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10. The Relation between Schooling and Savings Behavior: An Example of the Indirect Effects of Education

by Lewis C. Solmon

INTRODUCTION AND SUMMARY

Most discussions of the benefits of more, as compared with less, education point out that the lifetime income obtainable by an individual rises with schooling attainment. However, education may have indirect effects on an individual's total utility, either positive or negative, which do not come through increased earnings. These include consumption benefits to the educated individual; for example, schooling may enable people to appreciate the finer things in life or to be more efficient in making consumption decisions.[1] Benefits may also accrue to society at large; e.g., a more educated populace may be more civilized or more tolerant of others.

In the present study we ask whether individuals save more, or save in different forms, as they become more highly educated, thus conferring benefits either on themselves or on society as a whole. Can we identify an additional benefit from schooling due to different savings behavior, over and above the ability to earn more on the job, to enjoy life more fully, to consume more efficiently, to be more civilized, and so on? Savings behavior may, of

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course, affect income, thereby altering an individual's total utility, but this influence does not operate directly on earnings; hence the categorization of the effects of saving as indirect.

The study analyzes the influence of differences in education and other acquired human capital, such as on-the-job training, on the observed savings behavior of individuals who are similar in other important respects, including income and age. Education may influence a person's average savings-income ratio or the extra amount he saves out of a given increment in income. Alternatively, it may affect the uses to which savings are put, i.e., the composition of a savings portfolio of any given size.

The second section examines a number of theories which might be helpful in predicting the relationship between education and savings behavior. The third section discusses the permanent-income hypothesis in more detail and applies this framework to the analysis of the savings-education relationship. The fourth section tests the hypothesized relationships between education and the amount an individual saves. The final section analyzes consumer responses to savings-related questions and suggests some reasons for the observed patterns.

The theory discussed below leads to the prediction that those with more education, *ceteris paribus*, will tend to save more, however savings are defined. This hypothesis is tested by estimating savings functions from a panel of household units. Initially, separate savings functions are estimated for families at each different educational level. Then all families are pooled and a single savings function is estimated, dummy variables being used to identify any difference in marginal propensities to save due to differences in educational attainment.

At the first stage of analysis, savings are defined as the change in financial and nonhousing property assets minus the change in nonhousing debt. Although this definition is close to the customary one used in much economic analysis, savings can take forms other than those mentioned. One objective of this study is to get at the relationship between educational attainment and "full" savings, defined so as to take account of types of savings that have traditionally been ignored.

The specific ways of handling additional types of savings are discussed in Appendix D, and I shall note just a few of them here. A dummy variable is used to control for the fact that some family

heads are business proprietors or independent professionals and hence may have incentives to save in the form of business assets. Quantitative estimates of postschool investment in human capital are provided by drawing on previous work of Mincer (1962). These estimates are then included as part of savings. The value of consumer durables purchased is used as an independent variable to explain the traditional financial-savings concept. In general, therefore, a full-savings concept is recognized. Either adjustments have been made to account for an item, or the direction of the bias due to inadequate adjustments is discussed.

For savings functions estimated both with traditionally defined savings and with "full" savings, a pattern evolves in which the marginal and average propensities to save rise with schooling. This relationship appears stronger in the full-savings cases, since on-the-job training (savings in the form of postschool investment in human capital) rises with formal educational attainment (Mincer, 1962). Moreover, we expect the more complete definition of savings to reflect the true relationship more accurately, since savings decisions are likely to be made with an awareness of all possible means of acquiring wealth.

The analysis of consumer attitudes toward saving suggests some reasons why the amount of savings rises with educational attainment. Data are presented on the proportion of each education group selecting particular answers to savings-related questions. Then regression analysis reveals factors associated with the selection of a particular response. In many important cases, educational attainment turns out to be a strong factor in explaining why a particular response was or was not selected.

Apparently, those who were more highly educated had a better understanding of inflation and were better able to protect themselves against it. Better-educated families saved primarily to benefit children (for their education, to help them set up a household, and to leave an inheritance), whereas the less educated saved more to maintain current income (to build a business or to prepare for emergencies). The less educated were more inclined to save in the form of United States savings bonds or savings accounts, whereas the more educated selected riskier assets. The less educated sought safety of principal, whereas the more educated sought capital gains and protection from inflation. Inferences are made concerning the greater efficiency in saving, the greater risk prefer-

ence, and the longer planning horizons of the more educated families as compared with the less-educated ones.

Both the study of the savings functions and the analysis of attitudes lead to the conclusion that the savings behavior of better-educated families is more beneficial to themselves, and possibly to society at large, than the savings behavior of the less educated. The greater willingness to assume risk is an example of a societal benefit since risky ventures will be able to attract funds.

One reason why the relationship between education and savings has not been studied previously is the difficulty of obtaining data on savings behavior and attitudes of individuals or families, along with other data on demographic, socioeconomic, and educational characteristics. I was fortunate to have data available from a series of questionnaire surveys of members of the Consumers Union taken between 1957 and 1959. The surveys contain detailed information on both current income and the income history of the family, as well as on the amount of its financial-asset holdings at the end of 1958 and at the end of 1959, from which 1959 savings can be calculated. The data include information on the education of the head of the family and on many other socioeconomic characteristics of the family as well as responses to numerous questions on attitudes toward saving-related issues. In addition, there is extensive information on consumer-durable purchases, including housing and automobiles.

The basic sample used over 3,300 families (observations). This number is the remainder of a much larger sample, which was pruned down to eliminate questionable or inaccurate responses. The details of the formulation of the sample appear in Appendix A, which also describes more fully the nature of the sample. In brief, Consumers Union members constitute a select group, well above the national average in income and education. They are also conscientious and planning-minded, as indicated by their willingness to fill out detailed questionnaires and by their membership in the Consumers Union. Thus our survey probably contains more accurate responses, but is also more select in its coverage, than most other samples.

Although unrepresentative of all United States households, the sample certainly does not lack relevance to the economy at large. In particular, the relatively high-income, highly educated group in this sample is probably representative of the high-income, highly

educated subgroup in the population as a whole. The less well educated and less wealthy segments of the Consumers Union sample are probably somewhat less representative of the corresponding groups in the population.

In general, one would expect sample respondents to be more homogeneous than the United States population with respect to variables that influence savings behavior. Our study asks whether there are systematic differences in savings behavior and attitudes across education groups in the sample. Since the data reveal that differences do exist, we can be reasonably confident that similar differences would also be evident in the larger society, where the same differences in education imply greater heterogeneity in other characteristics.

THE EDUCATION-SAVINGS RELATIONSHIP

This section examines some of the possible relationships between education and savings behavior. For this purpose, it will be useful to put aside the problem of a working, quantifiable definition of full savings and merely ask about the relationship between education and willingness to defer present consumption for future consumption. Moreover, it is not important whether postponement is effected by converting current income into financial assets, into physical assets for business, into human capital, or into consumer durables.

There are several reasons why aggregate savings patterns might differ among groups classified according to their educational level:

1 Large amounts of education are associated with high incomes, and the fraction of income saved probably depends upon the level of income. However, the focus in this chapter is on how saving is influenced by education when income is held constant. Savings patterns also depend upon the time path of income. More education effects an initial delay in earning power and, later, a steeper rise in income than is experienced by less-educated people.

In addition, education may change the nature and sources of income and hence may influence savings behavior. Educated people's incomes may differ in regard to variance from period to period, in regard to source (whether from physical or human capital), and in regard to form (in terms of the split between wages and fringe benefits). Differences in variance, source, and form should result in differences in savings behavior.

2   Saving results from particular decisions about the relative value of present and future goods.[2] The subjective rate of transformation over time may well be affected by the amount of education possessed. Since the more educated should expect relatively steeply rising earnings streams, the prospect of increasing comforts might lead them to value future goods less and hence to save less for any level of current income. On the other hand, since the more educated may be better able to realize the worth of future goods, they may save more.

People also prefer present goods because of the shortness and uncertainty of life, which probably vary less with schooling attainment than the other factors!

The actual process of education might affect the tastes and attitudes of students in regard to characteristics influencing savings behavior. According to I. Fisher (1965, p. 62), time preference, or impatience, plays a central role in the theory of interest, where interest expresses a price exacted to exchange future goods for present ones. Time preference is the excess (percentage) of the present marginal desire for one more unit of present goods over the present marginal desire for one more unit of future goods. Thus the rate of time preference for present over future goods of like kind is readily derived from the marginal desirabilities of present and future goods, respectively. The higher a man's time preference, the less likely he is to defer consumption (save), and the higher the price he must be paid to do so.

Fisher has provided a list of personal characteristics that would seemingly influence time preferences and hence savings: foresight, self-control, a habit of thrift, concern over the uncertainty of life, concern for heirs, and concern for fashion and fads. It could be argued that these characteristics are influenced by education. Harold Watts (1958, p. 111) has pointed out that "high education may imply lower consumption, quite apart from the income correla-

[2] Bohm-Bawerk (1891, pp. 253–254) observed that the urgency of present over future goods is "most frankly expressed in children and savages [perhaps the least educated] but still exists in civilized society." Some of the suggested reasons are inadequate powers of representation and abstraction and an unwillingness to devote time to contemplating the future. These factors may differ according to education, so that the more educated better understand the future and are more willing to save for it. As Bohm-Bawerk pointed out: "As a fact, the future has a greater place in our economic provision; greater indeed, than people usually think . . . our economical conduct has acutely little reference to the present but is, almost entirely, taken up with the future" (p. 238).

tion, if better educated people are more farsighted and therefore have stronger retirement motives."

On the other hand, a recent survey of the literature on psychological testing to determine the impact of the college experience on students (Feldman & Newcomb, 1969, pp. 33–34) produced the following conclusion: "With a few exceptions, difference-scores between freshmen and seniors show seniors to be more ready to express impulses, more spontaneous, less ready to defer gratification, and less self-controlled or restrained. . . . According to this developmental pattern, college students tend to become somewhat more impulsive and somewhat less self-controlled, orderly and conscientious." This implies that a high level of education would be associated with a high level of consumption, contrary to Watts's conjecture. However, these observations may be the result of the ages of the students, their "growing up" and becoming adults, rather than the result of schooling. Moreover, students probably defer gratification during their years in school and then make up for lost time during the immediate postschool years. To show the net effects of education on attitudes like impulsiveness, changes in attitudes for freshmen and seniors in college should be measured against changes in attitudes for people of comparable age not attending college, one year and four years after graduation from high school.

The argument that education alters tastes, in whatever direction, is relevant only to the extent that these new taste patterns persist in the postcollege years. Feldman and Newcomb (1969, p. 323) summarize recent psychological literature on this subject by saying that "persistence is the general rule."

3 So far, the explanations of observed differences in aggregate savings behavior by education have implied some indirect causation running from education to savings. The impact of education has been through its effect on the incomes or the tastes of individuals. However, there might be another reason for observed patterns which does not imply causation.

Time preference, to repeat, is subjective; it refers to the degree of desirability of present goods over that of future goods, or the preference for comparatively remote or deferred income (I. Fisher, 1965). Hence a person with a high time preference would be less likely to defer current consumption to future periods. Both the decision to remain in school rather than to work and earn income

and the decision to save a larger part of income of any size are usually associated with a relatively low time preference.

There are several ways in which students may avoid deferring consumption while attending school. First, they may have access to the capital markets. Traditionally, however, imperfections in lending markets have limited student borrowing if the individuals are unable to provide tangible security for the loan. Second, they can be financed by their families; in this case, decisions affecting school may be made by families as a whole, rather than by students alone. In such instances, families are willing to forgo current consumption (demonstrating low time preference) so that the children can obtain an education. If the children's tastes are influenced by their parents' low time preference, the general argument still holds: Students have low time preference. If, holding socioeconomic background constant, we observe consumption standards of college students and their families to be below those of families which have noncollege offspring of the same age, the inference is that the former are more willing to defer consumption, given the capital-market conditions.

If saving is a function of time preference and if people with low time preference choose to obtain more schooling, then an observation that the more educated groups save more, *ceteris paribus,* need imply nothing about the effect of education on saving. Due to their inherent low time preference, the educated individuals would have been relatively large savers even without education.

To a considerable extent, it may be that the changes which occur during the college period are more a reflection of the cultural and societal forces that impinge upon the colleges and individual students than the effect of deliberate educational policy or program. Even if it were possible to observe changes in attitudes during the college experience, the question arises of whether these changes are due to cultural forces that would have been at work even without the schooling.

4   If better-educated people differ from less well educated people in regard to family size, age, or location, differences in these factors might cause the observed differences in saving among education groups. However, in that event, only a tenuous line of causation could be drawn from education to saving.

5   One factor which should affect the total amount saved is the total rate of return obtainable from this saving. It may be argued that

better-educated people can obtain a higher return because they are able to select a more efficient portfolio. It is generally agreed that one purpose of education is to instill an analytical ability in students. Returns to saving will be high when the saver can estimate and analyze the effects of current and future prices of goods, current and expected returns to various financial assets, the investment alternatives available, and current and future conditions of other aspects of the economy.

It is possible that people with the same income can purchase equally good investment data and advice. However, it would seem that an educated person can do whatever the less analytical person can do and more; perhaps, for example, he can discriminate among advisers more efficiently. Relatively high rates of return to saving should have a positive substitution effect (more income goes into savings). The income effect probably implies more savings as well, although this may be reversible in the sense that as returns rise, consumption may replace some saving. The argument that education increases one's efficiency in saving is analogous to Becker's argument (1967*a*) that education improves one's efficiency in consumption (see also Michael, 1972).

Becker has argued that as people become more educated, incomes rise. Consequently, the opportunity cost of time rises. In order to produce utility, more goods and less time will be used in the household of a more educated family, other things being equal. In other words, both consumption (*C*) and income (*Y*) rise with education. Thus whether *C*/*Y* rises with schooling depends upon the relative change in *C* and *Y* with education, which in turn depends upon the relative efficiency of the more educated in saving activities, consumption activities, and work activities. Also, since current saving is a way of providing for future consumption, the choice must be made between providing goods in the future (1) by forgoing consumption currently or (2) by working more in the future.

Current saving allows investments to grow for subsequent conversion to consumption goods; it is argued that the more educated person will be able to make his savings grow larger than will the less-educated person. Also, since income paths are steeper for the more educated, any work time in future periods will make possible the purchase of more consumer goods at that time than work by the less educated will. For a more detailed analysis of consumption over time, see Chapter 11 in this volume.

This discussion has yielded some observed relationships between education and savings and several plausible explanations — a not uncommon occurrence. In general, we expect greater amounts of education to be associated with greater saving, and we postulate several reasons for this association.

THE PERMANENT- INCOME HYPOTHESIS

One important framework for examining consumption and savings decisions is the permanent-income hypothesis, developed by Friedman (1957, pp. 27–28). In this framework, consumption is determined by relatively long-term considerations, so that any transitory changes in income lead primarily to additions to assets or to the use of previously accumulated balances rather than to corresponding changes in consumption. Hence the change in consumption due to an *observed* change in income (marginal propensity to consume) depends not only upon the fraction of permanent income devoted to consumption (k) but also upon the fraction of an observed change in income which is also a change in permanent income (dY_P/dY).

Since permanent income is not observed, k cannot be estimated directly, but instead we can estimate b, the marginal propensity to consume out of measured income. Two independent explanations of the relationship between k and b at any point in time can be derived. First, $b/k = dY_P/dY$, where dY_P/dY is a function of the discount rate. Also, $b/k = P_r$, where P_r is the ratio of the variance of permanent income to the variance of total income.

The simple specification of a model to explain consumption can suggest routes through which differences in education lead to differences in aggregate savings. We shall be estimating coefficients like b, which may differ with education for two types of reasons: The k's might be similar, but the adjustment coefficients (dY_P/dY and P_r) might vary with education, or the k's themselves might vary with schooling. Hence the question arises of how dY_P/dY and P_r are affected by education. Since dY_P/dY will change as an individual's discount rate r changes or as the coefficient of expectations[3] β changes, we must ask as well how r and β vary with schooling.

To deal with the question of the k's themselves first, we should note that Friedman (1957, p. 54) says that there is no reason why

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[3] The coefficient of expectations is defined as the change in future-period income expected when current-period income changes. It is assumed that $dY^*_{t+1}/dY = dY^*_{t+n}/dY$, the asterisk indicating "expected."

the long-run average or marginal propensity to consume must remain constant. He suggests that k is a function of the ratio of wealth to income, the degree of uncertainty contemplated, the rate of interest, and taste factors such as age, family size, and location. It will be argued that the taste factors directly influence the size of k, whereas factors such as the interest rate (related to the discount rate), the ratio of wealth to income, and the degree of uncertainty (related to dY_P/dY and β) influence both k and what we call the *adjustment coefficients* (dY_P/dY and P_r).

The hypothesis that k is larger for larger families might be suggested. Family size depends upon the desire for children and the ability to have the desired number. Probably more educated people practice birth control more efficiently. There is evidence of a persisting inverse relationship between number of children of ever-married women and educational attainment (U.S. Bureau of the Census, 1964).

Age has been said to affect the marginal propensity to consume. As one gets older, he may feel less need to save owing to a shorter expected lifetime. This argument is consistent with a finite horizon which excludes the desire to provide for heirs. On the other hand, a hypothesis more consistent with the empirical results presented below can be suggested. These results are based on a sample including only members of the labor force. It seems reasonable that as people approach retirement, they save more and more in order to have reserves to draw on during the retirement period. That is, people become more aware of retirement needs as that time approaches. The first argument implies a progressively increasing time preference over a lifetime; the second implies a declining time preference over the years immediately preceding retirement.

Watts (1958, p. 109) suggests that the expectations of older spending units tend to be the same as current income, whereas younger spending units are influenced by secular income increases and expectations of rising profiles (particularly in educated households). In the present context, these arguments would imply a larger dY_P/dY, and also a larger β, for younger households. Hence for these younger households, b would be larger, even with the same k. As age increases, changes in observed income would be less likely to be considered permanent or persistent, evoking less reaction in terms of consumption change.

If b's are compared for different groups classified by education and years on the job, those individuals with more schooling and

the same experience will be older. Thus even if education has no effect on b, a comparison of education groups with the same experience will reflect an "age effect."[4]

It has been argued that r, the individual's discount rate, affects both k and the adjustment coefficients. It is at the rate r that the individual evaluates expected future returns, thereby obtaining his subjective estimate of permanent income. From studies of education in the United States, it appears that the rate of return to additional schooling declines as more schooling is obtained (Becker 1967, pp. 20–21; Hanoch, 1965). These results are consistent with the hypothesis that more educated people have better access to capital markets. Acceptance of these results leads to the prediction that, other things being equal, b should decline with education, assuming that, in equilibrium, the rate of return equals the discount rate for an individual. However, other things probably are not equal.

Another factor influencing b is β, the consumer unit's coefficient of expectations. According to Friedman (1957, pp. 144–145), the larger the β, the larger the adaptation to any discrepancy between measured and expected income; hence the more rapid the adjustment and the shorter the (retrospective) time span that matters. There is almost no evidence concerning the effect of education on β. It might be hypothesized that since the more educated have less fluctuation in income, any change in Y is considered to be a change in Y_P, and a positive relationship exists between β and education. On the other hand, more educated people might be more cautious and so might react more slowly to any change in current income, not immediately considering it a change in Y_P. Since an increase in β implies an increase in b, there is no way to predict the effect of education on b through the effect of education on β.

Finally, estimates of b should be influenced by what has been called P_r, the ratio of the variance of Y_P to the variance of Y. Among other things, P_r is likely to be a function of the ratio of human to nonhuman wealth and of the nature of a person's employment.

We must now turn to the question of whether education has a systematic influence on factors affecting P_r. We shall consider how the nature of employment is affected by schooling and how, in turn, the nature of employment affects saving. The first question

[4] For further discussion of other socioeconomic or taste factors and how they might affect saving, see Watts (1958).

is whether the variance of the transitory component of any income level is higher or lower for a more educated person than for one with less education. If the variance of the transitory component Y_t of measured income Y is high, a larger share of income will be saved as a protection against the "emergencies" which are likely to arise when Y_t is negative. This means that the higher the variance of Y_t, the lower b is, since saving from any change in income will be greater. However, this says nothing about a change in the long-run propensity k.

Income earned by independent businessmen, or entrepreneurial income, is likely to have a relatively large transitory component compared with wage or salary income. A clue to the relationship between the entrepreneurial nature of income and education is found in Table 10-1, which shows the percentage of persons in each age-education group who are self-employed. The percent of self-employed rises with education in each age group. According to the argument in the preceding paragraph, those with more education should save more, since they are more likely to be self-employed and to have a larger transitory component of income. Hence the P_r, as defined above, would be smaller for more educated people, and b would decline with education.

Self-employment can be subdivided into the number of business proprietors (B) and the number of independent professionals (I). Quite likely $\dfrac{I}{(B+I)}$ rises with education. Friedman has observed

TABLE 10-1 *Self-employed* *by age and* *education* *(percent)*		*Years of school completed*					
Age	*0–4*	*5–8*	*9–11*	*12*	*13–15*	*16 and over*	*Total*
14–24	n.o.*	2.3	1.5	2.1	1.8	2.3	1.9
25–34	2.9	5.4	7.1	7.5	8.3	9.2	7.4
35–44	7.5	10.3	10.3	11.5	16.5	18.0	12.3
45–54	8.8	11.7	14.0	15.5	16.4	26.2	14.9
55–64	15.5	15.6	15.5	16.6	23.8	28.0	17.4
65 and over	25.7	22.9	20.9	30.0	37.5	35.3	26.2
TOTAL	12.0	11.5	9.6	10.2	13.4	17.2	11.6

* No observations.
SOURCE: Leveson (1968, Table III-7).

that the income elasticity of consumption for independent professional families is lower than that for other independent businessmen. One reason for this could be that the independent professionals rely more on human capital for income than on physical capital. The former is less marketable and is not as good security for a loan. Since earnings in this case are more directly tied to the health and energy of the individual, a possible loss of earnings capacity must be counterbalanced by personal saving. Moreover, independent professionals are less likely to be able to participate in group health, accident insurance, and life insurance plans than proprietors of businesses with more employees, and so they must save in lieu of them. This argument would lead to the prediction of a lower long-run k as well as a lower b.

It appears that those who are both highly educated and self-employed are less likely to be in physical-capital-intensive occupations; that is, they rely on human rather than physical capital to a greater extent in earning a living. Saving in the form of investment in one's own business capital should yield a higher return than a portfolio would, if only because it avoids brokerage costs. Whether one has reason to invest in physical capital depends upon whether he is self-employed and also upon the nature of the self-employment (B or I as defined above).

It would seem that as the income level rises, those with less education would be more likely to invest in physical capital for their own businesses, probably enjoying a higher return to saving, defined to include this investment. As education rises, returns to all forms of saving might decline, since there is less likelihood of direct investment compared with portfolio investment. This argument suggests that at higher levels of education, a smaller share of income is saved in all forms. However, estimates of financial saving would probably rise with education. Finally, independent professionals are less likely to have access to various forms of deferred income and pension arrangements provided by corporations; hence they are more likely to save on their own.

Several general points should be made in concluding this section. Regarding a lifetime saving or investment plan, the question arises of whether one who has already deferred consumption by forgoing earnings while in school tries to compensate for this early saving by saving less after entering the full-time labor force. This consideration might lead us to expect less saving from income for people with more education. On the other hand, it could be argued

that the habit of thrift, once acquired during the school years, is maintained afterward. The latter possibility suggests a positive relationship between the saving-income ratio and schooling. Similarly, those with enough foresight to stay in school might also have the foresight to defer consumption even after completing their formal education.

Table 10-2 summarizes the influence of the various factors that might be expected to affect the relation between education and savings. This general scanning of existing theory strongly suggests that a positive relationship ought to be observed between education and saving.

EMPIRICAL ESTIMATES OF SAVINGS FUNCTIONS Two types of savings functions have been estimated. First, separate functions were estimated for each of the four education groups; that is, one savings function was estimated for all families whose head had a high school education or less, another was estimated for those with less than four years of college, and so on. The equations to be estimated looked like

TABLE 10-2 *Summary of factors influencing the relationship between education (E) and saving (S) during working life*

i	*Factors affecting saving (X_i)*	$\dfrac{dX_i}{dE}$	*Reason*	$\dfrac{dS}{dX_i}$	$\dfrac{dS}{dE}=\dfrac{dX_i}{dE}\times\dfrac{dS}{dX_i}$
1	r	—	Declining rate of return to education	—	+
2	β	—	Caution	—	+
3	Family size	—	Taste, plus efficiency in birth control	—	+
4	Age	+	When classified by experience, more educated enter labor force later	+	+
5	Yt/Y	+	Self-employment	+	+
6*	$I/(I+B)$	+	Independent professionals have more education	+	+
7	Portfolio return	+	Efficiency in obtaining return	+	+
8	Human wealth / Nonhuman wealth	+	Definition of education	+	+
9*	Taste for saving (time preference)	+	Foresight	+	+

* The relationship hypothesized more largely reflects my predilection than a solid theoretical basis.

$$S_{ij} = a_i + b_i Y_{ij} + U_{ij} \qquad (10\text{-}1)$$

where S_{ij} and Y_{ij} are savings and family incomes, respectively, of families with heads having i educational level and U_{ij} is comprised of other factors in the savings function to be described below. Hence a_i and b_i will be estimates of the intercept and marginal propensity to save for those familes with education i. In these models both the intercepts and slopes can vary among education groups.

The second approach was to combine all families in estimating a single savings function which includes interaction terms between income and educational level. The main interpretive difference is that the latter approach forces all savings functions through the same Y intercept, and we are testing only for differences in slopes (b_i's). The general form of this equation is

$$S_j = a + bY_j + b_1 Y_j D_1 + b_2 Y_j D_2 + b_3 Y_j D_3 + U_j \quad (10\text{-}2)$$

Here S_j, Y_j, and U_j are data for each family. There are four separate education groups, and the highest (more than four years of college) is not represented by a dummy. D_1 takes on a value of 1 if the education of the head of the household is high school or less, a value of 0 otherwise; D_2 takes on a value of 1 if education is some college and a value of 0 otherwise; and D_3 takes on a value of 1 if education is four years of college and a value of 0 otherwise. b is interpreted as the marginal propensity to save (MPS) of the most highly educated group; $b + b_1$ is the MPS of the group with the least amount of education; $b + b_2$ is the MPS of the next most highly educated group; and $b + b_3$ is the MPS of the second most highly educated group. The t-values on the b_1, b_2, and b_3 tell whether these coefficients are significantly different from zero or whether the MPS of each less well educated group is significantly different from b (the MPS of the most highly educated group).

In general, the regression results tend to confirm the view that the more educated have greater savings, defined as a ratio to income, as an elasticity, or as the marginal propensity to save. However, before the specific results are presented, we must look at the variables besides income and education which may be used to "explain" saving.

The basic income concept chosen in estimating savings functions was family income after taxes. This seems to be the best measure of disposable income. However, wife's pretax income was inserted

in several of the estimates in order to see whether the composition of family income had effects on saving and whether these composition effects differed across schooling classes. It should be noted that although the coefficient on the family-income variable represents the marginal propensity to consume out of total disposable income, the coefficient on wife's income does not represent the MPS from wife's income. Let

$$S = \alpha_0 + \alpha_1 F + \alpha_2 W \qquad (10\text{-}3a)$$

where F is family income and equals $H + W$ (or husband's income plus wife's income). Equation (10-3a) can be rewritten

$$S = \alpha_0 + \alpha_1 H + (\alpha_1 + \alpha_2) W \qquad (10\text{-}3b)$$

From this simple transformation it can be seen that the MPS from wife's income is equal to the sum of the coefficients on F and W. This implies that if the coefficient on wife's income is positive in an equation which includes family income, the MPS from her income exceeds that from husband's income or from total disposable income. In Friedman's sense, the implication of this result would be that wife's income is considered more transitory than husband's income.

Another group of special independent variables that should be noted are those intended to take account of purchases of consumer durables, an aspect of saving not included in the dependent variable. Three different types of consumer durables are distinguished: housing, automobiles, and others. The value of purchases of small consumer durables and the value of automobiles owned were inserted as independent variables, whereas a dummy was created to indicate whether or not a family had purchased a house within the past year. Also house purchasers were excluded from some regressions, since the behavior of their nonhousing assets is likely to be poorly measured. In explaining savings, we hypothesize negative coefficients on nonhousing consumer-durable variables, since their purchase implies both a substitution effect away from savings (as defined in the dependent variable) to durables and a financing effect (the need to pay for durables by reducing assets or incurring debt).

Some of the regressions include a variable measuring change in the value of holdings of common stocks and mutual funds. This

variable reflects *unrealized* capital gains. If all profits were converted into cash and no new purchases or other sales were made, this variable would be zero. The question asked is whether "paper" gains or losses affect savings behavior. The results given below indicate that they do not. The failure of unrealized capital gains to affect saving *might* be due to two offsetting factors. One is that households with unrealized capital gains feel wealthier and hence spend more, giving the expected positive correlation between wealth and consumption. But on the other hand, households with larger capital gains may also expect larger rates of return from savings and tend to substitute savings for consumption, thus imparting a negative correlation between capital gains and consumption.

Some regressions include an occupation dummy. This variable equals 0 if the family head is an independent professional or business proprietor and 1 otherwise; that is, it controls for self-employment. The negative signs on this variable indicate that, other things being equal, savings are higher for those families whose head is self-employed.

The next section will show that average response patterns to attitude questions differed systematically according to the educational level of the group. The significance of these answers to hypothetical questions depends upon whether the respondents act as they say they will. For example, to help explain savings, a variable was inserted which was the answer to the question: What percentage of your income do you aim to save over the next three to five years? The results indicate that respondents with intentions of having relatively large savings did indeed save more. This was a strongly significant variable, even after controlling for many other factors which affect saving.[5]

Introduced with similar objectives was the question: How do you expect the level of prices of consumer goods five years hence

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[5] When we put in the savings-plan variable, we have to be careful in interpreting the coefficients. In using savings plans, we are talking about financial-asset changes, not about the full-income savings notion. There is a presumption that the effect of putting ex ante savings in the regression will be to reduce the influence of all variables already taken into account by the household in reporting their savings plan. The variables that would clearly be taken into account are all those in the regression, especially factors like income and education. Thus the interpretation of an income coefficient in a regression of savings on income and savings plans ought to be that it reflects the influence on savings of *unanticipated* changes in income—essentially more of a transitory effect than that observed in the other regressions.

to compare with the level of prices at present? There were nine choices, with higher-numbered responses indicating expectations of greater inflation. This variable was introduced to see whether there was a relationship between savings behavior and the extent of inflation expected. No significant relationship was revealed. This might be due to the noncontinuity of the variable or to the fact that different people react differently to the same inflationary expectations.

In certain of the regression estimates, two variables were inserted together—years of full-time labor force experience and earnings in the first year of full-time work. A rather intricate relationship enables us to control for investment in on-the-job training (OJT) when using these two variables for people of the same educational attainment.

Two people with the same education (given equal schooling and equal ability) entering the labor force at the same time can be assumed to be able to obtain the same full income in their first year of employment. Hence it follows that differences in income received are due to differences in opportunity costs (forgone earnings) incurred while obtaining on-the-job training. Those obtaining greater postschool human capital in the form of OJT can expect a steeper income profile; indeed, after some years, income for those with greater OJT will be greater than income for others.

Controlling for education, experience, and current income, we would expect a negative relationship between first-year income and rate of future growth of income (or level of expected future income). To the extent that current consumption depends not only on current income but also on expectations of future income, we would expect a negative relationship between first-year income and consumption or a positive relationship between saving and first-year income. Another way of looking at this point is to postulate that where saving in the form of OJT is (or has been) higher, less saving will take place in other forms.

Tables 10-3 to 10-6 report on savings patterns among the sample of 3,086 families. Families purchasing houses in 1959 and families with extreme incomes (less than $3,000 or over $50,000) have been eliminated. The rationale for these eliminations has several elements. The house buyer's savings in nonhousing forms are seriously altered when purchasing a house. Since our data make it difficult to establish the net amount saved when purchasing a house, it seemed better to exclude these people. The few extreme-

	Education class			
	High school or less	Some college	Four years of college	More than four years of college
Number of observations	505	611	855	1,115
Family income after taxes*	7,936	9,025	10,029	10.777
Savings*	627	700	830	960
Savings-income	0.0790	0.0776	0.0828	0.0891
Income*	8,000	9,292	10,682	11,438
Full savings*	1,008	1,419	1,966	2,101
Full savings–income	0.1260	0.1527	0.1840	0.1837
Purchases of selected consumer durables*	295	324	293	272
Purchases of cars*	1,573	1,673	1,604	1,503
Unrealized capital gains*	595	710	936	1,265
Percentage not self-employed	88.51	86.42	89.36	83.77

* Dollars.

SOURCE: All estimates are derived from Consumers Union data collected by the National Bureau of Economic Research. For description of the sample, see Cagan (1965).

income families could potentially have seriously distorted the savings patterns and hence were also dropped.

Table 10-3 reveals only a slight increase in average financial and property saving as a share of disposable income when education increases. However, when on-the-job training and mortgage-principal repayments are added to saving, this "full saving" as a share of full income (earned plus forgone for OJT) clearly rises with schooling level. Of course, some of this strength has been built into the data, since OJT saving was calculated as a function of schooling.[6]

Table 10-4 provides results of regression estimates of savings functions for all observations combined, with the education effect sought through dummies representing interaction between income and education. In the two cases presented where saving was de-

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[6] When OJT was recalculated as a function of occupation rather than schooling level, the results were unaffected.

fined as accumulation of financial and property assets only [(1), (3)], the coefficients on the interaction terms did not reveal differences by educational level in the marginal propensities to save. However, when a more complete definition of saving was used [(2), (4)], a strong pattern was revealed: The MPS increased with educational level. The clearest result was that families whose head had had four or more years of college had significantly higher marginal propensities to save than families whose heads had had less than four years of college.

The procedures reported in Table 10-4 forced the savings function of four education groups to have the same Y intercept. This restriction can be eliminated by estimating separate savings func-

TABLE 10-4 Regression coefficients (t-ratios) from equations that pool all observations and use interaction terms between education and income	Eliminating housebuyers		Eliminating house buyers and "extreme" income	
	(1) Savings	*(2)* Full savings	*(3)* Savings	*(4)* Full savings
Constant	549.6 (2.268)	284.1 (10.81)	446.7 (1.856)	265.3 (10.06)
Family size	−74.38 (−2.887)	−92.16 (−3.340)	−77.97 (−3.072)	−98.76 (−3.622)
Age of head	−4.605 (−1.045)	−51.47 (−10.95)	−7.378 (−1.692)	−52.68 (−11.34)
Family income after taxes	.0838 (11.56)	.1591 (21.72)	.1111 (12.41)	.1875 (20.49)
Value of consumer durables purchases	.0764 (.7990)	.0678 (.6626)	.0233 (.2479)	.0276 (.2726)
Education dummy 1 × income	−.0169 (−1.439)	−.0437 (−3.509)	−.0112 (−.9645)	−.0417 (−3.371)
Education dummy 2 × income	−.0176 (−1.900)	−.0306 (−3.175)	−.0120 (−1.275)	−.0265 (−2.688)
Education dummy 3 × income	−.0092 (−1.253)	.0016 (.2229)	−.0063 (−.8101)	−.0058 (−.7308)
Occupation dummy	−108.5 (−1.021)	−189.3 (−1.661)	−61.80 (−.5828)	−116.2 (−1.018)
Value of cars	−.0436 (−1.495)	−.0708 (−2.270)	−.0968 (−3.283)	−.1176 (−3.714)
Unrealized capital gains	.0043 (1.009)	.0044 (.9530)	.0029 (.6910)	.0030 (.6614)
Income squared				
R^2	.0520	.2019	.0573	.1794

SOURCE: See Table 10-3.

TABLE 10-5
Regression
coefficients
(t-ratios) for
simple savings
function
within
education
classes

Independent variables	Panel A: Dependent variable is financial and property saving only Education class			
	High school or less	Some college	Four years of college	More than four years of college
Number of observations	505	611	855	1,115
Constant	30.08 (.0859)	−45.27 (−.1206)	73.47 (.2158)	222.0 (.6365)
Family income after taxes	.0564 (2.978)	.0700 (4.187)	.0966 (6.523)	.1169 (8.552)
Age of head	3.219 (.4531)	2.598 (.3139)	−5.214 (−1.563)	−12.63
R^2	.0188	.0297	.0491	.0617
	Panel B: Dependent variable is full savings, including OJT and mortgage payments			
Constant	704.9 (1.836)	1639 (3.907)	2925 (7.622)	2718 (7.262)
Family income after taxes	.0793 (3.859)	.1178 (6.515)	.1748 (11.28)	.2019 (15.04)
Age of head	−7.124 (−.9242)	−229.91 (−3.324)	−69.51 (−7.695)	−70.79 (−8.526)
R^2	.0293	.0752	.1599	.2042

SOURCE: See Table 10-3.

tions for each educational level. Here the results reveal a strong positive relationship between education and saving. Table 10-5 shows that for *either* definition of savings, the marginal propensity to save rises with education. Two other features of these functions should be noted. First, with the change in financial- and property-asset definition of savings, the intercept term does not differ significantly from zero. This is consistent with Friedman's contention that if the factors affecting the relative permanency of income are controlled for (e.g., education), a Friedman-type permanent-income savings function might be capable of estimation, where MPC= APC and is constant. Second, the effect of age on savings is usually negative, always becoming more negative as schooling level rises. At any income level, older people, on the average, save less (dissave more) the higher their educational level. Older people with

more education probably feel less compulsion to save, since they have provided for their future earlier in life.

These strong results—particularly the fact that the marginal propensity to save is higher for those with four years of college or more than it is for those with less than four years of college—are revealed again in Table 10-6. This table uses several other factors besides age and income to explain savings. Although signs on these newly added explanatory variables look systematic and are in the directions hypothesized earlier, few are significant. However, in

TABLE 10-6 *Regression coefficients (t-ratios) for savings functions that exclude extreme-income observations and home purchasers*

Independent variables	Panel A: Dependent variable is financial and property saving only			
	Education class			
	High school or less	Some college	Four years of college	More than four years of college
Constant	162.6 (.3357)	−374.8 (−.6939)	−787.2 (−1.453)	164.4 (.3240)
Family income after taxes	.0576 (2.569)	.0543 (2.793)	.0930 (5.617)	.1012 (6.397)
Age of head	−2.025 (−.2464)	5.089 (.5464)	.4330 (.0443)	−13.69 (−1.500)
Wife's income	.0142 (.3966)	.0235 (.6669)	.0423 (1.150)	.0057 (.1752)
Value of consumer durables	−.3316 (.1873)	.2953 (1.712)	−.0604 (−.3636)	−.0355 (−.1831)
Value of cars	−.1689 (−3.268)	−.0662 (−1.195)	−.1694 (−3.208)	−.0049 (−.0817)
Unrealized capital gains	.0129 (.7143)	.0378 (1.969)	−.0002 (−.0459)	−.0010 (−.0937)
Family size	−41.16 (−.7399)	−15.29 (−.2767)	−17.57 (−.3558)	−36.13 (−.7564)
Inflationary anticipation	49.71 (1.133)	−34.35 (−.6290)	87.40 (1.530)	−64.72 (−1.315)
Savings plan	31.06 (3.676)	30.97 (3.397)	53.18 (6.577)	46.62 (5.660)
First income	.0420 (.6393)	.1096 (1.873)	.0463 (.9080)	.0432 (1.162)
R^2	.0806	.0727	.1138	.0938

	Panel B: Dependent variable is full savings, including OJT and mortgage payments Education class			
Independent variables	High school or less	Some college	Four years of college	More than four years of college
Constant	942.8 (1.781)	107.4 (1.802)	189.8 (3.183)	268.6 (5.083)
Family income after taxes	.0988 (4.056)	.0973 (4.605)	.1724 (9.907)	.1934 (12.56)
Age of head	−14.27 (−1.593)	−24.47 (−2.404)	−62.01 (−5.875)	−72.62 (−7.775)
Wife's income	.0029 (.0749)	.0023 (.0603)	−.0018 (−.0411)	−.0083 (−.2455)
Value of consumer durables	−.3153 (−1.633)	.3539 (1.859)	−.0733 (−.3992)	−.0467 (−.2325)
Value of cars	−.2235 (−3.967)	.0067 (.1097)	−.1758 (−3.104)	−.0565 (−.9077)
Unrealized capital gains	.0128 (.6476)	.0211 (.9968)	.0026 (.4913)	−.0063 (−.5893)
Family size	−89.31 (−1.472)	−38.10 (−.6258)	−14.71 (−.2701)	−67.83 (−1.371)
Inflationary expectation	102.4 (2.141)	−22.27 (−.3695)	106.1 (1.681)	−45.90 (−.8981)
Savings plan	17.00 (1.845)	23.33 (2.317)	53.90 (6.031)	49.09 (5.736)
First income	.0125 (.1741)	.1791 (2.771)	.0628 (1.111)	.0453 (1.170)
R^2	.0866	.1062	.2081	.2334

SOURCE: See Table 10-3.

TABLE 10-6 (continued)

the relationship between savings and income, the strong patterns across education groups persist.

In order to assure that the results would still hold if we included the extreme-income families (under $3,000 and over $50,000) and if we also included home purchasers (controlling for purchase of homes by inserting a dummy), we estimated additional savings functions not reported here. In general, the patterns were much the same though a bit less systematic. Most savings functions still

reveal a rising marginal propensity to save and elasticity as education rises. The average savings-income ratio also rises.[7]

In summary, both the average and marginal propensity of a family to save increase with the schooling attainment of the head of the household, after controlling for other important factors. This conclusion holds for several different definitions of saving. Saving represents provision for the future; therefore, greater saving implies greater provision for consumption in old age and for future generations and also greater potential capital formation for production. Hence we may infer that as the educational attainment of our society grows, we shall benefit from the added future wealth, security, and growth made possible by increased propensities to save.

EVIDENCE ON CONSUMER ATTITUDES   The respondents to the Consumers Union survey answered a series of questions dealing with attitudes toward various aspects of saving. When respondents are sorted by their level of education, patterns emerge which suggest relationships between education and such things as time preference, liquidity preference, risk preference, efficiency in making savings decisions, and objectives for saving. Initially, respondents were divided into four education groups: those who completed high school or less, those who completed some college, those who completed four years of college, and those who completed more than four years of college. For each education group, the proportion selecting various answers to these attitude questions was obtained, and systematic patterns by education were revealed. However, since there is a strong correlation between schooling and income or age, it is possible that part of the pattern of responses resulted from differences in income or age rather than from differences in education.

In order to examine the net influence of education on these atti-

[7] An attempt was made to see whether the *level* of income was a factor in the marginal propensity to save. This was done by inserting income squared as an additional explanatory variable. If the savings function is $S = a + bY + cY^2$, then the MPS is $dS/dY = b + 2cY$. If the coefficient c is significantly different from zero, then the level of income does affect the MPS. Although the high t-values on the income-squared coefficients indicated that the level of income does affect the MPS, the insertion of this variable tends to distort the systematic relationship of the MPS by educational level. Neither the coefficients on income nor the MPS (defined as $b + 2cY$) displays any systematic movement with schooling. These results are somewhat disturbing, but may be due to statistical problems arising from correlations among income, income squared, and saving. The strong, systematic relationship between savings and income by education still should be thought of as substantive.

tudes, we estimated regressions with a series of dummy dependent variables that equaled 1 if a particular response was chosen and 0 otherwise. These (1, 0) dummies were regressed on income, family size, age of head of the household, and occupation of the head, as well as on education.[8] Separate regressions were estimated for each of the responses. In almost all cases educational level significantly influenced response in the expected direction, tending to corroborate the patterns shown in simple classification of responses by education group.

It is important to note that if these patterns can be observed in the Consumers Union sample, they would probably be even stronger in the population as a whole. One of the characteristics of the members of the Consumers Union is that those with relatively little formal schooling are probably closer in certain respects to their more highly educated peers than the less-educated members of the general populace are. Those who subscribe to Consumers Union should be more thoughtful, more careful planners, and better informed than others. If there is a discernible difference in behavior between these particular people with low education and the more highly educated, this difference should be magnified when comparing education groups without the special characteristics of Consumers Union members.

The question arises of whether actual behavior parallels the

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[8] The use in regression analysis of dependent variables that take on discrete (usually dichotomous) values presents statistical problems, since the assumptions about normality in the error distribution are clearly violated. In general, therefore, the regression results presented below must be interpreted with caution.

The statistical problems associated with dichotomous dependent variables are especially severe where the observations tend to cluster about one or the other point, that is, around either a zero or a one response, and they are much less severe when the dependent variable is evenly distributed between the two possible responses.

As a rule of thumb, the reader should be suspicious about regression results when more than 80 percent of the observations are located at one of the two points and fewer than 20 percent at the other; the more extreme the clustering, the greater the degree of suspicion.

One of the tables below uses a discrete trichotomous variable $(+1, 0, -1)$, and here an additional problem is present. The scaling implied by a $+1$, 0, -1 variable defines the distance between any pair of possible responses. The implied distance is not the same for a scaling of $+3$, 0, -3 as it is for a scaling of $+1$, 0, -1, and these (and other) possible scalings are all arbitrary. Where only two responses are possible, there is no scaling problem, since the statistical properties of the equation do not depend on the numerical values assigned to the two responses.

attitudes and preferences expressed by people responding to hypothetical questions. That is, although certain patterns may emerge from the question studied, only a subsequent study of actual portfolio composition and savings shares can fully confirm the relationships between education or income and factors like time preference or risk aversion. One piece of evidence lends credence to the conclusions presented here. Respondents were asked the percentage of income they planned to save in the upcoming three- to five-year period. The response to this question was inserted as a variable along with income, education, age, and so on, to explain the actual amount of 1959 saving. There was always a strongly significant positive relationship between actual saving and the percentage of income the individual planned to save. Hence, at least in this case, responses to hypothetical questions paralleled actual behavior.

The patterns emerging from the survey of attitudes toward saving can best be analyzed by studying the answers to five separate questions. Tables 10-7 and 10-8 deal with responses to the question: If you expect some inflation during the next few years, what actions do you believe that you and your family can take to protect yourselves against the effects of the inflation? Respondents indicated by their answers whether they understood the meaning of inflation and whether they knew ways to protect themselves against its effects; in other words, the answers reflect one aspect of efficiency in making savings decisions. Replies can generally be classified into three groups: clearly wrong, uninterpretable, and clearly correct.

Table 10-7 shows a marked decline in the percentage answering incorrectly as education increases. Those who answered that the way to protect against inflation is to purchase fixed-dollar assets, to shun debt, or to practice austerity were judged incorrect. Of respondents with a high school education or less, 25.85 percent answered in this manner, and 18.91 percent of those with some college did so, whereas 10.24 percent of those with four years of college and 9.17 percent of those with more than four years of college answered incorrectly. Ignoring the uninterpretable responses, 45.24 percent of those in the lowest education group were incorrect, and this share fell steadily, so that on the same basis, 13.25 percent of those in the highest education class were incorrect. Although income and other relevant factors have not been held constant, these results lead to a tentative conclusion that, at least with respect to inflation, the more educated are more so-

	(1) Uninter- pretable*	(2) Wrong way to protect†	(3) Buy business	(4) Common stock	(5) Mutual funds
High school or less					
Number	441	266	3	158	16
Percent	42.86	25.85	2.92	15.35	1.55
Percent of total less uninterpretable		45.24			
Some college					
Number	405	235	14	303	42
Percent	32.59 .	18.91	1.13	24.38	3.38
Percent of total less uninterpretable		29.38			
Four years of college					
Number	512	165	7	547	56
Percent	31.76	10.24	0.43	33.93	3.47
Percent of total less uninterpretable		15.00			
More than four years of college					
Number	689	205	5	767	92
Percent	30.73	9.17	0.22	34.30	4.11
Percent of total less uninterpretable		13.25			

* Hostile answer, not concerned, do not know, no remedy, abstract formula, other financial assets, other assets, effort, pay price, work harder, save less, other behavior, politics.

† Fixed-dollar assets, shun debt, austerity.

‡ Commodities, old masters, gold, and silver.

SOURCE: All estimates are derived from the Consumers Union data collected by the National Bureau of Economic Research. For a description of the sample, see Cagan (1965).

phisticated (or efficient) investors. Table 10-7 also reveals that the most popular hedges against inflation are common stocks, real estate, and mutual funds, in that order of preference.

In order to deal with the problem of other factors blurring the education-efficiency relationship, a regression model was developed. The dependent variable took on the values -1, 0, and $+1$, according to whether a response was clearly incorrect, uninterpretable, or clearly correct, respectively. The explanatory variables

(6) *Real estate*	(7) *Real assets‡*	(8) *Education*	(9) *Go into debt*
118	16	5	6
11.47	1.55	0.49	0.58
215	16	5	8
17.30	1.29	0.40	0.64
291	20	4	10
18.05	1.24	0.25	0.62
419	30	6	23
18.74	1.34	0.27	1.03

were family size, age of the head of the household, family income after taxes, and an occupation dummy (zero if independent professional or business proprietor and one if wage or salary employee), along with education (in years of school completed). These results appear in Table 10-8.

From Table 10-8 it appears that education has a strongly positive effect on the likelihood of a respondent's answering the inflation question correctly, even after holding income, age, occupation, and

	Independent variable	Coefficient	t-value	R^2
TABLE 10-8 *Factors affecting knowledge of how to protect against inflation*[*]	Constant	−.3914	−3.571	
	Family size	−.0183	−2.028	
	Age of head	−.0026	−1.713	
	Family income after taxes	.00002	7.632	
	Education	.0494	10.52	
	Occupation dummy[†]	−.1553	−2.020	
				.0560

[*] Dependent variable has values −1, 0, 1, according to whether the answer was incorrect, unclear, or correct.

[†] Equals zero if head was independent professional or business proprietor and one if wage or salary employee.

SOURCE: All estimates are derived from the Consumers Union data collected by the National Bureau of Economic Research. For a description of the sample, see Cagan (1965).

TABLE 10-9 *Basic data from response to the question: In planning to save, what are your goals in building up your savings?*

	Build own business	Provide for old age	Provide for emergencies	Provide for children's education and help them set up a household
High school or less				
Number	66	361	261	135
Percent	6.72	36.76	26.57	13.74
Average age[*]	44.5	51.6	44.2	39.6
Some college				
Number	77	345	287	261
Percent	6.44	28.89	24.03	21.85
Average age[*]	43.2	49.7	42.2	41.9
Four years of college				
Number	94	365	353	408
Percent	6.00	23.31	22.54	26.05
Average age[*]	39.1	46.4	38.3	40.1
More than four years of college.				
Number	74	497	494	621
Percent	3.41	22.93	22.79	28.65
Average age[*]	39.8	46.8	38.9	40.0

[*] Average age of groups: high school or less, 46.4; some college, 43.7; four years of college, 40.2; more than four years of college, 40.9.

SOURCE: All estimates are derived from the Consumers Union data collected by the National Bureau of Economic Research. For a description of the sample, see Cagan (1965).

family size constant. Also, those with higher incomes and those who are self-employed appear significantly more efficient in this sense. From the relationship between education and efficiency in protecting against inflation, we may infer one indirect benefit of schooling: In an economy with a continually changing price level, the more educated are better able to cope with these fluctuations; that is, they are more likely to minimize the costs associated with changes in the price level.

Tables 10-9 and 10-10 refer to the question: In planning to save, what are your goals in building up your savings? Since the age of respondents is a major factor here, the average ages of respondents in each category are provided in Table 10-9. The mean age of all

Provide for inheritance	Buy or build a house	Buy a large item	Increase income	Other
2	40	36	70	11
0.20	4.07	3.66	7.12	1.12
51.5	41.3	47.7	45.3	43.2
2	75	45	85	17
0.16	6.28	3.76	7.11	1.42
51.0	38.9	40.4	43.5	44.8
10	111	59	138	28
0.63	7.08	3.76	8.81	1.78
46.8	36.5	39.2	38.5	39.4
17	160	84	179	41
0.78	7.38	3.87	8.26	1.89
47.5	36.7	39.0	40.9	41.1

respondents with a high school education or less is 46.4 years; for those with more than four years of college it is 40.9 years. In each education class the average age was highest for those whose stated savings goal was to provide for old age or to provide an inheritance for heirs. In the least educated group 36.96 percent had one of these two responses, whereas 29.05 percent of those with some college, 23.94 percent of those with four years of college, and 23.71 percent of those with more than four years of college expressed one of these as the primary goal of saving. In each education class those who selected one of the above goals had a higher mean age than respondents indicating other goals for saving.

In the most educated class the most popular goal was to provide education for children and to help the children set up a household (28.65 percent of respondents). Only 13.74 percent of those in the lowest education class selected this as the primary goal. Here the income effect is probably in evidence as well as the education effect. In all education classes those selecting this savings goal were relatively young.

If we abstract from income, age, and other factors influencing savings goals, some tentative relationships between education and savings goals are suggested by Table 10-9. The less-educated respondents seem to feel that provision for their old age is most urgent and best accomplished through financial markets. As education increases, families tend to be less concerned with retirement but more concerned with the children's education. If one believes that more educated, and hence wealthier, offspring will look after retired parents, perhaps investment in children's schooling is also a provision for old age. However, if depletion of savings in order to educate children becomes necessary before old age, one might postulate that less-educated people have longer-run concerns than more educated people. Of course the greater earning capacity of those with more education implies that they will be better able to accumulate reserves for old age *after* educating their children, whereas the less educated, who earn less, may have to begin saving earlier in life in order to have adequate reserves upon retirement.

These speculations can be brought into clearer focus by looking at Table 10-10, which presents a series of regressions aimed at determining whether—and in what direction—various factors, including education, influence the choice of savings goals. It appears that *after* controlling for family size, age of head of household, family income, and whether the head of household is self-

TABLE 10-10
*Regression
analysis of
some data
collected in
response to the
question:* **In
planning to
save, what are
your goals in
building up
your savings?***

	Provide for old age	Provide for emergencies	Provide for children's education and help them set up household
Coefficient on education used alone	−.0166 (−6.460)	−.0050 (−2.063)	.0194 (7.857)
R^2	.0107	.0011	.0158
Constant	−.3700 (−6.451)	.7284 (12.41)	−.0188 (−.3196)
Family size	−.0532 (−11.25)	−.0012 (−.2537)	.0770 (15.88)
Age of head	.0166 (20.74)	−.0077 (−9.451)	−.0014 (−1.669)
Family income	.000003 (2.898)	−.000005 (−4.220)	−.000001 (−1.227)
Education of head	−.0010 (−.4095)	−.0083 (−3.295)	.0122 (4.863)
Occupation dummy	.0313 (.7783)	.0870 (2.113)	−.0634 (−1.538)
R^2	.1905	.0358	.0902
Interaction of observations	.264	.219	.238

* The question to be answered is: To what extent can we explain why an answer was or was not chosen? The regressions were run three times with 0, 1 dummies as dependent variables. In each case, 1 was assigned to a particular response, 0 being assigned if the answer was not chosen. The education variable has values of 10, 14, 16, and 18 years. The occupation dummy is 0 if the respondent is a business proprietor or an independent professional and 1 if he is a wage or salary employee. Figures in parentheses are t-values.

SOURCE: All estimates are derived from the Consumers Union data collected by the National Bureau of Economic Research. For a description of the sample, see Cagan (1965).

employed, there is a highly significant negative relationship between education and the likelihood of indicating "provide for emergencies" as the primary savings goal. After controlling for the same variables, there is a highly significant positive relationship between level of schooling and the probability of having as the primary savings goal "to provide for children's education and help them set up a household."

One explanation for the negative relationship between level of schooling and the probability of saving primarily to provide for emergencies may be that more educated people are less concerned

TABLE 10-11
*Basic data for
responses to the
question:
If you had some
money to invest
at this time,
how would you
invest most of
it?*

	Savings accounts	*U.S. savings bonds*	*Other U.S. bonds*	*Common stock and mutual funds*
High school or less				
Number	296	94	15	333
Percent	29.71	9.43	1.50	33.43
Some college				
Number	196	55	19	532
Percent	16.30	4.57	1.58	·44.25
Four years of college				
Number	208	53	31	838
Percent	13.32	3.39	1.98	53.68
More than four years of college				
Number	359	63	30	1,167
Percent	16.75	2.94	1.39	54.45

SOURCE: All estimates are derived from the Consumers Union data collected by the National Bureau of Economic Research. For a description of the sample, see Cagan (1965).

about risk or are more willing to accept risk, a set of attitudes which could arise from the belief that human capital is more enduring than other kinds of capital. The explanation may also lie in the fact that the more highly educated save more. It is plausible that saving for emergencies is a primary savings goal with a low income elasticity (i.e., one which is satisfied by, say, the first 3 percent of income saved). If so, then the higher a household's saving level, the less likely it is to save *primarily* for emergencies.

The correlation between education and a savings goal concerned with one's children is strongly positive. These results may indicate both that a longer horizon is possessed by the more educated and that educated parents have different tastes (are more eager to see their children educated) even after controlling for other factors such as income and family size.

These relationships between choice of savings goals and education are net of family income after taxes. Hence at any level of income the less educated appear to save in order to maintain income (by building businesses or providing for emergencies), whereas the more highly educated appear to save so that their children

State and local bonds	Other marketable securities	Insurance and annuities	Real estate	Own business
22	9	22	167	65
2.21	0.9	2.21	16.76	6.53
10	15	36	257	82
0.83	1.24	2.99	21.38	6.82
21	21	36	256	97
1.34	1.34	2.31	16.40	6.21
27	24	47	361	65
1.25	1.12	2.19	16.84	3.03

may benefit, eventually providing utility and satisfaction to their parents. It is possible that the savings necessary to replace continuously depreciating physical capital are larger than those required to maintain human capital. One of the attributes of the latter is its greater malleability in the face of advancing technology.

Tables 10-11 and 10-12 analyze responses to the question: If you had some money to invest at this time, how would you invest most of it? In other words, some factors influencing desired portfolio composition are revealed. Table 10-11 indicates that in every education group, the largest percentage of respondents said that they would prefer to buy common stocks or mutual funds with savings. However, less-educated groups were much more prone to prefer savings accounts or United States savings bonds.

There are several possible reasons for these patterns. In the first place, people with a lower level of education probably have lower incomes and consequently have lower total savings in dollars. Considerations relating to the cost of transactions and the acquisition of information suggest that small amounts of funds would more likely be put into savings accounts or savings bonds than into

common stock purchases; hence the observed preference by the less educated for savings accounts or savings bonds.[9] The increasing preference for common stocks by educational level may also reflect the tax advantages of capital gains income, with these tax benefits worth more (and better known) to those with more education and more income. On the other hand, one might infer that poorer, less-educated groups are relatively more averse to risk than the more educated and high-income groups.

Table 10-12 enables us to see the partial effects of education and income, holding the other factors constant, on the probability of respondents' selecting particular types of assets as their preferred investments. The relationship between schooling and pref-

[9] Recent refinements in mutual fund plans were not widespread in 1959, when this survey was taken.

TABLE 10-12 *Regression analysis of some data collected in response to the question:* **If you had some money to invest at this time, how would you invest most of it?***

	Savings accounts, U.S. savings bonds, other U.S. bonds, state and local bonds	Common stocks and mutual funds	Real estate
Coefficient on education alone	−.0199	.0244	−.0041
	(−8.063)	(8.430)	(−1.906)
Constant	.3009	.2414	.2905
	(4.962)	(3.387)	(5.405)
Family size	−.0077	−.0029	.0015
	(−1.535)	(−.5010)	(.3322)
Age of head	.0049	−.0029	−.0009
	(5.767)	(−2.954)	(−1.175)
Family income	−.000004	.000007	−.000003
	(−3.590)	(5.428)	(−2.688)
Education of head	−.0140	.0195	−.0039
	(−5.411)	(6.387)	(−1.698)
Occupation dummy	−.0127	−.0013	−.0221
	(−.2975)	(−.0268)	(−.5865)
R^2	.0307	.0269	.0038
Percentage who selected this answer	23.8	48.4	16.6

The dependent variable is 1 for answer selected, 0 being assigned if the answer was not chosen. Figures in parentheses are t-values.
SOURCE: See Table 10-11.

erence for fixed-yield assets (savings accounts, savings bonds and all other government bonds) is strongly negative, whereas the education–common stock–mutual fund relationship is strongly positive (both relationships are net of the effects of income, family size, age, and occupation). The relationship between income level and the decision to buy fixed-yield assets is also strongly negative, whereas the income–common stock relationship is strongly positive, suggesting that the argument concerning economies of scale in investment is plausible.

Are there any implications regarding the indirect or social benefits of schooling to be drawn from the responses to this question? As schooling levels rise, people are more willing to take risks, as evidenced by an increased preference for variable-priced assets with greater education. In our economy, risk preference has historically been associated with higher net yields; hence higher schooling levels are associated with higher private returns. Whether the society as a whole receives any net benefit from the lesser risk aversion of the more educated segments is a more complex question to analyze, although it seems clear enough that at the extreme, a society characterized by complete aversion to risk will be less progressive and dynamic than one characterized by a more even distribution of attitudes toward risk.

Tables 10-13 and 10-14 serve to· explicate more directly the motives for saving. Respondents were asked: In selecting among various types of investment, what would be your major considerations? Reponse differentials for education groups may bear on differences in either taste for risk or time preference. Of those families with heads having high school education or less, 60.88 percent indicated safety of principal as the primary consideration. The implication is that risk aversion falls with schooling attainment. A comparison of the percentage of those interested in maximizing current return with the percentage of those desiring capital gains provides clues about time preference.

The current-return choice indicates both an aversion to risk and a short-term outlook. The percentage choosing this as the primary objective fell from 7.38 to 5.39 as education rose from the lowest to the highest class. On the other hand, the percentage who indicated capital gains as their major consideration rose with education from 10.74 to 26.80. Desire for capital gains implies a longer-run view, as well as a greater willingness to accept risk. Moreover, the understanding of, and desire to benefit from, the tax advantages

TABLE 10-13
Basic data for
responses to the
question: In
selecting among
various types
of investment
what would
be your major
considerations?

	Safety of principal	Maximum current return	Capital gains	Ready availability or marketability
High school or less				
Number	618	75	109	51
Percent	60.88	7.38	10.74	5.02
Some college				
Number	567	83	215	56
Percent	46.39	6.79	17.59	4.58
Four years of college				
Number	566	82	396	62
Percent	35.50	5.14	24.84	3.88
More than four years of college				
Number	765	119	591	90
Percent	34.69	5.39	26.80	4.08

SOURCE: All estimates are derived from the Consumers Union data collected by the National Bureau of Economic Research. For a description of the sample, see Cagan (1965).

of capital gains are evident. Another factor could be the greater realization by the better educated that our economy has been inflationary.

Those who saved primarily as a hedge against inflation were more numerous in the more educated classes (14.38 percent in the lowest education class and 27.30 percent in the highest education class). This result may reflect efficiency in the sense of an awareness of the steady rise in prices during the postwar period.

Table 10-14 reveals a strong positive relationship between education and the probability that the major savings objective will be capital gains or a hedge against inflation. These relationships are net of the effects of family income, age, occupation, and family size. The implication is that, *ceteris paribus,* the more educated have a greater awareness of the advantages of capital gains income and the need to protect against inflation.

The savings objective with the strongest negative correlation with education is safety of principal. This is consistent with evidence presented earlier that, all other things being equal, the more educated are less averse to risk.

Finally, there is a negative relationship between education and the probability of indicating the objective of maximum current return. This might indicate either a longer horizon for the more educated or a knowledge of the tax benefits of deferred income from capital gains.

Hedge against inflation	Convenience	Other
146	8	8
14.38	0.78	0.78
288	6	7
23.56	0.49	0.57
459	9	20
28.79	0.56	1.25
602	16	22
27.30	0.73	0.99

TABLE 10-14 *Regression analysis of some basic data collected in response to the question:* In selecting among various types of investment, what would be your major considerations?*

	Safety of principal	Maximum current return	Capital gains	Hedge against inflation
Coefficient on education	−.0330 (−11.68)	−.0041 (−3.202)	.0205 (8.548)	.0166 (6.636)
R^2	.0342	.0027	.0186	.0113
Constant	.5852 (8.515)	.1670 (5.242)	.0838 (1.432)	.0446 (.7205)
Family size	−.0254 (−4.484)	−.0001 (−.0524)	.0072 (1.498)	.0097 (1.890)
Age of head	.0068 (7.145)	−.0009 (−2.010)	−.0041 (−5.072)	−.0010 (−1.162)
Family income	−.000007 (−5.372)	−.0000006 (−1.046)	.000009 (8.341)	.0000002 (.1381)
Education of head	−.0229 (−7.790)	−.0046 (−3.341)	.0133 (5.313)	.0148 (5.578)
Occupation dummy	.0067 (.1388)	−.0083 (−.3730)	.0559 (1.361)	−.0512 (−1.180)
R^2	.0650	.0043	.0437	.0135
Percent who selected this answer	40.9	5.1	22.0	24.7

*The dependent variable is 1 for answer selected, 0 being assigned if the answer was not chosen. Figures in parentheses are t-values.

SOURCE: See Table 10-13.

It is interesting to note that when both income and education are used together, the sign of income is always the same as that of schooling. The responses to this question point out once again that the more educated are willing to assume risks and defer short-run income.

CONCLUSION   This chapter has been an attempt to determine the relationship between education and savings behavior. First, existing savings and consumption-function theories were reviewed with the aim of seeing how education might be a factor in these theories. The general conclusion was an expectation that more education should lead to more saving for individuals who are otherwise similar. Then actual differences in savings behavior across schooling groups were sought. The results indicate that both average and marginal propensities to save tend to rise with the schooling attainment of the family head, other things being equal. It was hypothesized that the growth in savings resulting from higher educational attainment would contribute to the growth of the income and wealth of the society.

Finally, a study of responses to questions concerning attitudes toward saving was made. This revealed systematic differences in response patterns due to education, even after other factors were controlled for. From these results we were able to infer some additional private benefits of schooling in regard to an apparently greater efficiency in portfolio management, and possibly some social benefits as well.

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