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Financial Illiteracy, Education, and Retirement Saving

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Financial Illiteracy, Education, and Retirement Saving

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Living with Defined Contribution Pensions

Remaking Responsibility for Retirement

Edited by

Olivia S. Mitchell and Sylvester J. Schieber

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Chapter 3

Financial Illiteracy, Education, and Retirement Saving

B. Douglas Bernheim

Most Americans save too little to maintain their standards of living after retirement. In the past, the typical worker has reached retirement with total savings insufficient to sustain his or her preretirement living standards (Diamond 1977; Hammermesh 1984).¹ Since social security benefits provide rather modest earnings replacement, and since defined benefit plans supplement this income for a shrinking minority of American workers, retirement income security has become increasingly dependent on the adequacy of personal saving. Yet recent research on the adequacy of saving has found that, through the combination of defined contribution plans and nonpension saving, the typical baby boom household is saving at slightly more than one-third the rate required to finance a standard of living during retirement comparable to the standard of living that it enjoys before retirement (Bernheim 1993, 1994a, 1995a; Arthur D. Little, Inc. 1993).² Even workers with defined benefit plans fall short of the mark.³ It is important to emphasize that this calculation does not represent a "worst case" scenario. On the contrary, it is based on many optimistic assumptions concerning longevity, future rates of taxation, and anticipated social security benefits.⁴ Even a moderate increase in future taxes would reduce relative saving adequacy below 30 percent, and a moderate reduction in social security benefits would depress it even further, to less than 20 percent. If social security benefits were eliminated, baby boomers would be saving only about one-tenth of what is required to avoid a precipitous decline in standard of living after retirement.

The increasing popularity of 401(k) accentuates these concerns, because it leaves critical decisions concerning participation, contributions, and investments in the hands of employees. Many employees choose to contribute little, or nothing at all, while others invest heavily in safe, low-

return, fixed income funds. As a result, fewer than one-third of pension plan sponsors believe that their employees will accumulate adequate plan balances.⁵

Why do Americans make such poor financial decisions? One possibility is that they lack the training, skill, and/or guidance to recognize financial vulnerabilities and to formulate prudent plans. If so, then education policy may prove to be a powerful tool for stimulating rates of saving—particularly as 401(k) plans continue to grow. This possibility led the Department of Labor in 1995 to launch a “national pension education program aimed at drawing the attention of American workers to the importance of taking personal responsibility for their retirement security” (Berg 1995). The desire to shape behavior through education is also presumably behind the recent explosion of retirement education in the workplace. As of 1994, 88 percent of large employers offered some form of financial education, more than two-thirds of which added these programs after 1990.⁶

In this chapter, I examine a series of questions central to the issues discussed above. First, is low saving associated with a failure to appreciate financial vulnerabilities? Second, even if individuals were aware of their vulnerabilities, would they typically possess the decision-making skills required to formulate sensible retirement plans? Third, when the requisite decision-making skills are absent, do individuals obtain authoritative advice and guidance? Finally, if low saving and poor investment choices are attributable in part to the absence of knowledge, skill, and guidance, is it possible to address these problems effectively through programs of retirement education, particularly in the workplace?

In answering these questions, I review existing evidence and, where appropriate, offer pertinent new evidence. Many of my conclusions are pessimistic: the typical household decision-maker underappreciates financial vulnerabilities, is ill equipped to formulate sensible retirement plans, and does not make significant use of authoritative guidance. However, I ultimately find considerable cause for optimism in the emerging body of evidence on the effects of employer-based retirement education.

Do Households Appreciate Their Financial Vulnerabilities?

The extent to which households perceive their financial vulnerabilities, and the relation between these perceptions and accumulated wealth, is revealed through an analysis of annual household survey data gathered by Merrill Lynch, Inc. The first of these surveys was administered in two “waves” during the fall of 1993 to a random, nationally representative sample of individuals between the ages of 29 and 47 (the “baby boom”

cohort). Both waves contain a detailed battery of questions concerning household assets, earnings, income, pension coverage, employment status, and demographic information. The first wave, which surveyed 1,209 households, also contains various self-assessments of current financial status and of future financial needs, intended saving, and actual saving. Additionally, it measures beliefs and expectations concerning Social Security, including current and future benefit levels, and other information on attitudes and expectations concerning unfunded government obligations. The second wave, which surveyed 806 households, assesses economic literacy, financial knowledge, developmental experiences that may be relevant to financial behavior, and sources of financial information and advice.⁷

The 1993 survey instrument contains several questions designed to elicit self-evaluations of financial status. These questions include the following:

Would you describe the state of your own personal finances these days as very shaky, fairly shaky, fairly secure, or very secure?

Overall, how well prepared do you think you are financially for your eventual retirement? (very well prepared, somewhat prepared, somewhat unprepared, very unprepared, or not prepared at all)

Do you expect to have a standard of living that is much worse, somewhat worse, somewhat better, much better, or have the same standard of living after you retire as you do today?

Overall, the answers to these questions indicate a fairly high degree of optimism about personal finances: 68 percent of respondents described their personal finances as fairly secure or very secure, 58 percent believed that they are very well prepared or somewhat prepared for retirement, while only 19 percent described themselves as very unprepared or not at all prepared. Virtually identical fractions of the population (31 percent) expected better and worse standards of living in retirement.

Provided that we have some objective measure of financial vulnerabilities, the answers to questions about personal financial status can be used to evaluate the extent to which individuals recognize these vulnerabilities. One possible measure of financial vulnerabilities is the ratio of wealth to earnings.⁸ A lower value of the wealth-to-earnings ratio does not, however, necessarily indicate greater vulnerability. A particular value of this ratio may indicate vulnerability for households with certain characteristics, while indicating relative security for households with other characteristics.

I therefore separate the population into four "adjusted-wealth" quartiles (Bernheim 1995b). Intuitively, this approach amounts to dividing

TABLE I Perceptions of Financial Security versus Household Financial Preparation

	<i>Index of financial preparedness (quartiles) (%)</i>			
	1	2	3	4
<i>State of personal finances</i>				
Secure/fairly secure	53.9	71.0	66.4	78.3
Shaky/very shaky	46.1	28.6	33.7	21.7
<i>State of preparation for retirement</i>				
Very well/somewhat	44.6	55.2	62.0	68.2
Very unprepared/not at all	29.9	9.5	13.0	14.3
<i>Standard of living during retirement</i>				
Better/much better	29.9	28.6	29.8	36.4
Worse/much worse	37.3	32.9	31.7	23.0

Source: Bernheim (1995b). The sample is taken from the 1993 Merrill Lynch household survey.

Note: The "index of financial preparedness" is based on the ratio of wealth to earnings, adjusting for other household characteristics. Households falling into the first quartile have the lowest level of financial preparedness (relative to similar households), while households falling into the fourth quartile have the highest level of financial preparedness.

the population into numerous subgroups based on age, earnings, gender, marital status, education, pension coverage, and number of children and then further subdividing each of the groups into quartiles based on wealth-to-earnings ratios. The first, or lowest, adjusted-wealth quartile corresponds to those individuals in the lowest wealth-to-earnings quartile within each population subgroup. Those individuals in the lowest adjusted-wealth quartile thus have very low levels of wealth compared to other individuals with identical characteristics. The other three adjusted-wealth quartiles are defined similarly.⁹

A household's adjusted-wealth quartile is a good measure of its financial vulnerability, relative to that of similar households. If individuals understand their financial vulnerabilities, then those in higher adjusted-wealth quartiles should regard themselves as more secure than those in lower adjusted-wealth quartiles.

Table I examines this possibility, reporting answers to survey questions concerning household financial status, separately for each adjusted-wealth quartile. The table exhibits a moderately strong relation between actual and perceived financial vulnerability. The fraction of the population that regards its personal finances as secure or fairly secure rises significantly between the first and second adjusted-wealth quartiles, as well as between the third and fourth quartiles. Oddly, this fraction de-

clines slightly between the second and third quartiles. The fraction of the population describing itself as very well or somewhat prepared for retirement rises monotonically with the household's adjusted-wealth quartile. The respondent's expected relative standard of living in retirement shows the weakest relationship to adjusted wealth. The fraction of the population expecting a better standard of living in retirement is highest in the top adjusted-wealth quartile, but varies little across the first three quartiles. On the other hand, the fraction of the population expecting a worse standard of living in retirement falls significantly between the first and second quartiles, and again between the third and fourth quartiles. (There is also a slight decline between the second and third quartiles.)

Although these results indicate some awareness of relative financial vulnerabilities, they also exhibit an unrealistic degree of optimism. Within the lowest adjusted-wealth quartile—a group that is poorly prepared by any objective measure of adequacy—more than half of the respondents (54%) regard their personal finances as secure or fairly secure, 45 percent believe that they are very well or somewhat prepared for retirement, and only 37 percent expect to achieve a lower standard of living after retirement.

To put these findings somewhat differently, among the least well-prepared segment of the population, nearly two-thirds believe that their standard of living during retirement will be as high or higher than it is today. This is particularly surprising in light of the fact that most of these individuals acknowledge that they save significantly less than they should and express little or no confidence in Social Security (Bernheim 1995b). Thus, for a substantial fraction of the population, the failure to save adequately may result in a failure to appreciate financial vulnerabilities adequately, coupled with possible self-deception.

Do Households Have Adequate Decision-Making Skills?

The existing literature contains a fair number of studies that shed considerable light on the general public's level of financial sophistication. Sophistication, or the lack thereof, is reflected in both knowledge and choices.

Collectively, existing studies paint a rather bleak picture of Americans' economic and financial literacy.¹⁰ For example, only 20 percent of adults can determine correct change using prices from a menu, and many have trouble determining whether a mortgage at 8.6 percent is better than a mortgage at 8¾ percent.

The sophistication of choices has also been the subject of extensive study. Numerous authors have observed that decision making under uncertainty gives rise to a variety of behavioral anomalies (Kahneman,

Slovic, and Tversky 1982). A large number of papers provide formal tests of rational intertemporal choice, with many authors concluding that the life cycle model does not accurately describe behavior (Shefrin and Thaler 1983, 1988; Levin 1992; Kotlikoff, Johnson, and Samuelson 1987). Numerous authors have also identified particularly naive or unsophisticated patterns of financial behavior. Examples include: a widespread failure to take advantage of clear arbitrage opportunities (Warshawsky 1987); the common practice of waiting until the end of a tax year to contribute to an IRA (Feenberg and Skinner 1989); the use of rough rule-of-thumb saving targets (Bernheim 1994b); the frequency of identifiable errors in personal financial management, including insufficient diversification and excessive conservatism in selecting investments (O'Neill 1990, 1993); limited familiarity with all but the simplest investment instruments (O'Neill 1993); the use of costly methods of borrowing (Hira 1993); the frequency with which personal bankruptcy results from poor credit management (Hira 1993); the prevalence of "compulsive spending addictions" (Faber and O'Guinn 1989); and the high frequency with which individuals fall prey to financial scams (Alliance Against Fraud in Telemarketing 1992).

In summary, the existing literature demonstrates that most Americans know little about managing personal finances and their choices reflect this ignorance. While these findings are useful and important, they leave many central questions unanswered. In particular, it is important to know whether identifiable population subgroups are particularly at risk of making uninformed or otherwise unsophisticated decisions, and whether this lack of information and sophistication relates systematically to behavior.

In this section, I address these issues using information collected in the 1993 Merrill Lynch household survey. The survey instrument contained eleven questions designed to assess the respondent's knowledge of economic matters. These questions are reproduced in the appendix. I have divided the questions into two subcategories: those that concern financial issues, and those that concern macroeconomic issues. These permit us to examine (1) overall performance on these test questions, (2) variation in relative knowledge over identifiable population subgroups, (3) individuals' awareness of their own sophistication, and (4) preliminary findings concerning the relation between knowledge and behavior.

An Analysis of Absolute Performance

The sample of respondents surveyed generally performed poorly on economic and financial test questions. This is consistent with the evidence reviewed at the outset of this section. Even allowing for an appropriate

margin of error on certain questions (such as the Dow Jones average), more than 80 percent of the sample answered at least five of the eleven questions incorrectly.

It is possible to characterize the nature of financial illiteracy more precisely. Nearly two-thirds of the sample would not hazard a guess as to the level of the Dow Jones average, despite the fact that this number is reported on the front page of virtually every business section in every daily newspaper, as well as on virtually every national television and radio news program. The median answer for those professing knowledge was 3,400 — more than 300 points below the true range of the average during the week of the survey.

More than 90 percent of the sample answered the questions concerning unemployment and inflation, but they overestimated both statistics. The median response concerning unemployment was 8 percent, compared to 6.7 percent nationally at the time of the survey, and roughly one-third named a figure of 10 percent or higher. Similarly, the median response concerning inflation was 4 percent, compared to a rate of 2.8 percent at the time of the survey.

Respondents severely underestimated the size of the federal debt, with one-third of the sample reporting a number below \$1 trillion. Among those answering this question, the median response was \$3 trillion, whereas the correct answer was nearly \$4.4 trillion. This discrepancy may be partially attributable to confusion about the differences between the debt and the deficit, as well as to inadvertent errors in orders of magnitude (i.e., saying “billions” rather than “trillions”). The survey separately asked for the federal debt per household. In theory, this number is far more relevant to the typical taxpayer than the total federal debt, since it measures the amount of liabilities that the government has incurred on his or her behalf. It is therefore striking — but perhaps not too surprising — that respondents were far more ignorant of the federal debt per household. Whereas 17 percent professed ignorance of the federal debt, more than one-third, or nearly twice as many, would not hazard a guess as to the federal debt per household. Those answering the question on debt per household severely underestimated this liability. The median answer was \$18,000, compared with an actual liability of \$45,700.

As noted in other studies, individuals tend to underestimate the power of compound interest. Nearly one-third of the sample indicated that \$1,000, left in the bank for 30 years at 8 percent interest, would earn less than \$5,000, whereas the correct answer is more than \$10,000. Many respondents also poorly understand common financial instruments. Roughly 42 percent could not identify the proper explanation for the difference in average returns between mutual funds and federally insured CDs.

Respondents did perform relatively well on a small number of questions. The median response concerning the national minimum wage was \$4.35 — only \$0.10 high — and 34 percent of the sample said \$4.25. Most respondents also provided reasonably accurate answers to the question about conventional mortgage rates, with homeowners performing noticeably better than renters.

An Analysis of Relative Performance

Despite these rather stark findings, it is difficult to obtain a meaningful absolute measure of financial literacy, since any such measure is necessarily predicated on subjective judgments concerning the set of things that a well-informed household ought to know. Test questions, such as those contained in the Merrill Lynch survey, are best suited for evaluating the relative sophistication of different population subgroups. For this purpose, I depart from the standard practice of coding responses as simply “right” or “wrong.” These binary measures are necessarily arbitrary; for example, how close to the actual Dow Jones average would an answer need to be to be scored as correct? Instead, I assign a “relative knowledge score” to each question. This score is defined as the fraction of the population who gave answers that were further in absolute value than the respondent’s answer from the true answer.¹¹ This procedure has the additional benefit of normalizing the score on each question to reflect difficulty, so that no question (or group of questions) dominates the variation in total scores.

Average scores for different population subgroups appear in Table 2. To interpret differences in test scores between subgroups, it is helpful to keep in mind the following information. Scores range between 25.8 and 96.5, with 25 percent of the population scoring between 25.8 and 54.2, 25 percent between 54.2 and 64.2, 25 percent between 64.2 and 73.5, and 25 percent above 73.5. Thus, toward the central portion of the population distribution, a 10 point increase in an individual’s score would move him or her past roughly one-quarter of the population.

Surprisingly, test scores do not rise or fall systematically with age. This may reflect the effects of various offsetting factors. For example, individuals both acquire new knowledge and forget old knowledge as they age. It is also important to keep in mind that all respondents were surveyed at roughly the same point in time. As a result, I cannot separately identify the effects of age and birth year. Younger cohorts may have received more — or less — financial training than older cohorts.

Several other clear patterns emerge from an examination of Table 2. Males score higher than females, and whites score higher than blacks. Due to the size of the sample, it was impossible to draw reliable inferences

TABLE 2 Average Normalized Scores from a Test of Economic and Financial Knowledge

<i>Population subgroup</i>	<i>Overall score</i>	<i>Financial score</i>	<i>Macroeconomic score</i>
<i>Age</i>			
29–34	63.5	70.1	55.7
35–40	63.1	69.8	55.0
41–47	64.2	70.6	56.6
<i>Gender</i>			
Male	68.5	74.0	62.0
Female	58.9	66.5	49.8
<i>Race</i>			
White	64.3	71.0	56.3
Black	55.9	62.0	48.6
<i>Education</i>			
College degree	68.3	74.8	60.4
No college degree	60.6	67.2	52.8
<i>Earnings</i>			
First quartile	59.4	65.8	51.8
Second quartile	64.1	69.9	57.2
Third quartile	65.5	72.4	57.1
Fourth quartile	67.3	74.2	59.0

Source: Author's calculations. Sample taken from the 1993 Merrill Lynch household survey.
Note: Test scores are normalized to lie on a scale of 0 to 100, based on relative performance.

for any other ethnic subgroup; indeed, even the sample of black respondents is relatively small, and a corresponding measure of caution is therefore warranted when evaluating differences between blacks and whites. Average scores rise with both education and income, although perhaps not by as much as one might expect.

Similar patterns are observed for overall scores, financial scores, and macroeconomic scores. This reflects the fact that financial and macroeconomic scores are very highly correlated (the correlation coefficient is quite large—0.51—and highly statistically significant). This is reassuring, since it suggests that the questions are consistently measuring underlying characteristics.

One must exercise considerable caution when interpreting any of the patterns described above. For example, since earnings, education, gender, and race are all correlated, it is impossible to discern from any given comparison whether one is observing the incremental effect of changing the characteristic in question. Proper interpretation of the data requires

TABLE 3 Regression Analysis of Normalized Scores from a Test of Economic and Financial Knowledge

Explanatory variable	Dependent variable		
	Overall score	Financial score	Macroeconomic score
Age/10 ⁴	0.464 (8.44)	-2.27 (8.90)	3.74 (11.4)
Gender	0.0800 (0.0094)*	0.0580 (0.0099)*	0.106 (0.013)*
Black	-0.0561 (0.0232) [†]	-0.0576 (0.0245) [†]	-0.0544 (0.0315)
Earnings/10 ⁷	1.39 (0.89)	3.19 (0.91)*	-0.775 (1.17)
Employment status	0.0278 (0.0139) [†]	0.0261 (0.0147)	0.0298 (0.0188)
High school only	0.0290 (0.0289)	0.0409 (0.0302)	0.0146 (0.0388)
High school plus (no college degree)	0.0746 (0.0283)*	0.0848 (0.0299)*	0.0624 (0.0383)
College degree	0.111 (0.028)*	0.122 (0.030)*	0.0977 (0.0384)*
Constant	0.494 (0.043)*	0.562 (0.046)*	0.414 (0.059)*

Source: Author's calculations. Sample taken from the 1993 Merrill Lynch household survey.

*Denotes statistical significance at 1% level.

[†]Denotes statistical significance at 5% level.

Note: For the purpose of this table, the dependent variables (test scores) are normalized to a scale of 0 to 1, rather than 0 to 100 (as for Table 2). Estimates are based on ordinary least squares regression. Standard errors are in parentheses.

the estimation of equations that explain test scores as a function of many demographic and economic factors.

Regression results are presented in Table 3. With respect to overall test scores, virtually all the patterns noted in Table 2 hold up. There is no systematic relation between test performance and age. Differences based on gender and race are statistically significant, even holding other variables (such as education and earnings) constant. More educated individuals generally obtain higher scores, and these differences are also statistically significant. Higher earnings are also associated with higher test scores, even controlling for education (as well as the other explanatory variables), but this effect is not statistically significant at conventional levels. In Table 3, I have also controlled for employment status, on the theory that gainfully employed individuals may be more knowledgeable about economic matters. Indeed, the estimates bear this out.

Further insight is obtained by examining results for financial knowledge and macroeconomic knowledge separately. These results are nearly

identical, with one important exception: financial scores rise with earnings, and this increase is statistically significant, whereas earnings have essentially no effect on macroeconomic scores. Although macroeconomic scores are correlated with earnings (Table 2), this correlation disappears once one controls for education, gender, race, and employment status. This finding is intuitive. Individuals with higher earnings almost certainly have greater incentives to acquire *financial* knowledge. For example, those who are able to purchase homes are more likely to follow movements in mortgage rates, and those who own stock are certainly more likely to follow the Dow Jones average. Thus, it is not surprising that I find a very strong positive relation between earnings and financial test scores, even when I control for education and other factors. However, those with greater resources do not necessarily have greater incentives to acquire macroeconomic information. Indeed, those with fewer resources are more vulnerable to unemployment and may therefore pay more attention to employment statistics. Likewise, they may be more concerned about the minimum wage, and at least as worried about inflation. Thus, it is not surprising that, once one controls for education and other factors, there is essentially no relation between earnings and macroeconomic test scores. This observation features prominently in the analysis below.

An Analysis of Self-Assessed Financial Knowledge

The 1993 Merrill Lynch household survey also contained an additional question designed to elicit a self-assessment of financial literacy. Specifically, respondents were asked:

Do you consider yourself very financially knowledgeable, somewhat financially knowledgeable, only a little financially knowledgeable, or not at all financially knowledgeable?

Answers to this question reflect a blend of actual knowledge and self-confidence. It is therefore of interest to evaluate the accuracy of self-assessments by comparing them with test scores, and to examine systematic differences in self-assessments across population subgroups.

Table 4 provides average test scores (overall, financial, and macroeconomic) broken down by self-assessments of financial knowledge. This table reveals a strong correlation between self-assessments and test scores. Nevertheless, this correlation is, perhaps, less pronounced than one might imagine. The average overall score among those pronouncing themselves "very financially knowledgeable" was 67.1, corresponding to the 57th percentile, whereas the average overall score among those describing themselves as "not at all financially knowledgeable" was 58.9, corresponding to the 38th percentile. It is noteworthy that those who are,

TABLE 4 Mean Normalized Scores from a Test of Economic and Financial Knowledge versus Self-Assessed Financial Knowledge

<i>Self-assessed knowledge</i>	<i>Mean normalized score</i>		
	<i>Overall score</i>	<i>Financial score</i>	<i>Macroeconomic score</i>
Very financially knowledgeable	67.1	73.5	59.4
Somewhat financially knowledgeable	64.2	70.8	56.3
Only a little financially knowledgeable	59.7	65.9	52.3
Not at all financially knowledgeable	58.9	68.2	47.7

Source: Author's calculations. Sample taken from the 1993 Merrill Lynch household survey.

Note: Test scores are normalized to lie on a scale of 0 to 100, based on relative performance.

by their own account, "not at all financially knowledgeable" actually obtained a higher average financial score than those who called themselves "only a little financially knowledgeable." In contrast, the average macroeconomic score rises monotonically with self-assessed knowledge. This observation raises the possibility that self-assessments of *financial* knowledge might actually reflect *macroeconomic* knowledge more closely than financial knowledge. I return to this issue below.

Table 5 provides summary statistics for self-assessed knowledge for various population subgroups. For each subgroup, I report the fraction of respondents describing themselves as either "very financially knowledgeable" or "somewhat financially knowledgeable." Most of the patterns here are similar to those noted for test scores (Table 2). There is no apparent relation between age and self-assessed financial knowledge; the youngest and oldest baby boomers consider themselves equally well informed on financial matters. Males generally believe themselves to be more financially knowledgeable than females, and self-assessed financial knowledge rises with education and earnings. There are, however, some notable differences between the patterns exhibited in Tables 2 and 5. The quantitative impact of gender, education, and earnings are very similar in Table 2 (test scores). For example, average overall scores for males and females differ by 9.6 points, scores for those with and without college degrees differ by 7.7 points, and scores for those in the top and bottom earnings quartiles differ by 7.9 points. In contrast, the relation between self-assessed knowledge and earnings is much more pronounced than the relation between self-assessed knowledge and education, which is in turn more pronounced than the relation between self-assessed knowledge and gender. Specifically, the difference between the summary statistics reported for those in the top and bottom earnings quartiles in Table 3 is 0.201, compared to a difference of only 0.109 for those with and with-

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TABLE 5 Demographic Patterns in Self-Assessed Financial Knowledge

<i>Population subgroup</i>	<i>Percent considering themselves either somewhat or very financially knowledgeable</i>
<i>Age</i>	
29–34	80.2
35–40	78.6
41–47	80.1
<i>Gender</i>	
Male	83.6
Female	75.8
<i>Race</i>	
White	80.2
Black	78.8
<i>Education</i>	
College degree	86.3
No college degree	75.4
<i>Earnings</i>	
First quartile	70.1
Second quartile	75.7
Third quartile	79.8
Fourth quartile	90.2

Source: Author's calculations. Sample taken from the 1993 Merrill Lynch Household Survey.

out college degrees, and a difference of 0.078 between men and women. In addition, there is practically no difference in self-assessed financial knowledge between whites and blacks, despite the differences in test scores noted in Table 2.

Of course, these preliminary observations are based on simple correlations. Estimates of probit specifications explaining high self-reported financial knowledge are presented in Table 6. The central patterns observed in Table 5 are unchanged: men have higher self-assessed knowledge than women; self-assessed knowledge is essentially unrelated to race, but rises with education. Notably, self-assessed knowledge is strongly related to earnings. Recall that, once other variables are controlled for, financial test scores are strongly related to earnings, while macroeconomic test scores are not. In this important respect, self-assessed financial knowledge behaves more like financial test scores than like macroeconomic test scores.

A comparison of the results in Tables 3 and 6 reveals that our explanatory variables affect test scores differently than they affect self-assessed

TABLE 6 Probit Regression Analysis, Explaining High Self-Assessed Financial Knowledge

<i>Explanatory variable</i>	<i>Coefficient</i>
Age / 10 ⁴	0.482 (1.04)
Gender	0.293 (0.116)*
Black	0.0913 (0.280)
Earnings / 10 ⁷	66.6 (21.0) [†]
Employment status	0.0968 (0.160)
High school only	1.06 (0.309) [†]
High school plus (no college degree)	1.16 (0.305) [†]
College degree	1.34 (0.309)
Constant	-1.07 (0.505)*

Source: Author's calculations. Sample taken from the 1993 Merrill Lynch Household Survey. Note: Estimates are based on a probit regression, which explains the probability that self-assessed financial knowledge is high. The dependent variable is set equal to 1 when self-assessed financial knowledge is high, and zero otherwise. Standard errors are in parentheses.

*Denotes statistical significance at 5% level.

[†]Denotes statistical significance at 1% level.

knowledge. Under the obviously debatable assumption that test scores accurately measure economic and financial knowledge,¹² this suggests that certain population subgroups may systematically overestimate or underestimate their financial sophistication. Young baby boomers are no more likely to be excessively or insufficiently confident than older baby boomers. The most obvious candidates for overconfidence include those with high earnings, those with high school diplomas, the nonworking, and blacks (alternatively, low earners, those not finishing high school, workers, and whites may be underconfident). College-educated individuals and women may also, on average, be overconfident in their financial sophistication.

The Relation Between Saving and Financial Knowledge.

Thus far, I have argued that many individuals are relatively ignorant of economic and financial matters, that they underappreciate their finan-

TABLE 7 Knowledge and Retirement Savings

	<i>Stock of retirement savings as % of annual earnings</i>	
	<i>Median</i>	<i>Mean</i>
<i>Test score quartile</i>		
4	37.6	87.3
3	28.3	69.7
2	22.2	52.8
1	14.9	42.1
<i>Self-assessed financial knowledge</i>		
Very	41.3	126
Somewhat	26.4	62.4
Only a little bit	13.5	33.2
Not at all	0.0	31.6

Source: Author's calculations. Sample taken from the 1993 Merrill Lynch Household Survey.

cial vulnerabilities, and that they save too little. It is natural to conjecture that these phenomena are related. If so, then there is reason to hope that behavior is responsive to education. I discuss direct evidence on the relation between education and behavior below. Here, I consider an intermediate question: does greater financial knowledge tend to promote more adequate saving?

There is, without any question, a powerful quantitative relation between economic knowledge and personal saving. As shown in Table 7, the median ratio of retirement savings to earnings for those receiving the highest test scores (those in the fourth quartile) was roughly two-and-a-half times as large as the median ratio of retirement savings to earnings for those receiving the lowest test scores (those in the first quartile). Similarly, the typical individual who describes him/herself as "very financially knowledgeable" has accumulated more than three times as much as the typical individual who describes him/herself as "only a little financially knowledgeable." Moreover, among those who consider themselves "not at all financially knowledgeable," the median individual has accumulated nothing for retirement. Similar patterns are observed for sample means.

These results do not, however, establish that individuals save more in response to the acquisition of economic knowledge. They are equally consistent with the possibility that individuals acquire economic knowledge after accumulating significant wealth, in order to manage their resources with greater competence. As observed above, people may pay little attention to mortgage rates until they have accumulated sufficient

resources to purchase a house, and they may begin to follow the Dow Jones average only after making significant investments in the stock market. Consequently, the direction of causality in Table 7 is far from clear, and requires further analysis.

Although the accumulation of wealth provides one possible motivation for the acquisition of financial knowledge, the level of knowledge presumably varies significantly across the population for other reasons as well. If one can identify a portion of the variation in financial literacy that does not result from differences in wealth, then it should be possible to distinguish between the hypothesis that knowledge causes the accumulation of wealth, and the hypothesis that wealth causes the acquisition of knowledge. This is done through the use of an instrumental variable. In this context, an instrumental variable must be correlated with financial literacy, but must not itself be affected by wealth.

Above, I also noted that, although financial test scores are strongly related to earnings, macroeconomic test scores are not. This result is intuitive, since those with greater resources do not necessarily have a greater incentive to acquire macroeconomic knowledge. Nevertheless, the correlation between financial knowledge and macroeconomic knowledge is extremely high. Thus, an individual's macroeconomic test score is a plausible instrument for his or her financial test score.

Table 8 contains the results of two regressions that explain a measure of retirement wealth as a function of demographics, economic characteristics, and financial knowledge.¹³ In the first of these, the potential endogeneity of the respondent's financial test score is ignored. As expected, there is a strong positive relation between wealth and the test score, even when one controls for a range of other household characteristics; however, this finding is consistent with the hypothesis that wealth causes the acquisition of financial knowledge. In the second regression, I treat the endogeneity of the financial test score by re-estimating the specification using two-stage least squares, where macroeconomic test score serves as the instrument. Note that the estimated effect of education is actually stronger in the second (instrumented) equation than in the first. Thus, a strong relation between wealth and financial knowledge persists even when the causal effects of wealth on the acquisition of knowledge are removed.

The relative sizes of the coefficients on the financial test score variable may at first seem surprising. Even if knowledge does affect saving, one might expect to observe a weaker relation between wealth and knowledge after using an instrumental variable to remove some of the factors that cause these variables to be related. However, one must also recall that the respondent's financial test score measures actual financial knowledge with error. For standard econometric reasons, this measurement

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TABLE 8 Regression Analysis Explaining a Measure of Accumulated Retirement Wealth

<i>Explanatory variable</i>	<i>Ordinary least squares estimates</i>	<i>Two-stage least squares estimates</i>
Financial test score	4.26 (1.35)*	7.26 (2.94) [†]
Married	0.266 (0.565)	0.130 (0.579)
Single male	0.005 (0.657)	-0.143 (0.672)
Black	0.109 (0.881)	0.270 (0.896)
Respondent's age	0.040 (0.028)	0.0412 (0.0282)
Number of children	-0.206 (0.140)	-0.219 (0.141)
Household earnings x 10 ⁶	3.23 (3.18)	2.45 (3.27)
High school only	1.34 (1.00)	1.20 (1.01)
High school plus	1.53 (0.99)	1.24 (1.02)
College degree	2.82 (1.00)*	2.37 (1.08) [†]
Constant	-9.69 (1.73)*	-11.4 (2.28)*

Source: Author's calculations. Sample taken from the 1993 Merrill Lynch Household Survey.
Notes: The dependent variable is $\ln[(RS + 1) / (EARN + 1)]$, where \ln is the natural log, RS is the stock of retirement savings, and EARN is total annual household earnings. I take logs in recognition of the fact that the distribution of wealth is extremely skewed, in order to reduce the influence of outliers. I add 1 to the numerator and denominator to assure that the argument is strictly positive. Standard errors are in parentheses.
 Statistical significance: * = 1% level, [†] = 5% level.

error biases the coefficient of financial knowledge toward zero. The use of an instrument treats both the endogeneity problem and the measurement error problem. Since these effects work in opposite directions, the coefficient of financial test score could, in theory, either rise or fall; in practice, it rises.

While these findings are consistent with the hypothesis that greater financial knowledge stimulates saving, my analysis has not proven causality. Even if there is no direct causal relation (in either direction) between macroeconomic knowledge and wealth, it is possible that these two variables are both systematically related to some unobserved third factor (e.g., the respondent's innate interest in economic issues). For this reason, it is particularly important to examine the effects of education directly.

Do Households Obtain Authoritative Advice and Guidance?

The fact that households are ill equipped to formulate complex, long-term financial plans does not necessarily imply that they will make poor decisions. In principle, individuals can seek advice and guidance from a variety of qualified sources, including professional financial planners. In practice, the market for professional guidance is highly imperfect (see Bernheim 1994b for a discussion of the reasons). Consequently, there is no reason to assume that the mere availability of qualified assistance translates into high-quality decision making. In this section, I examine empirical evidence concerning the extent to which households rely on different forms of guidance.

Table 9 summarizes data from the 1993 Merrill Lynch household survey concerning the relative importance of the five most common sources of financial information and advice (parents and other relatives, friends, personal judgment, financial professionals, and print media).¹⁴ As in previous sections, the data are disaggregated by age, gender, race, education, and earnings. A number of interesting patterns are readily apparent. Younger baby boomers tend to rely more on parents and relatives and less on their personal judgment. The use of financial professionals appears to peak between ages 35 and 40. For women, parents and relatives are by far the dominant source of financial information and advice. In contrast, for men, parents and relatives rank third behind personal judgment, but these differences may not be representative given the small size of the black subsample. Surprisingly, college-educated individuals are, if anything, slightly less likely to rely on their own personal judgment. Parents and relatives are also less important as sources of financial information and advice for those with college degrees. College education and earnings are both correlated with greater reliance on financial professionals and print media. Those with higher earnings also tend to seek less information and advice from friends. Although those in the lowest earnings quartile rely to a much greater extent on personal judgment, and to a lesser extent on parents and relatives, earnings bear little systematic relation to the use of these sources beyond the lowest quartile.

Given the general state of financial literacy, it is worrisome that so many individuals rely primarily on their own judgment. In the majority of cases, reliance on parents, relatives, and friends amounts to the blind leading the blind. It is therefore noteworthy that somewhere in the neighborhood of 60 percent of virtually every population subgroup relies primarily on parents, relatives, friends, and personal judgment. The fraction relying on financial professionals and print media does not exceed 40 per-

TABLE 9 Primary Sources of Financial Information and Advice

<i>Population subgroup</i>	<i>Parents/ relatives (%)</i>	<i>Friends (%)</i>	<i>Personal judgment (%)</i>	<i>Financial professional (%)</i>	<i>Print media (%)</i>
<i>Age</i>					
29-34	34.9	7.8	22.6	9.1	17.7
35-40	27.1	6.3	25.6	16.5	17.3
41-47	23.0	8.0	29.3	11.1	20.2
<i>Gender</i>					
Male	21.5	7.2	29.9	11.5	23.8
Female	34.6	7.7	22.2	13.1	13.3
<i>Race</i>					
White	28.0	7.6	24.9	13.3	20.0
Black	36.4	0.0	36.4	3.0	15.2
<i>Education</i>					
College degree	23.6	9.3	24.0	15.3	23.3
No college degree	31.1	6.2	27.3	10.4	15.3
<i>Earnings</i>					
First quartile	24.7	10.9	32.2	9.2	10.3
Second quartile	29.5	11.0	18.5	12.1	19.1
Third quartile	27.2	5.8	26.6	11.6	21.4
Fourth quartile	29.5	4.6	23.1	15.6	24.3

Source: Author's calculations. Sample taken from the 1993 Merrill Lynch Household Survey.

cent for any population subgroup. Thus, it seems likely that most individuals lack an authoritative, reliable source of information and advice.

The Effects of Retirement Education in the Workplace

At this point, it is useful to summarize a number of key findings. Most Americans are not making adequate financial preparations for their futures. As a result, financial vulnerabilities are widespread. Poor financial planning tends to be associated with a failure to appreciate these vulnerabilities. Households generally exhibit an excessive degree of optimism concerning their financial status. This perceptual failure may reflect a more general problem of financial illiteracy. Although those with high earnings and college degrees tend to obtain higher scores for financial literacy, their scores still indicate substantial deficiencies. Finally, most households do not compensate for the lack of financial decision-making skills by seeking and obtaining assistance from qualified authorities.

In the past few years, numerous companies—particularly those that

sponsor participant-directed plans—have moved to bridge the financial literacy gap by offering retirement education programs. In light of the evidence developed in the preceding sections, it is conceivable that these programs could have a significant impact on behavior. In this section, I review some of the existing evidence on this topic, and provide some new evidence.

Previous Studies

Much of the evidence on the effects of retirement education in the workplace is derived from qualitative surveys and case studies. According to Milne et al. (1995), 92 percent of 401(k) participants say that they read materials provided by their employers; of those, 44 percent say that they allocate their funds differently, and 33 percent say that they contribute more to their plans. Employers who enhanced their educational efforts also tend to report increases in participation (A. Foster Higgins & Co., Inc. 1994), and case studies frequently cite dramatic changes in behavior (Milne et al. 1995; Borleis and Wedell 1994).

Two recent studies provide formal econometric evidence on the effects of employer-based retirement education. One analysis, by Bernheim and Garrett (1996), is based on a fall 1994 Merrill Lynch household survey of roughly 2,000 individuals between the ages of 30 and 48. The authors examine the relations between various measures of saving and two key educational variables. The first measures whether the respondent's employer offers some sort of retirement education program, while the second indicates whether the respondent actually makes use of the program.

Conceptually, it may seem more appropriate to control for participation in educational programs, rather than the mere availability of such programs. The authors are concerned, however, about the possible effects of endogeneity. They provide various kinds of evidence in support of the proposition that education tends to be adopted as a remedial measure, and therefore is negatively correlated with factors that predispose respondents to save more. This means that cross-sectional relations between saving and the availability of education are probably conservative, in the sense that they understate the causal effect of education. It is conceivable, however, that the usage of education, conditional on availability, is positively correlated with the inclination to save. This could produce a spurious positive correlation between saving and educational usage.

Bernheim and Garrett's measures of employer-based retirement education are obviously coarse. Unfortunately, the 1994 Merrill Lynch household survey did not gather detailed descriptions of program structure and content. One must therefore view their study as an investigation of

TABLE 10 The Effects of Retirement Education in the Workplace: Results Based on a Survey of Households

	<i>Availability of education, incremental effect</i>	<i>Usage of education, incremental effect</i>
<i>Total saving rate (%)</i>		
First quartile	1.29*	1.83*
Median	1.65*	2.18*
Third quartile	0.82	1.04
<i>Retirement saving rate (%)</i>		
First quartile	0.60 [†]	1.50*
Median	0.92*	1.83*
Third quartile	0.94	1.62*
<i>Respondent's 401(k)</i>		
Participation rate (%)	11.8*	19.5*
Balances, first quartile	1,113 [†]	2,161*
Balances, median	2,508 [‡]	2,826*
Balances, third quartile	6,084 [†]	2,714
<i>Spouse's 401(k)</i>		
Participation rate (%)	9.5 [†]	8.0 [†]
Balances, first quartile	1,022 [†]	1,069*
Balances, median	420	1,205
Balances, third quartile	466	436

Source: Bernheim and Garrett (1996). Sample taken from the 1994 Merrill Lynch Household Survey.

Notes: Effects on saving rates and participation rates are measured in percentage points. Statistical significance: * = 99% level, [†] = 95% level, [‡] = 90% level.

the average effects of educational activities: it probably understates the effects of the best programs.

Key findings from Bernheim-Garrett are summarized in Table 10. Several robust patterns emerge. One is that the availability of education has a powerful effect on the typical respondent, raising the median total saving rate by 1.65 percent of income. This reflects a 28 percent increase over the median saving rate among those who do not have access to retirement education in the workplace (6 percent of income). Similarly, the median retirement saving rate rises by 0.92 percent of income, which is a 31 percent increase over the median retirement saving rate among those without access to employer-based retirement education (3 percent of income). Finally, median 401(k) balances increase by just over \$2,500, which represents a 50 percent increase over median 401(k) balances among those without access to retirement education (\$5,000). These

effects represent large proportional changes, relative to those for whom education is unavailable.

Another conclusion is that the estimated effects for usage of education are generally greater than those for availability. This stands to reason. However, it is worth reiterating that one should exercise caution when interpreting the results for usage. Perhaps the strongest results (both in terms of proportional effect and in terms of statistical significance) are obtained for those who are least inclined to save (i.e., at the first saving quartile of the population distribution). In contrast, little or no effect is usually detected among those who are most inclined to save (i.e., those at the third quartile). This is exactly what one expects to find. If education nudges each household toward an appropriate mode of behavior, its impact on low and average savers should bear little resemblance to its impact on high savers; even the sign of the effect could be different. One exception is the substantial positive effect of educational availability on respondents' 401(k) balances among high savers (\$6,084). It is particularly interesting that a stronger result is obtained for availability than for usage (\$2,714). There is, however, a natural explanation. High savers may be constrained by plan limits on 401(k) contributions that are necessitated by nondiscrimination requirements. If education induces other employees to contribute more, then the respondent can contribute more as well, irrespective of whether he or she makes use of the education. Under this hypothesis, the primary factor determining the effect of education on 401(k) contributions at the third quartile would be availability, rather than usage, exactly as the results indicate.

Additional results illustrate that education has a particularly powerful effect on rates of participation in 401(k) plans. This is consistent with other findings indicating that education is most effective at modifying the behavior of those who are least inclined to save. Finally, the availability (and usage) of education at the respondent's workplace appears to have positive spillovers on choices made in the context of a spouse's 401(k) plan. The effects are, however, smaller than for respondents, and only statistically significant among those least inclined to save (i.e., at the first quartile, and for participation rates).

A second study, by Bayer, Bernheim, and Scholz (1996), analyzes employer surveys fielded by KPMG Peat Marwick in 1993 and 1994. KPMG Peat Marwick annually surveys roughly 1,000 plan sponsors, approximately half of which have 401(k) plans. There is an effort to survey the same firms in consecutive years, so it is possible to use the surveys as a short panel. The analysis of employer survey data is complementary to Bernheim and Garrett's (1996) use of household survey data. With employer survey data, one cannot investigate the effects of education on

TABLE 11 The Effects of Frequent Retirement Seminars in the Workplace: Results Based on a Survey of Employers

<i>Incremental impact of frequent seminars on:</i>	<i>Non-highly compensated</i>	<i>Highly compensated</i>	<i>All employees</i>
<i>Participation rates (%)</i>			
No fixed effects	11.5*	6.4 [†]	8.2*
Fixed effects	12.1 [‡]	6.6	7.7 [‡]
<i>Contribution rates (%)</i>			
No fixed effects	0.8*	0.3	0.7*
Fixed effects	1.1 [†]	-0.1	0.4

Source: Bayer, Bernheim, and Scholz (1996). Sample taken from the KPMG Peat Marwick employer survey.

Note: The coefficients in this table measure the incremental effects of offering frequent retirement seminars in the workplace. Statistical significance: * = 99% level, [†] = 95% level, [‡] = 90% level.

saving outside of pension plans. However, offsetting this disadvantage, one has access to more detailed data on the nature of education in the workplace, and more accurate data on choices (participation and contributions).

One of the key findings in Bayer-Bernheim-Scholz is that firms tend to establish or enhance educational offerings when participation rates are low among non-highly compensated workers. This finding supports the hypothesis that education is generally remedial, in the sense that it is intended to address inadequate retirement saving. As a consequence, cross-sectional relations between plan activity and education will tend to understate the effects of education.

The KPMG Peat Marwick survey provides information on the type of education offered, as well as the frequency. Types of programs are divided into print media (newsletters, plan descriptions, etc.) and seminars. There is no indication in the data that either participation or contributions are affected by programs that rely on print media. However, there is strong evidence that seminars — particularly frequent ones — are effective.

Some of the central findings of Bayer-Bernheim-Scholz are summarized in Table 11. All results are based on the pooled 1993 and 1994 samples. In addition to educational seminars, each regression controls for other educational initiatives (through newsletters and summary plan descriptions), matching rates, loan provisions, the number of investment options offered, the existence of other pension plans, the number of employees at the firm, the fraction of employees covered by the 401(k), and year.

As indicated, some regressions control for firm-specific fixed effects, while others do not.¹⁵ Since employees' predispositions to save may differ systematically across firms, and since (as discussed above) these predispositions may be related to the employer's decision to offer retirement education, the inclusion of firm-specific fixed effects is potentially important. However, since the 1993 and 1994 samples are not identical, the inclusion of fixed effects significantly reduces sample size. Regressions without fixed effects are based on between 658 and 1,027 observations, while regressions with fixed effects are based on between 147 and 291 observations. Estimates with fixed effects therefore tend to be less precise. The inclusion of fixed effects may also increase the noise-to-signal ratio for the educational variable (measured changes may not be actual changes), which creates a bias that results in an understatement of the educational effect.

The coefficients reported in Table 11 measure the effects of instituting a program with frequent retirement seminars at a firm with no previous educational initiatives. An examination of these coefficients leads to two central conclusions. First, retirement seminars have substantial effects on overall rates of participation and contributions. Second, these effects appear to be concentrated among non-highly compensated employees. Although seminars may also affect the decisions of highly compensated employees, the evidence for this proposition is weak. The inclusion of fixed effects does not materially alter this qualitative picture, though (as expected) it does reduce the precision of the estimates.

Based on these estimates, one infers that the establishment of frequent seminars raises rates of participation for non-highly compensated employees by roughly 12 percentage points. To put this figure in perspective, consider the fact that the average participation rate among non-highly compensated employees is 59 percent for this sample. The contribution rate among non-highly compensated employees rises by roughly one percentage point (0.8 points without fixed effects, 1.1 points with fixed effects), which is large relative to an average contribution rate of 3 percent (for the non-highly compensated) in the sample. While participation rates for highly compensated employees rise by about 6 percentage points (versus an average of about 80 percent for the sample), there is little indication that education significantly affects the contribution rate of this group. For the reasons discussed above, these findings should be regarded as conservative.

Some New Evidence

More recently, I had an opportunity to design and administer a short survey to plan sponsors who attended a Merrill Lynch conference on

401(k)s. Surveys were mailed to the participants in advance of the conference so that respondents would have access to relevant company records. Approximately 200 employers were represented at the conference, of which roughly 20 percent (40 companies) completed surveys. While there is precedent in the academic literature for using small employer surveys to examine aspects of 401(k) plans (Papke, Petersen, and Poterba 1993), it is certainly natural to wonder whether the current survey is representative. It is possible to get some sense for this issue by comparing responses to those obtained from broader surveys.

Reported rates of participation in 401(k) plans averaged 71 percent, ranging from a low of 20 percent to a high of 98 percent; 89 percent match employee contributions, and 84 percent permit loans against plan balances. Of those providing education (78% of the total), 97 percent cover principles of asset allocation, 83 percent discuss retirement income needs, and 79 percent cover retirement income sources. All these numbers are similar to figures obtained from larger surveys that are regarded as representative.

Among respondents offering education, newsletters (69%) and other written materials (86%) were the most common forms of employee communications. However, more than half (55%) used seminars, 38% provided one-on-one counseling, 21 percent offered interactive software, and 16 percent sponsored participatory workshops. The most important reasons given for offering education, both among those with programs and among those thinking about establishing programs, were that "employees were not thinking enough about retirement" and to "increase participation generally." This reinforces the finding that education is remedial (and hence that cross-sectional relations between participation and education understate the effects of education).

Table 12 reports three regressions based on this 1995 survey. The first relates 401(k) participation rates to the availability of education, the availability of an employer match, the ability to take loans against plan balances, and the vintage of the 401(k) program (i.e., the number of years the program has been in effect). Despite the small size of the sample, the estimated effects of education and matching provisions are large and highly significant. Controlling for other factors, participation is, on average, 18.5 percentage points higher in firms that offer education. The estimated effects of matching and loan provisions are consistent with results based on the much larger KPMG Peat Marwick surveys. The regression also indicates that participation rates tend to be higher for older programs.

As discussed above, the survey also contained information on the type of education offered. Unfortunately, the sample size is too small to identify statistically significant differences between the effectiveness of differ-

TABLE 12 The Effects of Retirement Education in the Workplace:
New Regression Analysis

<i>Explanatory variable</i>	<i>Dependent variable</i>		
	<i>Participation rate (%)</i>	<i>Participation rate (%)</i>	<i>Change in participation rate</i>
Education	18.5 (7.6)*	13.2 (8.2)‡	12.0 (4.8)*
High frequency	—	11.9 (7.6)†	—
Match	23.6 (9.81)*	22.5 (9.6)*	5.0 (4.4)
Loan	-4.44 (9.15)	-9.1 (9.4)	-9.5 (4.5)*
Vintage	0.62 (0.35)†	0.46 (0.35)	—

Source: Author's calculations. Sample taken from the Merrill Lynch 401(k) Plan Sponsor Survey.

Note: The dependent variable is rate of participation. Effects are measured in percentage points. Statistical significance: * = 95% level, † = 90% level, ‡ = 85% level.

ent approaches. The one exception to this concerns the frequency of education interventions. Nearly one-third of respondents (32%) provide education monthly or quarterly, while 46 percent provide it at lower frequencies. The second regression in Table 12 adds a variable that indicates "high frequency" educational offerings, meaning programs with monthly or quarterly activities. The coefficients of "education" and "high frequency" are not estimated with a great deal of precision, owing to the small sample size. However, these estimates do provide some support for the view that frequency is a key determinant of impact. While the provision of low-frequency education raises participation rates on average by 13 percentage points, high-frequency education increases this rate on average by 25 points. This qualitative pattern is consistent with results based on the KPMG Peat Marwick survey.

The final regression in Table 12 is based on retrospective questions, which ask whether there have been any changes in educational offerings, matching rates, or loan provisions during the preceding five years. These variables are coded as +1 if the firm has become more aggressive or generous with respect to the activity in question, -1 if it has become less aggressive or generous, and 0 if there has been no change. Firms also reported their participation rates from five years before the survey was taken; using this response in combination with the current participation rate, I constructed the change in participation over a five-year period. This final regression is of considerable interest, since it removes one

important source of potential bias by controlling for firm fixed effects. In some ways, it is superior to the panel estimates based on the KPMG sample, in that it covers a longer time frame and in that differencing may not have as large an effect on the noise-to-signal ratios for the independent variables (since the questions on current and past plan provisions are answered by the same individual).

The results demonstrate that changes in education are strongly related to changes in participation. This finding is broadly consistent with the result obtained from cross-sectional estimates. Notably, the coefficient of education proves far more robust to differencing than the coefficients of matching provisions or loans. Once again, this result is qualitatively similar to that obtained with the KPMG Peat Marwick sample.¹⁶

Conclusion

This chapter reviews existing evidence and presents new evidence concerning the financial status of American workers. This evidence depicts a crisis in financial planning. Most Americans are not making prudent financial decisions. To a large extent, they are unaware of their financial vulnerabilities, and they lack the knowledge, sophistication, and/or authoritative guidance required to set them on the right track. The evidence suggests that improvements in economic and financial education and training could go a long way toward encouraging greater saving.

APPENDIX: Economic and Financial Test Questions

Financial knowledge

What is the current Dow Jones Industrial average?

For people who pay federal income taxes, what is the lowest income tax bracket?

What is the 30 year conventional mortgage rate right now?

If you deposited \$1,000 and earned 8%, compounded annually, over thirty years, at the end of this period would you have earned more or less than \$5,000?

Why do mutual funds typically have higher rates of return than federally insured bank CDS? (Options: (1) It's the law; (2) Mutual funds are bigger; (3) Mutual funds are riskier; (4) Inflation)

Which investment situation would you prefer: a chance to earn 8% when inflation is at 6%, or a chance to earn 5% when inflation is at 1%?

Macroeconomic knowledge

What is the current national unemployment rate?

What is the national minimum wage?

What is the annual rate of inflation?

What is the size of the total federal debt?

What is the size of the total federal debt per household?

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Notes

1. Although Kotlikoff, Spivak, and Summers (1982) dispute this finding, they attribute the adequacy of retirement preparation to an enormous unanticipated increase in Social Security benefits, rather than to adequate saving.

2. Even if baby boomers are unable to maintain their preretirement standards of living after retirement, they may still fare well in comparison to retirees of previous generations. According to a study conducted by the Congressional Budget Office (1993), baby boomers have significantly higher real incomes and greater accumulated wealth than their parents did at comparable ages. Kingson (1992), Easterlin, Schaeffer, and Macunovich (1993), Cantor and Yuengert (1994), and Yakoboski and Silverman (1994) have reached similar conclusions. While these findings appear to suggest that baby boomers are on track to match or exceed their parents' standard of living during retirement, caution is warranted for a number of reasons; see Bernheim (1994c).

3. See Bernheim (1993, 1994a, 1994b). Arthur D. Little, Inc. (1993) concurs that even those with pension plans typically will have only 50–60 percent of what they need to retire comfortably.

4. A study by Auerbach and Kotlikoff (1994) demonstrates that deep cuts in Social Security, or steep increases in taxes, will be required to achieve long-run fiscal balance between revenues and expenditures. Bernheim (1994a, 1995a) analyzes the importance of these policy scenarios for the adequacy of saving by baby boomers.

5. Shultz (1996). The article references a recently released survey of 520 plan sponsors, conducted by RogersCasey, a pension-consulting firm.

6. *Pensions and Investments* (1995).

7. See Bernheim (1995b) and Bernheim and Garrett (1996) for discussions of the accuracy and representativeness of the data contained in the Merrill Lynch household surveys.

8. The measure of wealth used in this analysis is total nonhousing wealth, including financial assets, real property, and business interests, net of debt. For married couples, I use the combined earnings of both spouses.

9. Formally, this is accomplished by estimating three quantile regressions (median, first quartile, and third quartile), explaining the wealth-to-earnings ratio as a function of household characteristics. Households are then placed into adjusted-wealth quartiles based on the relation between their actual wealth-to-earnings ratios and the fitted ratios from the quantile regressions.

10. See for example Walstad and Soper (1988), Walstad and Larsen (1992), Jordon (1993), the Consumer Federation of America and the American Express Company (1991), and Crenshaw (1993).

11. Suppose, for example, that we ask three individuals, A, B, and C, the same question. Suppose that the true answer is "5," that A answers "6," B answers "8," and C answers "0." Then A would receive a score of 100, B would receive a score of 67, and C would receive a score of 33.

12. The test of economic knowledge contained in the Merrill Lynch survey is obviously imperfect. Some discrepancies between self-assessed knowledge and test scores may be attributable to subtle biases. In particular, cultural bias may account for the disparate effects of race in Tables 3 and 6. Consider, for example, the question on the national unemployment rate. It is well known that survey respondents often reinterpret questions, providing answers that are more relevant to their own circumstances. Blacks might well report an unemployment figure that is accurate for blacks, but not for the general population. A closer inspection of answers to this particular question reveals that, although the median rate of unemployment reported by blacks and whites is identical (8 percent), a far larger fraction of blacks report rates in excess of 15 percent. Thus, it appears that a sizable minority of black respondents may be interpreting the question differently than intended, and providing an answer that is both more relevant, and more accurate, for their circumstances.

13. The dependent variable is $\ln[(RS+1)/(EARN+1)]$, where \ln is the natural log, RS is retirement savings, and EARN is total household earnings. I take logs in recognition of the fact that the distribution of wealth is extremely skewed, in order to reduce the influence of outliers. I add 1 to the numerator and denominator to assure that the argument is strictly positive.

14. One notable omission from this list is information disseminated by government agencies (e.g., the Social Security Administration). As sources of information and advice on financial planning, government sources ranked behind "prayer," which was volunteered by a surprising number of respondents.

15. When firm-specific fixed effects are omitted, we correct the estimated standard errors by allowing for a correlation between observations on the same firm.

16. The estimated effects of education are generally larger for the Merrill Lynch employer survey sample than for the KPMG Peat Marwick sample. It is certainly possible that firms in attendance at the Merrill Lynch conference tended to have more aggressive education programs than the typical firm. It is also possible that the conference sample measures vendor-specific effects. In either case, the results suggest that the impact of the best educational programs may be significantly larger than that of the average program, as inferred from the broader KPMG Peat Marwick sample.

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