups are systematically biased.

The analysis underlying Table 39 depends heavily on two critical assumptions: (1) within each of the housing groups the level of durable goods buying intentions is uncorrelated with intervening events; and (2) within each group the *ex ante* probability associated with durable goods buying intentions is also uncorrelated with the level of buying intentions. If favorable intervening events were positively correlated with the level of buying intentions, the regression coefficient of intentions (p) would then be too large as a measure of the mean difference in *ex ante* probability between intenders and nonintenders; the constant term (k) would be too small as a measure of the influence attributable to intervening events. The reverse would be true if U and \hat{P} were positively correlated. Similarly, if the *ex ante* probability associated with intentions were higher for households that reported a relatively large number of buying intentions, the regression coefficient of \hat{P} would be too large in that particular group, the constant term too small.

ANALYSIS OF PURCHASES AND INTENTIONS

A comparison of mean purchases and buying intentions in the H_{01} and H_{11} groups, where the mean *ex ante* probability of a housing purchase is likely to be quite different (both purchased houses, but only those in H_{11} reported house-buying intentions), suggests that the higher the *ex ante* probability of buying a house, the larger are both intentions to buy and purchases of durable goods, given that a house is purchased. But if this is true for a comparison between households in H_{01} and H_{11} , it should apply equally well within these groups. If so, households in H_{01} or H_{11} with the highest (lowest) *ex ante* probability of purchasing a house would have reported the most (fewest) durable goods buying intentions and made the most (fewest) purchases, relative to other households in the same groups. To the extent that this is the case, the regression coefficient of buying intentions on purchases will be too large as a measure of the difference between intenders and nonintenders in mean purchase probability, the constant term too small as a measure of the importance of intervening events.

Similarly, mean durable goods buying intentions are generally much smaller in H_{10} than in H_{11} (both groups reported intentions to buy a house, but only those in H_{11} purchased), again indicating that the *ex ante* probability of buying a house is correlated with the number of buying intentions for durable goods. If this is also true within each of these groups, those with the largest number of durable goods buying intentions would have had relatively high *ex ante* probabilities of purchasing the house. Since none of the households in H_{10} purchased, those with relatively large numbers of durable goods buying intentions must therefore have experienced unfavorable intervening events to a greater degree than others in the same group. The consequence here is a *downward* bias in the regression coefficient of durable goods buying intentions in the H_{10} group, an *upward* bias in the constant term.

These considerations also bear on the within-group correlations between intentions and purchases. The data show that the correlation between purchases and intentions is generally weaker in H_{01} and H_{10} than in H_{11} , and generally stronger in H_{00} than in H_{10} , as predicted. That is,

$$r_{11} > r_{01}, r_{10}$$

$$r_{00} > r_{10},$$

where the subscripts denote the housing groups and r is the simple correlation between purchases and durable goods buying intentions. However, it is also true that r_{11} is always greater than r_{00} , and that r_{01} is frequently greater than r_{00} and almost always greater than r_{10} . Both r_{11} and r_{01} thus

tend to be higher than anticipated and r_{10} tends to be lower than anticipated, observations consistent with the presence of within-group inter-correlations between the *ex ante* probability associated with buying intentions and the level of intentions.

One experiment that shows rather interesting results is to substitute a set of partially a priori regression coefficients for those shown in Table 39 and then to recompute the constant. The data provide empirical evidence that

$$p_{11} > p_{01}, p_{00} > p_{10},$$

but the quantitative differences seem unduly large. Suppose it is assumed that p_{00} is an unbiased estimate of p^*_{00} —the “true” regression coefficient in H_{00} . Since the sample size in H_{00} is extremely large and the importance of intervening events is presumably less than in any of the other groups, any bias ought not to be serious. The data indicate that p_{10} is smaller than p_{00} , but the differences seem too large on a priori grounds. So p^*_{10} is arbitrarily set equal to $p^*_{00} - 0.05$. There is no empirical evidence that p_{01} differs from p_{00} ; hence, p^*_{01} is set equal to p^*_{00} . Finally, the empirical evidence indicates that p_{11} is greater than p_{00} , but again the difference seems too large in many of the groups. In addition, it appears that the difference between p_{11} and p_{00} varies with life-cycle status; a careful scrutiny of Table 39 suggests that $p_{11} - p_{00}$ is quite small in the youngest age group, quite large in the oldest age group, and of moderate size in the central age group. Accordingly, it is assumed that in $A_1, B_1,$ and $C_1: p^*_{11} = p^*_{00} + 0.05$; in $A_2, B_2,$ and $C_2: p^*_{11} = p^*_{00} + 0.15$; and in $A_3, B_3,$ and $C_3: p^*_{11} = p^*_{00} + 0.25$.²⁸ Given these assumptions a new set of constants— k^* —can be estimated.²⁹ These are shown in Table 40, with the original k values included for comparison.

²⁸ It is not quite accurate to designate all of the p^* estimates as “assumptions.” The p coefficients are of course empirically obtained. Since p^*_{00} is assumed equal to p_{00} , it is basically an empirical estimate. Similarly, p^*_{01} is assumed equal to p^*_{00} , but p_{01} shows no systematic tendency to differ from p_{00} . The estimate of p^*_{10} is essentially arbitrary, since the data suggest only that p^*_{10} is lower than p^*_{00} . Finally, the p^*_{11} estimates are reasonably close to the (observed) average p_{11} for the A, B, and C samples in the respective life-cycle classes, as can be seen from the following tabulation.

| Life-cycle Class | Computed Mean p_{11} | Mean Estimate of p^*_{11} |
|------------------|------------------------|-----------------------------|
| 1 | .42 | .47 |
| 2 | .58 | .53 |
| 3 | .63 | .57 |

²⁹ In the A_3 group shown in Table 39, the estimate of p_{00} seemed unduly low. The estimates of k^* are based on the assumption that all the p_{00} regression coefficients are unbiased except for this one, which was raised from 0.23 to 0.35. This adjustment has some effect on the differentials in p^* but serves mainly to reduce all the k^* values in the A_3 group.

ANALYSIS OF PURCHASES AND INTENTIONS

The k^* estimates are almost wholly consistent with the hypotheses advanced earlier, except in the A sample. The rank ordering of the k^* estimates is perfectly consistent with the predicted ordering for all three life-cycle classes in the combined (A + B + C) sample, for the mean of the k^* estimates in the separate samples, and for the C sample.

TABLE 40
ESTIMATED AND COMPUTED VALUES OF THE CONSTANT TERM IN A LINEAR REGRESSION OF PURCHASES ON BUYING INTENTIONS WITHIN SPECIFIED LIFE-CYCLE AND HOUSING STATUS GROUPS

| | Estimated k^* | | | | | Computed k | | | | |
|-------------------------|-----------------|------|------|-----------|-----------------|--------------|------|------|-----------|-----------------|
| | A | B | C | A + B + C | Mean of A, B, C | A | B | C | A + B + C | Mean of A, B, C |
| Life-cycle group 1 | | | | | | | | | | |
| H_{01} | 2.23 | 1.85 | 2.06 | 2.16 | 2.04 | 2.29 | 1.98 | 2.00 | 2.13 | 2.09 |
| H_{10} | 0.94 | 1.30 | 0.31 | 0.85 | 0.85 | 1.27 | 1.62 | 1.23 | 1.36 | 1.37 |
| H_{11} | 2.01 | 2.03 | 1.59 | 1.95 | 1.87 | 2.37 | 2.08 | 1.48 | 1.95 | 1.97 |
| H_{00} | 0.88 | 1.19 | 0.97 | 1.14 | 1.01 | 0.88 | 1.19 | 0.97 | 1.14 | 1.01 |
| Life-cycle group 2 | | | | | | | | | | |
| H_{01} | 1.68 | 2.15 | 2.15 | 2.03 | 1.99 | 2.40 | 2.18 | 0.82 | 2.11 | 1.80 |
| H_{10} | 1.03 | 0.60 | 0.64 | 0.80 | 0.75 | 1.21 | 1.07 | 1.30 | 1.16 | 1.19 |
| H_{11} | 2.19 | 2.06 | 1.39 | 2.00 | 1.88 | 2.20 | 2.06 | 0.69 | 1.92 | 1.65 |
| H_{00} | 1.29 | 1.17 | 0.82 | 1.13 | 1.09 | 1.29 | 1.17 | 0.82 | 1.13 | 1.09 |
| Life-cycle group 3 | | | | | | | | | | |
| H_{01} | 2.00 | 2.74 | 1.45 | 2.24 | 2.06 | 1.78 | 3.09 | 0.61 | 2.21 | 1.82 |
| H_{10} | 2.17 | 0.62 | 0.31 | 1.21 | 1.03 | 2.26 | 1.64 | 0.84 | 1.81 | 1.58 |
| H_{11} | 2.05 | 1.79 | 1.27 | 1.95 | 1.70 | 1.17 | 1.80 | 1.46 | 1.34 | 1.48 |
| H_{00} | 1.35 | 1.19 | 1.08 | 1.24 | 1.20 | 1.43 | 1.19 | 1.08 | 1.24 | 1.23 |
| Rank ^a r^2 | 0.16 | 0.75 | 1.00 | 1.00 | 1.00 | 0.16 | 0.64 | 0.00 | 0.44 | 0.44 |

SOURCE: Computed values of k from Table 39; see accompanying text for discussion of the k^* estimate.

^a Predicted versus observed rank.

These results suggest a basis for recomputation of the net regression coefficients for H_{01} , H_{10} , and H_{11} in the multivariate analysis. If the mean probability associated with buying intentions is such that

$$p^*_{11} > p^*_{01}, p^*_{00} > p^*_{10}$$

and if the numerical relations are those estimated above, the equation used to estimate the coefficients of H_{01} , H_{10} and H_{11} was not properly specified. Instead of one buying intentions variable there ought to have been several, reflecting the fact that the mean probability associated with durable goods buying intentions differs among the housing groups. A rough estimate of the coefficients that would have been observed for H_{01} , H_{10} , and H_{11} if

separate intentions variables had been included in the analysis can be obtained from the p^* values.

The coefficients of the housing variables in Tables 42-44 are estimates of the difference in mean purchases of durables between households in H_{00} and those in the other three groups, other things equal. The coefficient of buying intentions is an estimate of the difference between intenders and nonintenders in mean purchase probability. The above analysis suggests that mean probability among intenders is a function of whether the household is in H_{01} , H_{10} , H_{11} , or H_{00} ; that mean probability among nonintenders is about the same for households in all four groups; and that the difference among these four groups in the mean probability associated with buying intentions is adequately measured by the p^* estimates. Granting these propositions, the appropriate coefficients for H_{01} , H_{10} , and H_{11} can be approximated by the following procedure.

1. Start with the coefficients of the housing dummy variables in the regression that does not include buying intentions (column 6 in Tables 42-44). These coefficients are estimates of mean differences in purchases of durables between H_{00} and the other groups, other things equal but ignoring intentions to buy durables.
2. Assume that p^*_{00} —the true regression coefficient of buying intentions in H_{00} —is equal to the net regression coefficient of buying intentions for the sample as a whole, as estimated in column 7 of Tables 42-44. The “true” coefficients of buying intentions in H_{01} , H_{10} , or H_{11} are then estimated from the assumed differences between p^*_{00} and p^*_{01} , p^*_{10} , or p^*_{11} .
3. Multiply the p^* coefficients in step 2 by the mean difference between H_{00} and the other three groups in the level of buying intentions. This calculation indicates the degree to which purchases in H_{01} , H_{10} , or H_{11} are expected to be higher or lower than purchases in H_{00} because of differences among these groups either in the level of buying intentions or in the mean probability associated with intentions.
4. Adjust the housing coefficients estimated in step 1 by adding (subtracting) the differences calculated in step 3. The resulting figure is an estimate of what H_{01} , H_{10} , and H_{11} would have been if the “true” coefficient of buying intentions for each group, rather than one coefficient reflecting a weighted average for all groups, had been used in the regressions. The calculation rests on the assumption that interrelations among purchases, buying intentions, housing status, and all other variables included in Tables 42-44 regressions

ANALYSIS OF PURCHASES AND INTENTIONS

would not be affected if separate intentions variables, reflecting the mean probability associated with buying intentions in each of the groups, had been used in place of the single intentions variable actually employed. Since all these interrelations appear to be quite weak, this assumption is unlikely to cause serious difficulty.

Table 41 summarizes alternative estimates of the regression coefficients for H_{01} , H_{10} , and H_{11} . The first estimate is taken from step 1 above; it consists of the mean differences in durable goods purchases between H_{00} and the other groups, as estimated by the multiple regression before account is taken of buying intentions but after standardizing for the influence of seven initial-data and two intervening variables. The second estimate is also taken directly from the multiple regressions; it measures differences among housing groups in mean purchases net of buying intentions, initial-data, and intervening variables on the implicit

TABLE 41
ALTERNATIVE ESTIMATES OF REGRESSION COEFFICIENTS FOR HOUSING CLASSIFICATION VARIABLES

| Estimate Number | H_{01} | H_{10} | H_{11} | H_{01} | H_{10} | H_{11} | H_{01} | H_{10} | H_{11} |
|-----------------|---|----------|----------|---|----------|----------|---|----------|----------|
| | A ₁ SUBGROUP | | | A ₂ SUBGROUP | | | A ₃ SUBGROUP | | |
| 1. | 1.20 | -0.09 | 1.52 | 0.66 | -0.13 | 1.25 | 0.68 | 0.54 | 2.04 |
| 2. | 1.05 | -0.23 | 1.05 | 0.49 | -0.31 | 1.03 | 0.66 | 0.54 | 1.39 |
| 3. | 0.99 | -0.19 | 1.00 | 0.51 | -0.44 | 1.08 | 0.64 | 0.53 | 1.38 |
| 4. | 0.99 | -0.18 | 0.93 | 0.51 | -0.39 | 1.00 | 0.64 | 0.53 | 0.77 |
| 5. | 1.35 | 0.06 | 1.13 | 0.39 | -0.26 | 0.90 | 0.65 | 0.83 | 0.70 |
| | B ₁ SUBGROUP | | | B ₂ SUBGROUP | | | B ₃ SUBGROUP | | |
| 1. | 0.77 | 0.30 | 1.53 | 1.14 | -0.33 | 2.08 | 1.69 | -0.27 | 2.26 |
| 2. | 0.71 | -0.03 | 1.06 | 1.05 | -0.63 | 1.48 | 1.54 | -0.53 | 1.78 |
| 3. | 0.68 | -0.10 | 0.95 | 1.04 | -0.68 | 1.41 | 1.53 | -0.61 | 1.59 |
| 4. | 0.68 | -0.04 | 0.87 | 1.04 | -0.62 | 1.07 | 1.53 | -0.54 | 0.82 |
| 5. | 0.66 | 0.11 | 0.84 | 0.98 | -0.57 | 0.89 | 1.55 | -0.57 | 0.60 |
| | C ₁ SUBGROUP | | | C ₂ SUBGROUP | | | C ₃ SUBGROUP | | |
| 1. | 1.39 | -0.40 | 1.38 | 1.27 | -0.06 | 1.94 | 0.45 | -0.46 | 0.62 |
| 2. | 1.10 | -0.89 | 0.78 | 1.32 | -0.40 | 1.33 | 0.40 | -0.86 | 0.51 |
| 3. | 1.09 | -0.88 | 0.83 | 1.21 | -0.58 | 1.26 | 0.43 | -0.83 | 0.56 |
| 4. | 1.09 | -0.80 | 0.74 | 1.21 | -0.49 | 0.94 | 0.43 | -0.76 | 0.49 |
| 5. | 1.09 | -0.66 | 0.62 | 1.33 | -0.18 | 0.57 | 0.37 | -0.77 | 0.19 |
| | A ₁ + B ₁ + C ₁ SUBGROUP | | | A ₂ + B ₂ + C ₂ SUBGROUP | | | A ₃ + B ₃ + C ₃ SUBGROUP | | |
| 5. ^a | 1.02 | -0.29 | 0.81 | 0.90 | -0.33 | 0.87 | 1.00 | -0.03 | 0.71 |

SOURCE: See accompanying text for explanation of estimates.

^a Multiple regression not computed; hence, estimates 1 through 4 could not be calculated.

assumption used in the first part of this chapter—that the mean probability associated with intentions does *not* vary systematically among the housing groups. The third estimate is similar in derivation to that described in step 4 above, but the coefficients of H_{01} , H_{10} , and H_{11} are based on the same assumption as in estimate 2—that the mean purchase probability associated with buying intentions is the same in all housing groups and is equal to the net coefficient of intentions in the basic multiple regressions. The fourth estimate is the one described in step 4; it measures differences in purchases net of buying intentions on the assumption that the probability associated with intentions is such that

$$\begin{aligned} \text{in life-cycle class 1: } p^*_{11} - 0.05 &= p^*_{01} = p^*_{00} = p^*_{10} + 0.05; \\ \text{in life-cycle class 2: } p^*_{11} - 0.15 &= p^*_{01} = p^*_{00} = p^*_{10} + 0.05; \\ \text{in life-cycle class 3: } p^*_{11} - 0.25 &= p^*_{01} = p^*_{00} = p^*_{10} + 0.05; \end{aligned}$$

and that in all three cases $p^*_{00} = X_{13}$, the net coefficient of intentions in Tables 42–44. The last estimate is derived from k^* ; the mean differences in purchases between H_{00} and H_{01} , H_{10} or H_{11} are calculated as the respective differences between k^*_{00} and k^*_{01} , k^*_{10} , or k^*_{11} .

A comparison of the second and third estimates indicates the extent to which the rough-cut procedure described above is able to reproduce the results of a formal regression. The third and fourth estimates differ only with respect to assumptions about the mean purchase probability associated with buying intentions for durable goods; both estimates are derived from the first estimate in exactly the same way. A comparison of the third with the fourth estimate is therefore a fair measure of the change in the H_{01} , H_{10} , and H_{11} regression coefficients that would take place if the assumptions about differential mean probability among the housing groups were correct.

Averaging the data for all nine subgroups, the results indicate that those in H_{11} purchase 0.60 more durables than those in H_{01} when the influence of buying intentions is ignored, standardizing for the effect of initial-data and intervening variables (estimate 1). Taking account of intentions but assuming that the mean *ex ante* probability associated with intentions is the same for all housing groups, those in H_{11} still purchase more than those in H_{01} ; but the average difference is considerably smaller—0.23 durables instead of 0.60 (estimate 2). A conceptually comparable figure based on a rough approximation (estimate 3) yields an average difference of 0.22. If it is assumed that mean *ex ante* probability varies according to the p^* values, the differential is reversed on average, although the mean difference is small—0.05 durables (estimate 4). Finally, the k^* estimate

ANALYSIS OF PURCHASES AND INTENTIONS

(5) indicates that those in H_{01} purchase more net of intentions than those in H_{11} , the average differential for all nine groups being 0.21 durables. These results support the proposition that the H_{01} coefficient would in fact be greater than H_{11} if the *ex ante* probability differences associated with intentions were held constant, or if a good measure of purchase probability itself, rather than intentions to buy, were available.

In sum, the model predicts that the coefficient of H_{01} must exceed that for H_{11} , holding purchase probability constant, because favorable intervening events must have been more common in H_{01} . The regression data in Tables 42-44 indicate that the reverse is true, a finding that I would regard as strong contradictory evidence vis-à-vis the probability model. But the simple regressions of purchases on intentions within the housing groups clearly suggest that mean *ex ante* probability is likely to be different for intenders in these groups, and reasonable assumptions about the size of the differences are sufficient to reverse the original result.

Summary

The results in this chapter lend additional support to the hypothesis that consumer responses to questions about intentions to buy durable goods are basically a reflection of purchase probability. To a considerable degree, information about income, assets, durables stock, expectations, and attitudes is not needed to explain differences among households in reported durable goods purchases; it may be that these variables are not completely redundant to intentions because the latter constitutes a less than adequate proxy for purchase probability. On the other hand, variables that reflect wholly or partly unforeseen events are strongly associated with durable goods purchases net of all other explanatory factors, as predicted. The summary tabulation below shows the mean of the F ratios (i.e., the means of the squared t ratios for each variable in the respective groups, taken from column 7 in Tables 42-44) for the groups of independent variables discussed at the beginning of the chapter—objective initial-data variables, of which the model contains four, anticipatory initial-data variables (three), intervening variables (five), and buying intentions variables (three).

| Class of Variables | Number of Variables | Subsample | | | | | | | | |
|--------------------|---------------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| | | A ₁ | A ₂ | A ₃ | B ₁ | B ₂ | B ₃ | C ₁ | C ₂ | C ₃ |
| Initial-Data | | | | | | | | | | |
| Objective | 4 | 4.1 | 3.3 | 3.6 | 7.9 | 6.1 | 7.2 | 1.2 | 4.8 | 1.6 |
| Anticipatory | 3 | 6.8 | 1.6 | 2.6 | 0.8 | 5.6 | 1.1 | 5.7 | 4.0 | 2.6 |
| Intervening | 5 | 11.5 | 5.3 | 2.4 | 5.2 | 8.4 | 7.3 | 10.1 | 7.8 | 1.4 |
| Buying Intentions | 3 | 46.0 | 45.0 | 13.4 | 36.0 | 28.0 | 13.0 | 45.3 | 36.7 | 19.5 |

ANALYSIS OF PURCHASES AND INTENTIONS

In all nine groups, intentions to buy durable goods have by far the strongest net relation to durable goods purchases; in six of the nine groups, intervening variables are more strongly related to purchases, on average, than either category of initial-data variables.³⁰ More importantly, the net influence of initial-data variables is reduced in all eighteen cases (nine subgroups, both objective and anticipatory categories) when buying intentions are held constant; in contrast, the net influence of intervening variables is increased in nine of eighteen comparable cases (nine subgroups, both income-change and housing categories). Finally, in the only instance where the empirical results generally stand in apparent contradiction to the model—the regression coefficient of anticipated housing purchases generally exceeds that of unanticipated housing purchases—it can be shown that the contradiction is only apparent: A simplifying assumption that holds in most cases clearly does not hold for the housing variables, and relaxation of the assumption makes enough difference to reverse the original results.

³⁰ It is true that the intervening income-change variables (ΔY and ΔY_i) are less strongly related to purchases than some of the initial-data variables, net of intentions to buy. However, the intervening income-change variables happen to be less strongly related to purchases throughout, and the model predicts that the net influence of initial-data variables will be *reduced* to a greater degree than that of intervening variables when intentions are held constant, not that the net influence of initial-data variables will be less. A glance at Tables 42–44 indicates clearly that intentions have less influence on the intervening income-change variables than on the initial-data variables, and that the former are generally less closely related to purchases than the latter.

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 42
SUMMARY OF CORRELATION DATA FOR TWELVE-MONTH DEFINITE AND PROBABLE-POSSIBLE INTENDERS CLASSIFIED BY LIFE-CYCLE STATUS

| INDEPENDENT VARIABLES | REGRESSION COEFFICIENTS FOR CORRELATION BETWEEN | | | | | | F RATIOS FOR | |
|---|---|-----------------|--------------------|-------------------------------------|-----------------|--------------------|--------------|-------|
| | Buying Intentions (\hat{P}) and | | | Durable Goods Purchases (P) and | | | ZERO-ORDER | |
| | $x_1 \dots x_4$ | $x_1 \dots x_7$ | $x_1 \dots x_{12}$ | $x_1 \dots x_4$ | $x_1 \dots x_7$ | $x_1 \dots x_{12}$ | \hat{P} | P |
| A ₁ —HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 25 AND 34 YEARS OLD | | | | | | | | |
| Initial-Data | | | | | | | | |
| Objective | (9.0) | (7.7) | (8.8) | (10.2) | (7.4) | (6.8) | (4.1) | |
| Y | .019 | .010 | .007 | .064** | .052** | .048** | .039** | 4.3 |
| ΔL_{-1} | .088 | .024 | .004 | .093 | .004 | .000 | -.000 | 3.2 |
| ΔY_{-1} | .065 | .024 | .037 | .025 | -.010 | -.024 | -.039 | 4.3 |
| S' | .135** | .140** | .147** | .100* | .108* | .106** | .020 | 24.3 |
| Anticipatory | (15.9) | (12.7) | (14.8) | (10.9) | (14.8) | (10.9) | (6.8) | |
| \hat{P} | .361 | .260 | .286 | -.019 | .286 | -.019 | -.100 | 6.5 |
| O | .305** | .283** | .436** | .383** | .436** | .383** | .291** | 53.2 |
| \hat{P}_e | .186** | .157* | .086 | .043 | .086 | .043 | -.010 | 15.3 |
| Intervening | | | | | | | | |
| Income Changes | (0.9) | (0.9) | (3.7) | (4.3) | (3.7) | (4.3) | (4.3) | |
| ΔY | -.034 | -.034 | .126* | .126* | .126* | .126* | .125* | 0.0 |
| ΔY_i | -.106 | -.106 | .252 | .252 | .252 | .252 | .289 | 0.0 |
| Housing | | | | | | | | |
| Unanticipated P | (5.2) | (5.2) | (33.6) | (28.1) | (33.6) | (28.1) | (28.1) | |
| H_{01} | .422* | .422* | 1.196** | 1.055** | 1.196** | 1.055** | 1.055** | 6.5 |
| Unfulfilled \hat{P} | (1.9) | (1.9) | (0.2) | (1.4) | (0.2) | (1.4) | (1.4) | |
| H_{10} | .242 | .242 | -.094 | -.234 | -.094 | -.234 | -.234 | 0.0 |
| Anticipated P | (40.0) | (40.0) | (39.7) | (19.4) | (39.7) | (19.4) | (19.4) | 2.2 |
| H_{11} | 1.275** | 1.275** | 1.519** | 1.053** | 1.519** | 1.053** | 1.053** | 42.6 |
| Buying Intentions ^a | | | (46.0) | .375** | (46.0) | .375** | .375** | 133.3 |
| \hat{P} | | | .045 | .081 | .045 | .081 | .045 | 16.4 |
| \hat{P}_e | | | .264 | .132 | .264 | .132 | .264 | |
| $Z\hat{P}_e$ | | | .139 | .210 | .139 | .210 | .139 | |
| Constant | .478** | -.132 | .015 | .946** | .428 | .264 | .081 | |
| R^2 | .032 | .075 | .113 | .036 | .075 | .139 | .210 | |

(continued)

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 42 (continued)

| INDEPENDENT VARIABLES | REGRESSION COEFFICIENTS FOR CORRELATION BETWEEN | | | | | | | F RATIOS FOR | |
|---|---|-----------------|--------------------|-------------------------------------|-----------------|--------------------|--------------------|---------------------------------|------|
| | Buying Intentions (\hat{P}) and | | | Durable Goods Purchases (P) and | | | | ZERO-ORDER CORRELATION WITH P | |
| | $X_1 \dots X_4$ | $X_1 \dots X_7$ | $X_1 \dots X_{12}$ | $X_1 \dots X_4$ | $X_1 \dots X_7$ | $X_1 \dots X_{12}$ | $X_1 \dots X_{15}$ | \hat{P} | (9) |
| A ₂ —HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 35 AND 44 YEARS OLD | | | | | | | | | |
| Initial-Data | (16.8) | (14.7) | (15.6) | (12.0) | (10.2) | (10.7) | (3.3) | 33.0 | 20.3 |
| Objective | .044** | .036** | .034** | .039** | .034** | .035** | .021* | 0.1 | 6.0 |
| Y | .003 | -.092 | -.109 | .132 | .080 | .058 | .055 | 4.0 | 3.0 |
| ΔL_{-1} | .081 | .011 | .006 | .073 | .038 | -.011 | -.030 | 29.8 | 22.4 |
| ΔY_{-1} | .153** | .164** | .167** | .156** | .162** | .168** | .078* | 0.0 | 0.0 |
| Anticipatory | (16.4) | (15.3) | (15.3) | (4.2) | (4.2) | (4.5) | (1.6) | 53.6 | 18.3 |
| \hat{E} | -.038 | -.101 | -.101 | -.250 | -.247** | -.355 | -.372 | 5.0 | 0.1 |
| O | .398** | .382** | .382** | .247** | .247** | .247** | .131 | 0.0 | 0.0 |
| \hat{E}_5 | .110 | .120 | .110 | .039 | .039 | .030 | -.022 | 0.0 | 0.0 |
| Intervening | (0.0) | (0.0) | (0.0) | (5.8) | (5.8) | (5.8) | (5.8) | 0.0 | 6.0 |
| Income Changes | ΔY | .017 | .017 | .152* | .152* | .152* | .148* | 0.0 | 8.0 |
| ΔY_4 | .001 | .001 | .001 | .494* | .494* | .494* | .488* | 3.0 | 4.0 |
| Housing | Unanticipated P | (4.8) | (4.8) | (6.2) | (6.2) | (6.2) | (3.6) | 22.4 | 0.0 |
| H_{01} | .548* | .548* | .548* | .664* | .664* | .664* | .488 | 3.0 | 4.0 |
| Unfulfilled \hat{P} | (20.4) | (20.4) | (20.4) | (0.0) | (0.0) | (0.0) | (1.4) | 0.0 | 0.0 |
| H_{10} | .966** | .966** | .966** | -.013 | -.013 | -.013 | -.312 | 0.0 | 0.0 |
| Anticipated P | (1.7) | (1.7) | (1.7) | (14.4) | (14.4) | (14.4) | (10.2) | 3.0 | 15.0 |
| H_{11} | .451 | .451 | .451 | 1.253** | 1.253** | 1.253** | (45.0) | 91.4 | 35.1 |
| Buying Intentions ^a | | | | | | | .292** | | |
| \hat{P} | | | | | | | .148** | | |
| \hat{P}_e | | | | | | | -.009 | | |
| $Z\hat{P}_e$ | | | | | | | .527 | | |
| Constant | .127 | -.096 | -.141 | .958** | 1.056** | .608 | .527 | | |
| R^2 | .064 | .109 | .132 | .046 | .058 | .089 | .158 | | |

(continued)

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 42 (concluded)

A₃—HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 45 AND 64 YEARS OLD

| | | | | | | | | |
|--------------------------------|--------|--------|---------|---------|---------|---------|--------|------|
| Initial-Data | (9.1) | (9.8) | (11.1) | (8.2) | (4.9) | (5.9) | (3.6) | |
| Objective | .012 | .005 | .004 | .043** | .035** | .035** | .033** | 3.2 |
| Y | .100 | .042 | .046 | .106 | .046 | .065 | .047 | 0.6 |
| ΔL_{-1} | -.052 | -.109 | -.086 | .160 | .102 | .100 | .126 | 0.0 |
| ΔY_{-1} | .196** | .204** | .215** | .100* | .107* | .114* | .042 | 32.0 |
| Anticipatory | (10.0) | (10.0) | (7.6) | (5.8) | (5.8) | (4.7) | (2.6) | |
| \hat{E} | .227 | .227 | .135 | -.113 | -.113 | -.300 | -.351 | 3.2 |
| O | .269** | .269** | .250** | .309** | .309** | .281* | .214* | 14.6 |
| \hat{E}_6 | .379** | .379** | .336** | .325* | .325* | .262* | .166 | 13.8 |
| Intervening | | | (1.5) | (0.6) | (0.6) | (0.6) | (0.4) | |
| Income Changes | | | .066 | .100 | .100 | .100 | .077 | 1.2 |
| ΔY | | | -.233 | -.005 | -.005 | -.005 | .051 | 2.5 |
| ΔY_t | | | | | | | | 0.0 |
| Housing | | | | | | | | |
| Unanticipated P | | | (0.0) | (2.2) | (2.2) | (2.2) | (2.2) | 0.0 |
| H_{01} | | | .073 | .679 | .679 | .679 | .657 | 1.9 |
| Unfulfilled \hat{P} | | | (0.4) | (2.2) | (2.2) | (2.2) | (2.2) | 0.0 |
| H_{10} | | | -.246 | .541 | .541 | .541 | .540 | 3.8 |
| Anticipated P | | | (33.2) | (14.4) | (14.4) | (14.4) | (6.8) | |
| H_{11} | | | 2.326** | 2.038** | 2.038** | 2.038** | 1.388* | 34.0 |
| Buying Intentions ^a | | | | | | | (13.4) | 18.5 |
| \hat{P} | | | | | | | .267** | 48.2 |
| \hat{P}_c | | | | | | | .054 | 3.8 |
| $Z\hat{P}_c$ | | | | | | | -.002 | |
| Constant | .348* | -.123 | -.265 | .982** | .826 | .859 | .898 | |
| R^2 | .055 | .099 | .151 | .050 | .076 | .111 | .148 | |

* = t ratio > 2.

** = t ratio > 3.

^a \hat{P} signifies definite intentions to buy within a year; \hat{P}_c , probable-possible intentions to buy within a year.

SOURCE: Basic data from Consumer Purchase Study, NBER.

NOTE: Figures in parentheses in first seven columns are either F ratios or joint F ratios.

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 43
SUMMARY OF CORRELATION DATA FOR SIX-MONTH AND "LATER" INTENDERS CLASSIFIED BY LIFE-CYCLE STATUS

| INDEPENDENT VARIABLES | REGRESSION COEFFICIENTS FOR CORRELATION BETWEEN | | | | | | | F RATIOS FOR | |
|---|---|------------------------|---------------------------|------------------------|-------------------------------------|---------------------------|---------------------------|------------------|------------|
| | Buying Intentions (\hat{P}) and | | | | Durable Goods Purchases (P) and | | | ZERO-ORDER | |
| | $x_1 \dots x_4$ (1) | $x_1 \dots x_7$ (2) | $x_1 \dots x_{12}$ (3) | $x_1 \dots x_4$ (4) | $x_1 \dots x_7$ (5) | $x_1 \dots x_{12}$ (6) | $x_1 \dots x_{15}$ (7) | \hat{P} (8) | P (9) |
| B ₁ —HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 25 AND 34 YEARS OLD | | | | | | | | | |
| Initial-Data | (20.0) | (17.6) | (16.9) | (15.6) | (13.0) | (13.5) | (7.9) | | |
| Objective | .035** | .028* | .033** | .064** | .059** | .066** | .056** | 13.7 | 30.0 |
| Y | .178* | .126 | .102 | .138 | .101 | .077 | .047 | 10.5 | 7.4 |
| ΔL_{-1} | .053 | .047 | .020 | .104* | .100* | .077 | .073 | 4.2 | 8.4 |
| ΔY_{-1} | .199** | .205** | .197** | .147** | .151** | .144** | .079* | 53.6 | 21.2 |
| Anticipatory | (11.0) | (8.3) | (8.3) | (3.8) | (2.1) | (2.1) | (0.8) | | |
| \hat{E} | -.193 | -.247 | -.257** | .098 | .098 | -.018 | .056 | 0.0 | 2.1 |
| O | .326** | .257** | .257** | .160* | .225** | .160* | .085 | 34.4 | 16.9 |
| \hat{E}_5 | .076 | .091 | .091 | .033 | .033 | .036 | .006 | 2.1 | 1.0 |
| Intervening | | | | | | | | | |
| Income Changes | (1.4) | (1.4) | (1.4) | (2.3) | (1.3) | (2.3) | (1.3) | | |
| ΔY | -.058 | -.058 | -.058 | -.058 | -.058 | -.058 | -.036 | 0.0 | 0.0 |
| ΔY_t | .220 | .220 | .220 | .307 | .307 | .307 | .234 | 3.1 | 4.2 |
| Housing | | | | | | | | | |
| Unanticipated P | (0.4) | (0.4) | (0.4) | (10.2) | (9.0) | (10.2) | (9.0) | | |
| H_0 | .205 | .205 | .205 | .773** | .773** | .773** | .710** | 0.0 | 6.3 |
| Unfulfilled \hat{P} | (24.3) | (24.3) | (24.3) | (1.7) | (0.0) | (1.7) | (0.0) | | |
| H_{10} | .936** | .936** | .936** | .300 | .300 | .300 | -.032 | 25.6 | 2.1 |
| Anticipated P | (34.5) | (34.5) | (34.5) | (14.4) | (14.4) | (30.2) | (14.4) | | |
| H_{11} | 1.443** | 1.443** | 1.443** | 1.530** | 1.530** | 1.530** | 1.062** | 38.8 | 31.1 |
| Buying Intentions ^a | | | | (36.0) | (36.0) | (36.0) | (36.0) | | |
| \hat{P} | .476** | .457 | .588* | .882** | .664* | .842* | .068* | 128.1 | 1.0 |
| \hat{P}_c | .071 | .100 | .152 | .057 | .067 | .104 | .165 | | |
| $Z\hat{P}_c$ | | | | | | | | | |
| Constant | | | | | | | | | |
| R^2 | | | | | | | | | |

(continued)

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 43 (continued)

B₂—HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 35 AND 44 YEARS OLD

| | | | | | | | | | | | | |
|--------------------------------|---------|---------|---------|---------|---------|---------|---------|------|--|--|--|-------|
| Initial-Data | | | | | | | | | | | | |
| Objective | (22.3) | (19.0) | (22.1) | (13.0) | (12.1) | (11.9) | (6.1) | | | | | |
| Y | .028** | .023* | .025** | .038** | .032** | .033** | .026** | 16.8 | | | | 18.8 |
| ΔL_{-1} | .284** | .215* | .194* | .112 | .032 | .048 | -.004 | 14.8 | | | | 2.0 |
| ΔY_{-1} | -.075 | -.103 | -.068 | -.098 | -.138* | -.119 | -.103 | 0.0 | | | | 2.0 |
| S' | .208** | .212** | .210** | .170** | .177** | .172** | .109** | 57.6 | | | | 29.0 |
| Anticipatory | (9.3) | (8.3) | (8.3) | (9.2) | (9.2) | (8.3) | (5.6) | | | | | |
| \hat{E} | .167 | -.050 | .655* | .655* | .655* | .463 | .480 | 0.0 | | | | 3.9 |
| O | .311** | .284** | .332** | .332** | .332** | .333** | .256** | 33.2 | | | | 25.9 |
| \hat{E}_s | .041 | .004 | .038 | .038 | .038 | -.013 | -.019 | 0.0 | | | | 0.0 |
| Intervening | | | | | | | | | | | | |
| Income Changes | | | | | | | | | | | | |
| ΔY | (0.0) | (0.0) | (0.0) | (0.0) | (0.0) | (0.0) | (0.3) | | | | | 0.0 |
| ΔY_i | -.036 | -.026 | .049 | .049 | .049 | .049 | .055 | 0.0 | | | | 0.0 |
| Housing | | | | | | | | | | | | |
| Unanticipated P | | | | | | | | | | | | |
| H ₀₁ | (2.0) | (2.0) | (2.0) | (16.8) | (16.8) | (16.8) | (15.2) | 0.0 | | | | 12.8 |
| Unfulfilled \hat{P} | .409 | .409 | .409 | 1.136** | 1.136** | 1.136** | 1.046** | 0.0 | | | | |
| H ₁₀ | (27.2) | (27.2) | (27.2) | (1.7) | (1.7) | (1.7) | (6.8) | 22.9 | | | | 2.0 |
| Anticipated P | 1.119** | 1.119** | 1.119** | -.331 | -.331 | -.331 | -.634* | 54.4 | | | | 40.5 |
| H ₁₁ | (57.9) | (57.9) | (57.9) | (38.4) | (38.4) | (38.4) | (19.4) | | | | | |
| Buying Intentions ^a | 2.234** | 2.234** | 2.234** | 2.079** | 2.079** | 2.079** | (28.0) | | | | | |
| \hat{P} | | | | | | | .291** | | | | | 115.2 |
| \hat{P}_c | | | | | | | .003 | | | | | 0.0 |
| Z \hat{P}_c | | | | | | | .018 | | | | | |
| Constant | .412** | .068* | .259 | .972** | .148 | .141 | -.032 | | | | | |
| R ² | .085 | .110 | .185 | .050 | .076 | .130 | .179 | | | | | |

(continued)

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 43 (concluded)

| INDEPENDENT VARIABLES | REGRESSION COEFFICIENTS FOR CORRELATION BETWEEN <i>Durable Goods Purchases (P) and</i> | | | | | | | <i>F</i> RATIOS FOR ZERO-ORDER CORRELATION WITH <i>P</i> |
|---|---|--|---|--|--|---|---|---|
| | <i>x</i> ₁ . . . <i>x</i> ₄ (1) | <i>x</i> ₁ . . . <i>x</i> ₇ (2) | <i>x</i> ₁ . . . <i>x</i> ₁₂ (3) | <i>x</i> ₁ . . . <i>x</i> ₄ (4) | <i>x</i> ₁ . . . <i>x</i> ₇ (5) | <i>x</i> ₁ . . . <i>x</i> ₁₂ (6) | <i>x</i> ₁ . . . <i>x</i> ₁₅ (7) | |
| B ₃ —HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 45 AND 64 YEARS OLD | | | | | | | | |
| Initial-Data | | | | | | | | |
| Objective | (24.6) | (24.5) | (24.4) | (12.4) | (11.6) | (11.2) | (7.2) | |
| <i>Y</i> | .035** | .031** | .031** | .052** | .049** | .050** | .044** | 16.6 |
| ΔL_{-1} | .275* | .239* | .202* | .100 | .065 | .046 | .006 | 10.5 |
| ΔY_{-1} | .095 | .039 | .004 | .143 | .123 | .052 | .053 | 2.2 |
| <i>S'</i> | .282** | .288** | .269** | .150** | .153** | .142** | .093* | 59.1 |
| Anticipatory | | (8.8) | (7.5) | | (2.6) | (2.3) | (1.1) | |
| \hat{E} | .702* | .702* | .601* | -.048 | -.048 | -.076 | -.218 | 6.7 |
| <i>O</i> | .291** | .291** | .287** | .235* | .235* | .219* | .142 | 23.7 |
| \hat{E}_s | .005 | .005 | .001 | .024 | .024 | .000 | .004 | 0.7 |
| Intervening | | | | | | | | |
| Income Changes | | | (1.1) | | | (3.8) | (3.2) | |
| ΔY | | | .067 | | | .054 | .052 | 0.7 |
| ΔY_t | | | .216 | | | .562* | .524* | 0.7 |
| Housing | | | | | | | | |
| Unanticipated <i>P</i> | | | (3.0) | | | (22.1) | (17.6) | |
| <i>H</i> ₀₁ | | | .582 | | | 1.687** | 1.535** | 3.7 |
| Unfulfilled \hat{P} | | | (14.8) | | | (0.4) | (1.4) | |
| <i>H</i> ₁₀ | | | 1.448** | | | -.274 | -.532 | 13.6 |
| Anticipated <i>P</i> | | | (33.1) | | | (18.5) | (10.9) | 0.7 |
| <i>H</i> ₁₁ | | | 2.585** | | | 2.257** | 1.776** | 40.6 |
| Buying Intentions ^a | | | | | | | (13.0) | 21.3 |
| \hat{P} | | | | | | | .220** | 63.5 |
| \hat{P}_c | | | | | | | -.056 | 2.2 |
| $Z\hat{P}_c$ | | | | | | | .030 | |
| Constant | .205 | -.666* | -.836* | .740** | .622 | .523 | .702 | |
| <i>R</i> ² | .117 | .148 | .207 | .063 | .073 | .130 | .162 | |

SOURCE: Basic data from Consumer Purchase Study, NBER.

NOTE: Figures in parentheses in first seven columns are either

F ratios or joint *F* ratios.

* = *t* ratio > 2.

** = *t* ratio > 3.

^a \hat{P} signifies intentions to buy within six months; \hat{P}_c , intentions to buy later.

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 44
SUMMARY OF CORRELATION DATA FOR TWELVE-MONTH AND INCOME-CONTINGENT INTENDERS CLASSIFIED BY LIFE-CYCLE STATUS

| INDEPENDENT VARIABLES | REGRESSION COEFFICIENTS FOR CORRELATION BETWEEN <i>Durable Goods Purchases (P)</i> and | | | | | | | F RATIOS FOR ZERO-ORDER CORRELATION WITH \hat{P} |
|--|---|------------------------|---------------------------|------------------------|------------------------|---------------------------|---------------------------|---|
| | $x_1 \dots x_4$ (1) | $x_1 \dots x_7$ (2) | $x_1 \dots x_{12}$ (3) | $x_1 \dots x_4$ (4) | $x_1 \dots x_7$ (5) | $x_1 \dots x_{12}$ (6) | $x_1 \dots x_{18}$ (7) | |
| C1—HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 25 AND 34 YEARS OLD | | | | | | | | |
| Initial-Data | | | | | | | | |
| Objective | (34.0) | (29.3) | (36.0) | (9.7) | (7.2) | (8.0) | (1.2) | |
| Y | .063** | .047** | .053** | .046 | .034* | .038** | .022 | 21.8 |
| ΔL_{-1} | .232* | .141 | .072 | .138 | .076 | .034 | .010 | 13.4 |
| ΔY_{-1} | .221** | .167** | .162** | .083 | .043 | .039 | -.006 | 5.1 |
| S' | .316** | .322** | .321** | .144** | .148** | .151** | .043 | 20.8 |
| Anticipatory | (20.8) | (20.8) | (16.6) | (11.7) | (11.7) | (11.0) | (5.7) | 73.1 |
| \hat{E} | .656 | .501** | .299 | .318 | .283 | .283 | .199 | 6.1 |
| O | .501** | .449** | .449** | .343** | .308** | .308** | .192* | 64.6 |
| \hat{E}_s | .220* | .220* | .199* | .228* | .273** | .273** | .208* | 13.4 |
| Intervening | | | | | | | | |
| Income Changes | | | (0.9) | (2.3) | (2.3) | (2.3) | (1.6) | 0.0 |
| ΔY | | | -.063 | -.082 | -.082 | -.082 | -.066 | 0.0 |
| ΔY_t | | | .231 | .262 | .262 | .262 | .208 | 1.0 |
| Housing | | | | | | | | |
| Unanticipated P | | | (6.7) | (33.6) | (33.6) | (33.6) | (22.1) | 36.9 |
| H_{0t} | | | .790* | 1.387** | 1.387** | 1.387** | 1.100** | 8.2 |
| Unfulfilled \hat{P} | | | (49.4) | (4.0) | (4.0) | (4.0) | (17.6) | 4.1 |
| H_{10} | | | 1.474** | -.397 | -.397 | -.397 | -.893** | 44.6 |
| Anticipated P | | | (34.0) | (24.0) | (24.0) | (24.0) | (7.8) | 28.2 |
| H_{11} | | | 1.863** | 1.384** | 1.384** | 1.384** | (45.3) | 22.9 |
| Buying Intentions ^a | | | | | | | | |
| \hat{P} | | | | | | | | 154.8 |
| \hat{P}_e | | | | | | | .287** | 20.8 |
| Z/\hat{P}_e | | | | | | | .048 | |
| Constant | .872** | -.153 | .174 | 1.056** | .424 | .638 | .423 | |
| R ² | .118 | .170 | .241 | .037 | .069 | .130 | .203 | |

(continued)

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 44 (continued)

| INDEPENDENT VARIABLES | REGRESSION COEFFICIENTS FOR CORRELATION BETWEEN | | | | | | F RATIOS FOR | | |
|---|---|-----------------|--------------------|--|-----------------|--------------------|--------------------|---------------------|---------------|
| | <i>Buying Intentions (P̂) and</i> | | | <i>Durable Goods Purchases (P) and</i> | | | ZERO-ORDER | | |
| | $x_1 \dots x_4$ | $x_1 \dots x_7$ | $x_1 \dots x_{12}$ | $x_1 \dots x_4$ | $x_1 \dots x_7$ | $x_1 \dots x_{12}$ | $x_1 \dots x_{15}$ | $\frac{F}{\bar{P}}$ | $\frac{F}{P}$ |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| C ₂ —HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 35 AND 44 YEARS OLD | | | | | | | | | |
| Initial-Data | | | | | | | | | |
| Objective | (34.2) | (31.7) | (34.8) | (13.4) | (12.0) | (12.2) | (4.8) | 10.8 | 21.9 |
| Y | .038** | .028* | .028* | .051** | .043** | .041** | .032** | 9.1 | 1.6 |
| ΔL_{-1} | .241* | .113 | .127 | .075 | -.014 | .040 | .006 | 3.3 | 0.0 |
| ΔY_{-1} | .095 | .078 | .062 | -.008 | -.032 | -.056 | -.070 | 105.5 | 26.2 |
| S' | .375** | .369** | .372** | .189** | .186** | .186** | .072* | | |
| Anticipatory | | (20.9) | (16.7) | (10.2) | (8.7) | (8.7) | (4.0) | 10.8 | 4.1 |
| \hat{E} | .852* | .696* | .696* | .467 | .358** | .472 | .289 | 61.7 | 30.6 |
| O | .551** | .492** | .492** | .358** | .358** | .334** | .190* | 1.6 | 6.6 |
| \hat{E}_6 | .012 | -.045 | -.045 | .175 | .175 | .172 | .176* | | |
| Intervening | | | | | | | | | |
| Income Changes | | | (2.5) | | | (1.5) | (0.8) | 4.9 | 4.1 |
| ΔY | | | .163* | | | .108 | .060 | 0.0 | 0.8 |
| ΔY_t | | | .062 | | | .201 | .184 | | |
| Housing | | | | | | | | | |
| Unanticipated P | | | (0.0) | | | (20.2) | (23.0) | 0.0 | 21.0 |
| H_{01} | | | .012 | | | 1.274** | 1.320** | | |
| Unfulfilled \hat{P} | | | (27.0) | | | (0.1) | (2.6) | 34.2 | 0.0 |
| H_{10} | | | 1.245** | | | -.060 | -.402 | | |
| Anticipated P | | | (27.5) | | | (24.0) | (11.6) | 20.2 | 19.3 |
| H_{11} | | | 2.131** | | | 1.940** | 1.328** | | |
| Buying Intentions ^a | | | | | | | (36.7) | 140.2 | 6.6 |
| \hat{P} | | | | | | | .316** | | |
| \hat{P}_c | | | | | | | -.011 | | |
| $Z\hat{P}_c$ | | | | | | | .078 | | |
| Constant | .834** | -.253 | -.710 | .648** | -.053 | -.536 | -.446 | | |
| R^2 | .141 | .201 | .257 | .061 | .095 | .145 | .219 | | |

(continued)

ANALYSIS OF PURCHASES AND INTENTIONS

TABLE 44 (concluded)

| | C ₃ —HUSBAND-WIFE HOUSEHOLDS, HEAD BETWEEN 45 AND 64 YEARS OLD | | | | | | |
|-----------------------|---|--------|---------|--------|--------|--------|--------|
| Initial-Data | (38.0) | (35.0) | (35.3) | (7.6) | (6.6) | (6.4) | (1.6) |
| Objective | .050** | .036** | .038** | .037** | .029* | .030* | .020* |
| Y | .288* | .149 | .130 | -.012 | -.118 | -.101 | -.132 |
| ΔL_{-1} | .264** | .184* | .181* | .150 | .089 | .070 | .026 |
| ΔY_{-1} | .444** | .439** | .441** | .158** | .160** | .158** | .045 |
| Anticipatory | (11.0) | (10.9) | (6.0) | (5.3) | (2.6) | (2.6) | (0.4) |
| \hat{E} | -.257 | -.335 | .449 | .394 | .324** | .461 | .212* |
| O | .479** | .486** | .328** | .141 | .134 | .086 | .086 |
| \hat{E}_s | .234 | .187 | (0.7) | (0.3) | (0.3) | (0.3) | (0.4) |
| Intervening | | | .085 | .032 | .013 | .013 | .013 |
| Income Changes | | | -.147 | .163 | .198 | .198 | .198 |
| ΔY | | | | | | | |
| ΔY_t | | | | | | | |
| Housing | | | | | | | |
| Unanticipated P | | | (0.0) | (1.0) | (0.8) | (0.8) | (0.8) |
| H_{0t} | | | .089 | .448 | .396 | .396 | .396 |
| Unfulfilled \hat{P} | | | (15.9) | (1.4) | (4.8) | (4.8) | (4.8) |
| H_{10} | | | 1.482** | -.456 | -.859* | -.859* | -.859* |
| Anticipated P | | | (0.5) | (0.8) | (0.6) | (0.6) | (0.6) |
| H_{11} | | | .311 | .616 | .514 | .514 | .514 |
| Buying Intentions* | | | | | (19.5) | (19.5) | (19.5) |
| \hat{P} | | | | | .253** | .253** | .253** |
| \hat{P}_e | | | | | .011 | .011 | .011 |
| $Z\hat{P}_e$ | | | | | .025 | .025 | .025 |
| Constant | .582** | .529 | .262 | .899** | .259 | .134 | .043 |
| R ² | .196 | .238 | .259 | .047 | .075 | .082 | .137 |

SOURCE: Basic data from Consumer Purchase Study, NBER.
 NOTE: Figures in parentheses in first seven columns are either F ratios or joint F ratios.

* = t ratio > 2.
 ** = t ratio > 3.
^a \hat{P} signifies intentions to buy within twelve months; \hat{P}_e , intentions to buy within twelve months if income is higher than expected.