

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

Volume Title: Consumer Expectations, Plans, and Purchases: A Progress Report

Volume Author/Editor: F. Thomas Juster

Volume Publisher: NBER

Volume ISBN: 0-87014-384-0

Volume URL: <http://www.nber.org/books/just59-1>

Publication Date: 1959

Chapter Title: Interactions Between Variables

Chapter Author: F. Thomas Juster

Chapter URL: <http://www.nber.org/chapters/c1838>

Chapter pages in book: (p. 92 - 104)

5. INTERACTIONS BETWEEN VARIABLES

A large number of factors in addition to income and age have been examined and found to be associated with either buying plans or purchases, or both. Some of them are significant for decision making, while others are likely to be unimportant in themselves, being associated with plans or purchases because they are interrelated with variables that are significant. Comprehensive tests of the relative importance of all these variables was not undertaken, since the object of the study was to survey the field of possibilities in search of relationships to be tested, rather than to predetermine the relevant variables and test them for net significance.¹

To examine some of the more promising interrelationships, we have discarded some data and combined others. The reader will recall that fifteen age-income groups were selected originally, and additional variables examined in turn within each of these groups. Further subclassification would be impossible because of diminishing cell frequencies. We have therefore combined the two most thickly populated income classes (\$5,000-7,499 and \$7,500-10,000), retaining the age breakdown within the combined class. We can now proceed to examine relationships between two additional variables within these three age groups. The incomes covered by this grouping are naturally less homogeneous than before; however, differences in the frequency of buying plans or purchases between the combined groups are not excessively large, as can be seen from Table 13.

Of the relationships previously examined, three stand out as warranting more study: (1) long-range financial prospects, which were strongly related to plans and as closely related to purchases as any variable examined; (2) general business expectations, which were strongly related to the six-months plans and seemed to offer most promise to explain the comparatively low level of plans in the April survey; and (3) price expectations, which, in conjunction with opinions about buying conditions, seemed to have an unexpectedly strong relationship to plans.

¹The choice here is between (1) entering all the possible factors in an elaborate correlation analysis with net relationships used as a criterion of relative importance, and (2) taking more or less leisurely "tours" through the data with successive additions of variables. The second procedure is better designed for finding relationships that are either not linear or depend on particular levels of other variables.

TABLE 47

AVERAGE LEVEL OF BUYING PLANS FOR AUTOMOBILES AND HOUSEHOLD EQUIPMENT OF HOUSEHOLDS WITH DIFFERENT EXPECTATIONS ABOUT LONG-RANGE FINANCIAL PROSPECTS, WITH AGE, INCOME, AND ONE OTHER VARIABLE HELD CONSTANT
(UNITY = \$300)

AVERAGE BUYING PLANS WITH FINANCIAL PROSPECTS 5 YEARS AHEAD
EXPECTED TO:

<i>Variable Held Constant (with Age and Income)</i>	<i>Number of groups averaged^a</i>	<i>Improve con- siderably</i>	<i>Improve somewhat</i>	<i>Improve slightly</i>	<i>Remain the same</i>	<i>Deteriorate</i>	<i>r^{2b}</i>
<i>6-Months Plans</i>							
Business expectations	12	1.27	1.02	0.91	0.73	0.62	0.26
Income expectations	9	1.40	1.03	0.94	0.86	0.68	0.43
Price expectations	9	1.43	1.07	0.94	0.87	0.71	0.52
Opinion about buying conditions	9	1.50	1.09	0.99	0.83	0.90	0.44
Debt maturity	12	1.15	0.94	0.89	0.54	0.56	0.42
<i>12-Months Plans</i>							
Business expectations	12	2.34	2.13	2.06	1.80	1.78	0.18
Income expectations	9	2.16	2.04	2.01	1.72	1.85	0.03
Price expectations	9	2.44	2.17	2.10	1.88	1.76	0.31
Opinion about buying conditions	9	2.45	2.17	2.05	1.87	1.96	0.25 ^c
Debt maturity	12	1.88	1.98	1.79	1.68	1.50	0.18

^aThe number of groups for each category of long-range prospects depends of course on the number of categories into which the other variables are classified. In this case we have only 1 income group, 3 age groups, and either 3 or 4 groups for all the other variables. Thus the number of groups to be averaged is either 9 or 12, depending on whether the third variable contains 3 or 4 separate categories. The averages shown are unweighted arithmetic averages.

^bCalculated by assigning ranks to the various long-range prospect categories, from 5 (improve considerably) down through 1 (deteriorate). The number of such rankings depends on the number of categories used for each variable shown in the stub. For business expectations, for example, there were four groups—optimistic, neutral, somewhat pessimistic, and strongly pessimistic. Thus we have four sets of ranks, one for each business expectation group, within each of three age groups, or a total of 12 sets of ranks. The correlation for this line is thus based on 60 observations—12 sets of a 5-through-1 ranking related to an equal number of hypothetical rankings.

^cRises to 0.24 if we remove people who expected a deterioration in financial situation. This group has the smallest sample size of any shown. Source: Basic data in this and other tables of this section from Consumer Purchases Project, National Bureau of Economic Research, unless otherwise noted.

Long-Range Financial Prospects

Expectations about long-range financial prospects are evidently among the most powerful factors influencing both plans and purchases. This is not to say necessarily that this variable is useful for aggregate predictions, since the distribution of such expectations may be rather stable over time. However, Table 47 indicates that, for buying plans, differences in long-range expectations explain a great deal of the variation between households. Conversely, when long range expectations are held constant, other factors that previously showed a strong relationship to plans become much less influential.

Differences in the average level of buying plans, with age, income, and a third variable constant, are striking—especially for the six-months plans.² Households with very optimistic long-range prospects plan to buy about twice as many durable goods, on the average, as households with deteriorating prospects do. The differentials for the twelve-months plans are considerably smaller in percentage terms and less consistent within groups.

This result would hardly be surprising if age differences were not accounted for, and part of our result may be due to the fact that the age brackets are relatively wide. That is, the optimistic end of the long-range prospect scale may contain relatively more very young people in the under-35 category than the pessimistic end of the scale does, and the pessimistic end relatively more very old people in the 45- and over category. If so, some of the differences in plans would reflect age rather than differences in subjectively estimated long-range prospects.

Comparison of Table 47 with Table 32 indicates clearly that the influence of long-range financial prospects is either not diminished or is strengthened when additional variables are taken into account. When they are (other things being equal), the rank correlations are about the same as those found when only income and age were held constant, and the average difference in levels of buying plans are generally greater. When long-range prospects are held constant, the influence of other factors is generally weakened. Table 48 shows rank correlations for the five factors, first, with age and income held constant, and second, with long-range prospects in addition to age and income constant. Where long-range prospects are related in a positive way to the other variable (e.g., income

²The reader should note that the entire level of the averages can be quite different for different rows. The reason is that the averages are unweighted; in the case of the debt maturity question, for example, there are a considerable number of relatively small sample size groups with no buying plans at all—people who expect to be in debt for 2 or more years. These zeroes make the unweighted averages low relative to the other rows.

TABLE 48

RANK CORRELATIONS FOR SELECTED VARIABLES RELATED
TO BUYING PLANS

Variable	RANK CORRELATIONS (r^2)			
	Age and Income Constant		Age, Income, and Long-Range Prospects Constant	
	6-Months Plans	12-Months Plans	6-Months Plans	12-Months Plans
Business expectations	0.30	0.22	0.07	0.00
Income expectations	.35	.28	.07	.11
Price expectations	.18	.00	.04	.22
Opinion about buying conditions	.75	.54	.54	.54
Debt maturity	.40	.39	.44	.53

Source: Correlations for 6- and 12-months plans with income and age held constant are shown in Tables 34, 28, and 44. Correlations with income, age, and long-range prospects constant are derived by the procedure described in notes to Table 47.

expectations), the latter shows a weaker relationship to buying plans when long-range prospects are taken into account. The implication is that long-range financial prospects are more relevant to purchase decision making than are short-range expectations about income. Where the two are related in a negative way (e.g., debt maturity), the influence of the other variable is somewhat enhanced.

Long-range financial prospects also show a somewhat stronger relationship to recent purchases after account is taken of additional variables, as Table 49 shows. The association here is noticeably weaker than that between financial prospects and buying plans.

The relationship between purchases and financial prospects has a much more consistent pattern for some age groups than others (Table 50). There seems to be no relationship at all between purchases and prospects for older people, which of course tends to weaken the overall relationships shown in Table 49. This is so regardless of which variables are included along with income and age. For data in Table 50, the rank correlation procedure was used for each age group within either three or four categories of the specified variable; that is, each of the three age groups was treated separately. The correlations that result are thus subject to considerably greater sampling error, since there were fewer observations. However, repetition of the same pattern for different classifications of the data

TABLE 49

AVERAGE LEVEL OF AUTOMOBILE AND HOUSEHOLD EQUIPMENT PURCHASES FOR HOUSEHOLDS WITH
DIFFERENT EXPECTATIONS ABOUT LONG-RANGE FINANCIAL PROSPECTS, WITH AGE,
INCOME, AND ONE OTHER VARIABLE HELD CONSTANT
(UNITY = \$300)

AVERAGE PURCHASES WITH FINANCIAL PROSPECTS 5 YEARS AHEAD
EXPECTED TO:

Variable Held Constant (with Age and Income)	Number of groups averaged ^a	EXPECTED TO:					r ^{2b}
		Improve con- siderably	Improve somewhat	Improve slightly	Remain the same	Deteriorate	
Business expectations	12	2.75	2.69	2.56	2.37	2.50	0.11
Income experience	9	3.11	2.78	2.67	2.39	2.57	0.27
Income expectations	9	2.95	2.78	2.71	2.61	2.50	0.30
Price expectations	9	2.87	2.70	2.62	2.44	2.52	0.12
Opinion about buying conditions	9	2.85	2.72	2.71	2.44	2.54	0.13
Debt maturity	12	3.18	3.05	2.85	2.81	2.76	0.09
Asset change	9	3.09	2.83	2.73	2.34	2.60	0.24

^aSame as in Table 47.

^bSame as in Table 47.

TABLE 50

RANK CORRELATIONS FOR THE RELATIONSHIP BETWEEN PURCHASES OF
AUTOMOBILES AND HOUSEHOLD EQUIPMENT AND LONG-RANGE
FINANCIAL PROSPECTS, DIFFERENT AGE GROUPS

<i>Variable Held Constant (with income)</i>	<i>Number of Observations</i>	RANK CORRELATION COEFFICIENT (r^2) FOR AGE GROUP ^a		
		<i>Under 35</i>	<i>35-44</i>	<i>45-Over</i>
Business expectations	20	0.33	0.39	(-)0.01
Income expectations	15	0.49	0.64	0.02
Income experience	15	0.54	0.75	(-)0.01
Price expectations	15	0.42	0.28	(-)0.02
Opinion about buying conditions	15	0.32	0.54	(-)0.05
Debt maturity	20	0.12	0.28	0.00
Asset change	15	0.49	0.44	0.01

^aCalculated by assigning rank to the average level of purchases for groups of people with different long-range financial prospects, within each income and age group for every category of the variable shown in the stub. For business expectations, we have four classes for every age-income group—optimist, neutral, somewhat pessimistic, and very pessimistic. Within each of these classes, we have average purchases for people who were very optimistic, moderately optimistic, slightly optimistic, neutral, or pessimistic with regard to their long-range financial prospects. Thus we have four sets of a 1 through 5 ranking, matched against the same number of hypothetical rankings.

The signs in parenthesis indicate groups where the slope was negative.

increases confidence in the results. A look back at the plan data, however, tends to cast doubt on any generalization about the effect of age on the importance of long-range financial prospects. The same kind of computation as shown in Table 50 indicates that the relationship between financial prospects and buying plans is strongest for the oldest age group, although some relationship seems to exist for all three age groups.

One might, in principle, expect long-range prospects to be more important for younger than for older people. The range of possible subjective estimates of income five years ahead seems to be considerably greater for younger people, mainly because they are still in the process of finding their appropriate occupational niches. At forty-five or fifty, it is easier to visualize future occupational and income status realistically, often with the expectation that current situations will continue. Older people may say they expect to be considerably better off in five years, but may put off acting on that premise until it is justified by events. Younger people would possibly be more prone to make current decisions on the basis of long-range optimism. If things turn out well, the decision was justified; if they

do not, necessary retrenchment might not be so catastrophic for them as for their more mature (and less viable) counterparts.

The influence of price expectations upon the impact of long-range prospects on purchase plans remains to be considered. Examination of the interrelationships shows that long-range prospects are very closely related to purchase plans (rank $r^2=0.84$) for households that expect prices to rise or remain the same. But for those expecting price declines, the relationship is comparatively weak (rank $r^2=0.11$). The implication may be that people who expect prices to remain the same or to increase regard such a situation as normal, hence, price expectations may exert little impact on their purchase plans or decisions, while long-range prospects have great influence. People who expect price declines may anticipate that that this will be a temporary phenomenon offering good bargains in the near future; expectations about longer-range prospects might well be ignored by these households.³

General Business Expectations

Expectations about general business conditions are of special interest in this survey, since there was a fairly sharp contraction in the United States economy during the survey period. Expectations reported were closely associated with both six- and twelve-months buying plans, and also seemed to have had some impact on purchases during the April 1957–April 1958 period. Further examination of the data suggests that removing the influence of additional variables has little effect on the relationship between business expectations and buying plans for the six-month forward period, although the association disappears almost completely for the twelve-months plans. Data for the six-months plans are shown in Table 51, with the rank correlation coefficients.

Business expectations continue to show a net effect on buying plans, although comparison of the average level of plans in different categories in Table 51 with those in Table 34 indicates that the magnitude of the net effect may be smaller than suggested above in section 4. However, the effect of business expectations is mainly concentrated in the two youngest age groups, and is especially strong in the under-35 group. Calculating rank correlations within each age group, we find that the under-35 age group shows values for r^2 ranging from 0.23 to 0.81, depending upon which additional variable is used. For the 35-45 age group, a similar range goes from 0.06 to 0.81, and for the oldest group, from zero to 0.12. Averages

³A similar pattern shows up in the relationship between income expectations, price expectations, and buying plans. The buying plans of people who expect prices to rise or remain the same are more influenced by income expectations (one year ahead) than are the plans of people who expect price declines.

TABLE 51

AVERAGE LEVEL OF BUYING PLANS FOR AUTOMOBILES AND HOUSEHOLD EQUIPMENT FOR
HOUSEHOLDS WITH DIFFERENT EXPECTATIONS ABOUT GENERAL BUSINESS CONDITIONS,
WITH AGE, INCOME, AND ONE OTHER VARIABLE HELD CONSTANT
(UNITY = \$300)

Variable Held Constant (with Age and Income)	Number of groups averaged	AVERAGE 6-MONTHS BUYING PLANS WITH BUSINESS CONDITIONS EXPECTED TO:			Deteriorate substantially	r ^{2a}
		Improve	Remain the same	Deteriorate somewhat		
Income expectations	12	1.03	0.99	0.87	0.80	0.33
Opinion about buying conditions	12	1.10	.99	1.10	.83	0.13
Long range financial prospects	20	1.03	.90	.98	.72	0.07
Amount of debt	16	1.04	.91	.84	.81	0.28
Asset change	12	0.99	.95	.91	.74	0.20
Amount of assets	8	1.06	.93	.90	.80	0.49

^aBased on ranking procedure within each of three age groups and within each category of the variables listed at the left.

TABLE 52

AVERAGE LEVEL OF SIX-MONTHS BUYING PLANS FOR HOUSEHOLDS WITH
 VARYING OPINIONS ABOUT BUYING CONDITIONS, WITH AGE,
 INCOME, AND ONE OTHER VARIABLE HELD CONSTANT
 (UNITY = \$300)

<i>Variable Held Constant (with Income)</i>	<i>Age Group</i>	6-MONTHS BUYING PLANS WITH OPINION THAT PRESENT IS:		
		<i>Good time to buy</i>	<i>Bad time to buy</i>	<i>Difference</i>
Income expectations	Under 35	1.42	0.83	0.59
	35-45	1.39	.60	.79
	45 and over	1.08	.83	.25
Business expectations	Under 35	1.45	.81	.64
	35-45	1.44	.61	.83
	45 and over	1.02	.82	.20
Amount of debt	Under 35	1.37	.82	.55
	35-45	1.40	.62	.78
	45 and over	1.14	.78	.36
Asset change	Under 35	1.45	.81	.64
	35-45	1.40	.62	.78
	45 and over	1.01	.80	.21
Amount of assets	Under 35	1.49	.84	.65
	35-45	1.48	.64	.84
	45 and over	1.06	.76	.30

for the different age groups make clear that the buying plans of the younger members of the population were relatively more affected by their expectations about general business conditions, and particularly by very adverse expectations.

Opinions about whether the present was a good or bad time to buy were closely associated with expectations about business conditions (and price expectations, too). Households that held favorable opinions had many more buying plans than the others.⁴ But the extent of the difference in buying plans varied rather systematically with age, and the variation is similar to that shown in connection with business expectations. That is, younger people who thought the present a good time to buy had more buying plans, relative to younger people who thought otherwise, than was the case for older people (Table 52). People with unfavorable opinions

⁴See above, Section 4.

had about the same number of purchase plans regardless of age; but younger people with favorable opinions about buying conditions had many more buying plans than did older people with the same opinions. Since households with relatively young heads generally plan to buy and actually do buy more durables than other households do, our data suggest that an adverse opinion about buying conditions tends to cause a sharp reduction in the purchase plans of younger households.

The implication seems to be that the impact of uncertainty and pessimism about business conditions shows up partly in response to a direct question about business expectations, and partly in response to the question about opinions of buying conditions. In both cases the main impact is on households where the head is under 45 years of age.

The association between past purchases and general business expectations is closer when additional variables are considered than it was without them. It seems quite clear that adverse expectations about the business situation did play a major role in the reduced rate of expenditures on durables during the first part of 1958. In addition to the results in Table 53, there was a strong relationship between opinions about buying conditions (expressed in April 1958) and the amount of purchases reported for the previous year. Both pieces of data indicate that people who held adverse views about business or unfavorable opinions about buying conditions in April had held these views for some time, and that their rates of purchase had been reduced in consequence. Once again, note that these statements are with respect to people having the same income, age, and either the same recent income change or the same views about their long-range financial prospects.

Price Expectations

It was noted previously that the relationship between people's opinions about buying conditions and their price expectations made it appear quite likely that the latter variable was of more importance than it had originally appeared to be. Data in Table 54 bear out this intuitive assertion. People who expected prices to fall had almost 30 per cent more buying plans, for both the six- and twelve-month forward period, than people who expected prices to rise or remain the same (with age, income, and opinion about buying conditions held constant); people who expected prices to rise had slightly fewer plans than those expecting no change. There is also a weak relationship between price expectations and recent purchases, with people who expected a decline in prices having made slightly fewer purchases than people expecting either no change or

TABLE 53

AVERAGE LEVEL OF AUTOMOBILE AND HOUSEHOLD EQUIPMENT PURCHASES FOR PEOPLE WITH DIFFERENT EXPECTATIONS ABOUT GENERAL BUSINESS CONDITIONS, WITH AGE, INCOME AND ONE OTHER VARIABLE HELD CONSTANT
(UNITY = \$300)

Variable Held Constant (with Age and Income)	Number of groups averaged	AVERAGE PURCHASES WITH BUSINESS CONDITIONS EXPECTED TO:			<i>r</i> ^{2a}
		Improve	Remain the same	Deteriorate somewhat	
Income experience	15	2.94	2.86	2.82	0.33 ^b
Long-range financial prospects	15	2.78	2.57	2.70	0.12

^aUsing ranking procedure within 3 age groups and 5 classifications of the variable shown on the left.

^bBased on ranks within 2 classes that experienced income increases over the past year (substantial and moderate), one class with no change, and 2 classes that experienced decreases.

TABLE 54

AVERAGE LEVEL OF AUTOMOBILE AND HOUSEHOLD EQUIPMENT BUYING PLANS AND PURCHASES FOR HOUSEHOLDS WITH DIFFERENT PRICE EXPECTATIONS IN APRIL 1958, WITH AGE, INCOME, AND OPINION ABOUT BUYING CONDITIONS HELD CONSTANT (UNITY = \$300)

Plan or Purchase Period	Number of Groups Averaged	PRICES EXPECTED TO:			<i>r</i> ^{2a}
		Increase	No Change	Decrease	
6-months plans	9	1.01	1.05	1.28	(-)0.44
12-months plans	9	2.01	2.10	2.46	(-)0.44
Purchases over past 12 months	9	2.75	2.76	2.75	(+)0.11

^aBased on ranks within 3 age groups and 3 opinions about buying conditions (good time to buy, bad time to buy, and don't know). The signs in parenthesis indicate whether the slope was positive or negative.

increases.⁵ Our interpretation of these data is that people who expected price declines in April 1958 had been making fewer purchases because of their expectations, and planned to increase their rate of purchase in future if their expectations were fulfilled.

It is also apparent that there is a difference in these findings between age groups—most evident in plans to buy over a twelve-month forward period. Here, the youngest age group reported the same amount of purchase plans regardless of their price expectations. The other two age groups showed a very sharp difference—almost 50 per cent, for the 35-45 group. We also find a similar difference in the six-months plans, with the consistency of the price expectations—buying plans relationship for the youngest age group being noticeably lower than for the other two groups. The explanation may be that younger people feel less disposed to postpone purchases in hopes of getting better bargains because their stocks of durables are smaller and their needs more pressing. For older people, purchases are more apt to represent replacements; but since the older item is usable they can better afford to await favorable price developments.

It may also be that the influence of price expectations is greater among a group of Consumers Union subscribers than among the population as a whole. The CU group presumably makes more rational purchase decisions

⁵The difference does not show up at all in the averages, which are heavily influenced by two observations where the frequency of purchases is very high for people who expect price declines. The rank correlation procedure indicates that some relationship does exist, however.

than the population at large—the fact of CU membership alone suggests this. Consequently, the sensitivity of buying plans to price expectations in our data does not necessarily extend to the population.