

Part I

Financial Literacy and Financial Decision-Making

Chapter 2

Financial Literacy and Planning: Implications for Retirement Well-being

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Most older Americans are not at all confident about the efficacy of their efforts to save for retirement, and in fact one-third of adults in their 50s have failed to develop any kind of retirement saving plan at all (Lusardi, 1999, 2003; Yakoboski and Dickemper, 1997). What explains this low level of retirement preparedness? Why do people do such a poor job when it comes to designing and carrying out retirement saving plans? In this chapter, we explore the hypothesis that poor planning may be a primary result of financial illiteracy. That is, we evaluate whether those who report that they are unable to plan for retirement and/or who cannot carry out their retirement saving plans are also those who are least aware of fundamental economic concepts driving economic well-being over the life cycle.

While several prior studies offer suggestions about why people fail to plan for retirement, few examine the roles that planning and information costs might play in affecting retirement saving decisions. Others have offered evidence on related topics; for instance Calvert et al. (2007) show that more sophisticated households are more likely to buy equities and invest more efficiently,¹ and Hilgert et al. (2003) and Lusardi and Mitchell (2009) demonstrate strong links between financial knowledge and financial behavior. Our contribution reports on a special module on planning and financial literacy we designed for the 2004 Health and Retirement Study (HRS), which allows us to investigate how workers make their saving decisions, how they collect the information for making these decisions, and whether they possess the financial literacy needed to make these decisions. Using the responses to this survey, we argue that lack of literacy is critical because it has important consequences for lifetime well-being.

Methods and data

The conventional economic framework used to model consumption and saving decisions posits that rational and foresighted consumers derive

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utility from consumption and leisure over the lifetime. In its simplest format, the consumer's problem is modeled in terms of lifetime expected utility or the expected value of the sum of per-period utility $U(c_j)$ discounted to the present (with discount factor β), multiplied by the probability of survival p_j from the worker's current age j to the oldest possible lifetime D :

$$E \left[\sum_{j=s}^D \beta^{j-s} U(c_j) \right].$$

Per-period assets and consumption (a_j and c_j) are determined endogenously by maximizing this function subject to an intertemporal budget constraint; here e_j is labor earnings, ra_j represents the household's returns on assets a_j , and SS and PP represent the household's Social Security benefits and pensions, which depend on the worker's retirement (R) age:

$$y_j = e_j + ra_j, \quad j \in \{s, \dots, R-1\}$$

and

$$y_j = SS_j(R) + PP_j(R) + ra_j, \quad j \in [R, \dots, D].$$

Furthermore, consumption depends on income, assets, and benefits so that:²

$$c_j + a_{j+1} = y_j + a_j, \quad j \in [S, \dots, R-1] \text{ before retirement}(R)$$

and

$$c_j + a_{j+1} = y_j + a_j, \quad j \in [R, \dots, D] \text{ from retirement to death } (D).$$

In other words, the economic model posits that the consumer holds expectations regarding prospective survival probabilities, discount rates, investment returns, earnings, pensions, Social Security benefits, and inflation. Further, the consumer is assumed to use that information to formulate and execute optimal consumption and saving plans.

This formulation makes it clear that saving for retirement requires substantial information and financial literacy, as well as the tools to plan and implement retirement saving plans. But whether 'real people' can meet this challenge is a topic of substantial current interest, and it is particularly important in view of the trend of workers taking responsibility to save, manage their pension investments, and draw down their retirement assets in a self-managed retirement environment. To further investigate the links between the sources of information on which households rely and financial literacy and planning, we designed a special module on

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retirement planning to assess levels of financial literacy along with consumers' efforts to budget, calculate, and develop retirement saving plans. We implement this in the context of the HRS, a nationally representative longitudinal dataset of Americans over the age of 50. This survey, conducted every two years since 1992, is designed to address these questions by tracking health, assets, liabilities, and patterns of well-being in older households. The core survey consists of a 90-minute core questionnaire administered to age-eligible respondents and their spouses. In addition, our special financial literacy and planning module included three questions on financial literacy, as follows:

- Suppose you had \$100 in a savings account and the interest rate was 2 percent per year. After five years, how much do you think you would have in the account if you left the money to grow: more than \$102, exactly \$102, less than \$102? I do not know; I refuse to answer.
- Imagine that the interest rate on your savings account was 1 percent per year and inflation was 2 percent per year. After one year, would you be able to buy more than, exactly the same as, or less than today with the money in this account? I do not know; I refuse to answer.
- Do you think that the following statement is true or false? 'Buying a single company stock usually provides a safer return than a stock mutual fund.' I do not know; I refuse to answer.

The first two questions we refer to as the 'Interest Rate' and 'Inflation' items, and they indicate whether respondents command key economic concepts fundamental to saving. The third question, which we dub 'Stock Risk', evaluates knowledge of risk diversification, crucial to informed investment decisions.

We also ask respondents how they calculate retirement saving needs. To do so, we replicate a question on whether people plan for retirement asked by Employee Benefits Research Institute (EBRI) in its Retirement Confidence Survey and in TIAA-CREF surveys (Ameriks et al., 2003; EBRI, 1996, 2001). We also ask whether people ever assessed their retirement saving needs and what followed from such assessment. The three HRS modular questions on retirement planning are as follows:

- Have you ever tried to figure out how much your household would need to save for retirement?
- Did you develop a plan for retirement saving?
- How often were you able to stick to this plan: would you say always, mostly, rarely, or never?

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Last, we assess what tools people use to devise and carry out their retirement saving plans. Specifically, we inquire whether respondents contact friends, relatives, or experts, and whether they use retirement calculators. Further, we ask whether respondents track their spending and set spending budgets. The specific planning tools questions are as follows:

- Tell me about the ways you tried to figure out how much your household would need.
 - Did you talk to family and relatives?
 - Did you talk to coworkers or friends?
 - Did you use calculators or worksheets that are computer- or Internet-based?
 - Did you consult a financial planner or advisor or an accountant?
- How often do you keep track of your actual spending: would you say always, mostly, rarely, or never?
- How often do you set budget targets for your spending: would you say always, mostly, rarely, or never?

Using respondents' answers to these questions, along with information of their socio-demographic characteristics, we can assess the prevalence of financial literacy, retirement calculations, and the planning tools people deploy to devise and execute their plans. In addition, we determine whether those who lack knowledge of basic economic concepts also seem to be those who have particular difficulty devising plans and carrying them out in practice. In what follows, we offer both tabular and multivariate analysis of the data, so as to evaluate whether those who are more financially literate are also more likely to plan and be successful planners.

Financial literacy results

Our first set of findings on financial literacy among this sample of older Americans is reported in Panel 1 of Table 2.1, where we see that only two-thirds of the respondents can do simple calculations related to interest rates.³ This is a discouraging finding inasmuch as this generation in its 50s and 60s has made many important financial decisions over its lifetime. More of the respondents—three-quarters—can answer the inflation question correctly and understand they would be able to buy less after a year if the interest rate was 1 percent and inflation 2 percent. Yet only half of the respondents know that holding a single company stock implies a riskier return than a stock mutual fund. It is also of interest to distinguish between those who can give a correct answer, versus those giving either an incorrect answer or saying they 'don't know' (DK). Interestingly, the proportion of

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TABLE 2.1 Financial literacy patterns in the Health and Retirement Study

	Correct	Incorrect	Don't know	Refuse
<i>Panel 1: Distribution of responses on financial literacy questions (%)</i>				
Interest rate	67.1	22.2	9.4	1.3
Inflation	75.2	13.4	9.9	1.5
Stock risk	52.3	13.2	33.7	0.9
<i>Panel 2: Joint probabilities of being correct on financial literacy questions (%)</i>				
	All three responses correct	Only two responses correct	Only one response correct	No responses correct
Proportion	34.3	35.8	16.3	9.9

Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

incorrect/DK responses varies according to the question. For example, only 9 percent did not know about interest rate calculations, but more than one-fifth (22 percent) gave an incorrect answer. On the inflation question, 10 percent did not know, while 13 percent gave a wrong answer. The question about stock risk elicited the most DKs: one-third (34 percent) of the sample did not know, while a smaller fraction (13 percent) gave a wrong answer.

Inasmuch as the first two questions are crucial to financial numeracy, it is disturbing that only slightly over half (56 percent) of the sample gets *both* questions right. Also disturbing is the fact that only one-third (34 percent) of respondents can correctly answer all three questions and 36 percent can answer only two questions correctly (see Panel 2). Another interesting finding is that the 'DK' responses are highly correlated: that is, financial illiteracy is systematic across areas examined. For instance, there is a 70 percent correlation between those who cannot answer both the interest rate question and the inflation question. Erroneous answers are more scattered, with mistakes having a correlation of only 11 percent.⁴

These results reinforce other US findings on older respondents (cf. Bernheim, 1995, 1998; Hogarth and Hilgert, 2002; Moore, 2003; Lusardi and Mitchell, 2007*b*, 2007*c*). These authors tend to concur that such individuals often fail to understand key financial concepts, particularly relating to bonds, stocks, mutual funds, and the working of compound interest; they also report that these people often do not understand loans (and in particular, mortgages).⁵ The same is true of younger Americans: the National Council on Economic Education (NCEE, 2005) study of high-school students and working-age adults in 2005 revealed a widespread lack of knowledge of fundamental economic concepts. Similar results for US high school students are reported by Mandell (2004) and for young adults

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by Lusardi et al. (2010).⁶ Clearly, the news is far from positive: Americans' financial literacy levels are low.

Who is financially literate? Next we evaluate the extent of heterogeneity in financial knowledge across demographic groups. Specifically, we are interested in whether knowledge patterns differ by race/ethnicity and education, as depicted in Figure 2.1. A first point to note is the differences in knowledge between Whites, Blacks, and Hispanics.⁷ Specifically, fewer than half of the Hispanics can answer correctly the interest rate question, and a sizable fraction of the remainder stated they did not know the answer. This is a potentially important result in view of the fact that many Hispanics tend to be unbanked and do not hold checking accounts (Hogarth et al., 2004). A similar pattern emerges with the question about inflation, where again Hispanics are least likely to answer correctly. As far as risk diversification is concerned, Hispanics and Blacks both display difficulty answering this question: only one-third (37 percent) of the Blacks responded correctly, and over 40 percent did not know the answer to this question. This may shed further light on why so many Blacks do not hold stocks (Haliassos and Bertaut, 1995).

Differences in financial knowledge across education groups are represented in Figure 2.2, and the patterns confirm expectations that financial literacy is highly and positively correlated with schooling. Most importantly, financial illiteracy is most acute for those with less than a high school

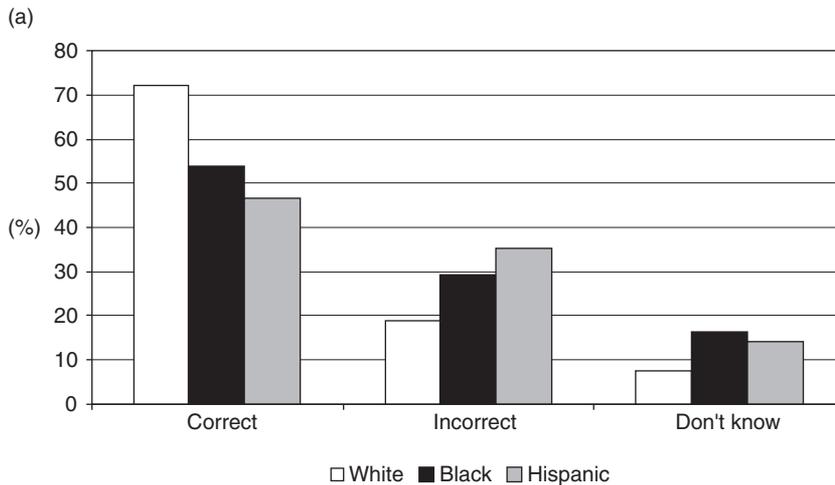


Figure 2.1 Distribution of survey responses across race. Panel A: interest rate

Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

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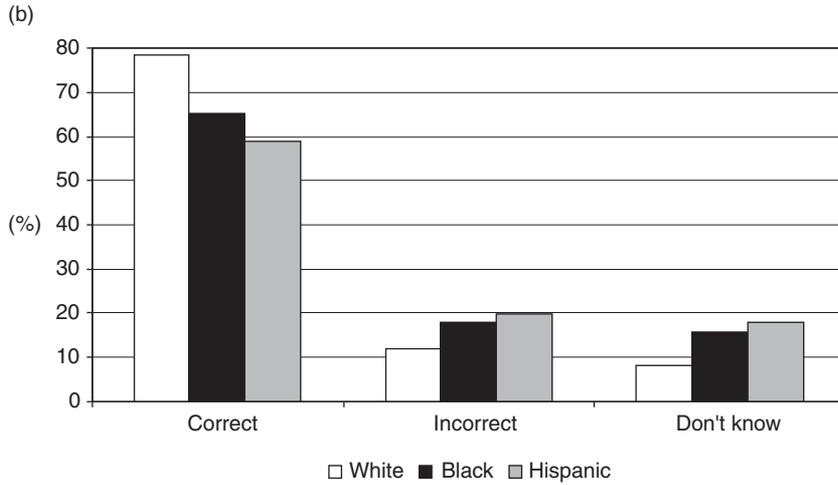


Figure 2.1 Distribution of survey responses across race. Panel B: inflation
Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

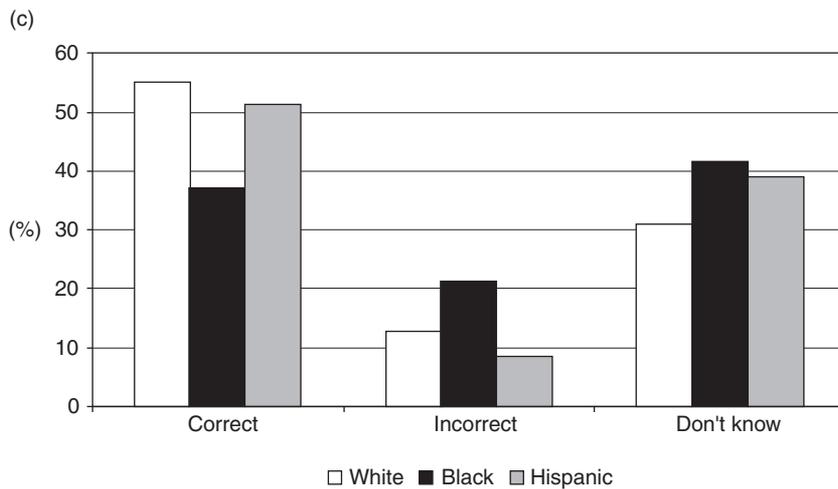


Figure 2.1 Distribution of survey responses across race. Panel C: stock risk
Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

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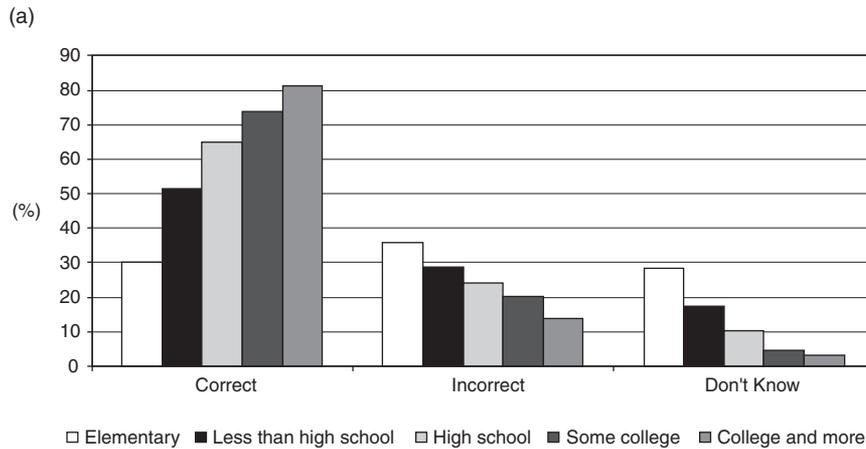


Figure 2.2 Distribution of survey responses across education. Panel A: interest rate
 Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

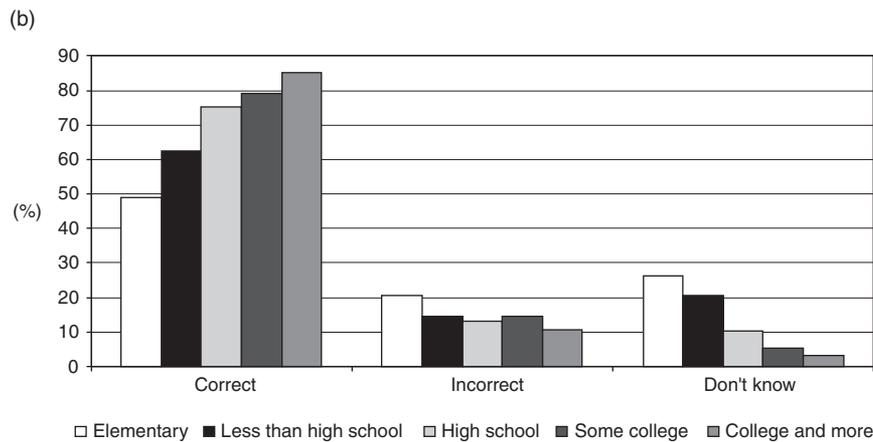


Figure 2.2 Distribution of survey responses across education. Panel B: inflation
 Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

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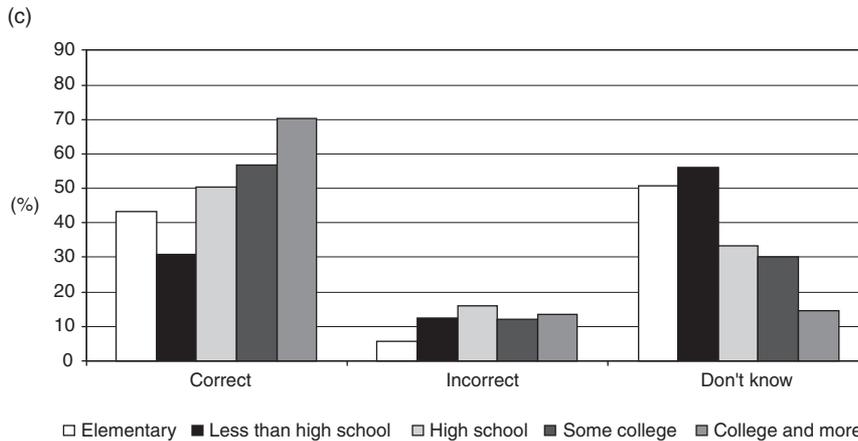


Figure 2.2 Distribution of survey responses across education. Panel C: stock risk
 Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

degree, and less than one-third of respondents with only elementary education could correctly answer the question about interest rates (another one-third did not know). The prevalence of correct answers to the interest rate question rises with education, while the proportion of both incorrect answers and DKs falls. A similar pattern characterizes answers to the inflation question, where those lacking a high school education are much more often incorrect or cannot answer the question. Turning to the risk diversification question, only those with at least a college degree display a high proportion of correct answers, though even here, almost one-third of these did not know the answer or answered incorrectly to this question. Among the less educated, the proportion of DK was particularly high; over half of those with less than high school education reported they did not know the answer to these questions.

Figure 2.3 reveals response patterns by sex, where the results confirm that women are generally less financially knowledgeable than men (cf. Lusardi and Mitchell, 2008). Concerning risk diversification, women are less likely to respond correctly to the question compared to men, and are more likely to not know the answer, rather than answering incorrectly. Also fewer women can answer all questions correctly compared to men.

For brevity, we merely summarize other financial literacy results along other dimensions. Findings worth highlighting include the fact that the leading edge of the Baby-Boomers (age 51–56 in 2004) was not very knowledgeable about inflation, perhaps a result of their limited historical

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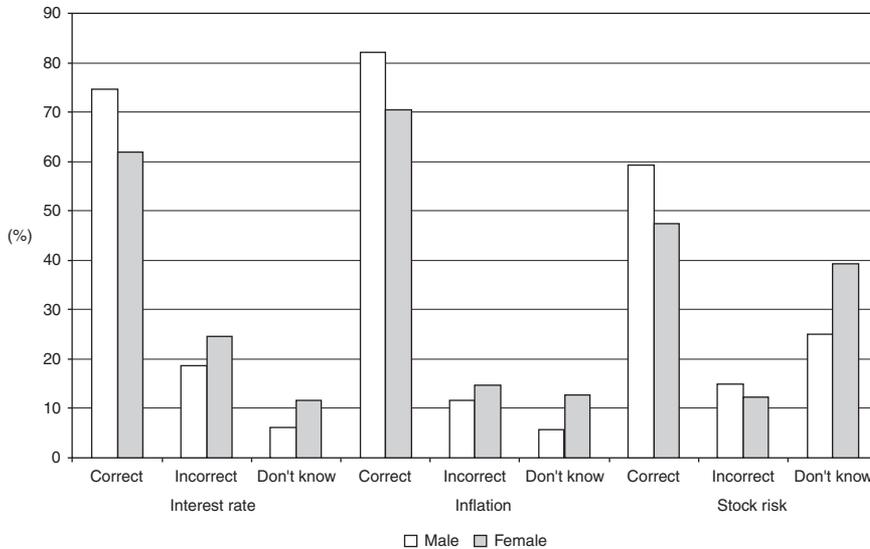


Figure 2.3 Distribution of survey responses across gender

Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

exposure to inflation or the fact they were in their 20s in the high inflation period during the 1970s and early 1980s. Moreover, financial literacy decreases sharply at an old age (for older cohorts). While it is not possible to distinguish between age and cohort effects in a single cross-section, older individuals/generations display lower financial knowledge than individuals in their 50s.

Findings for retirement planning

Next, we turn to an assessment of some of the other predictions of the canonic economic model, including the hypothesis that people look ahead and calculate how much they need to save for retirement. To this end, our HRS modules ask respondents whether they ever tried to figure out how much they need to save for retirement, and Table 2.2 reports the results. Somewhat discouragingly, less than one-third of the sample respondents (31 percent) indicated that they actually attempted to do a retirement saving calculation; these we call the *Simple Planners*. The small size of this group confirms summaries of older HRS waves, where many people indicated they had given little thought to retirement, even when they were just a

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TABLE 2.2 Prevalence of retirement planning calculations in the Health and Retirement Study

Question	Response				
<i>Panel 1: Proportion of planners in respective subgroups (%)</i>					
	Yes	No	Refuse/ Don't know		
Did you try to figure out how much to save for retirement?	31.3	67.8	0.9		
	Yes	More or less	No	Refuse/ Don't know	
Did you develop a plan?	58.4	9.0	32.0	0.6	
	Always	Mostly	Rarely	Never	Refuse/ Don't know
Were you able to stick to the plan?	37.7	50.0	8.0	2.6	1.0
<i>Panel 2: Proportion of planners in the full sample (%)</i>					
	Yes				
<i>Simple Planners:</i> Did you try to figure out how much to save for retirement?	31.3				
	Yes or more or less				
<i>Serious Planners:</i> Did you develop a plan?	21.1				
	Always or mostly				
<i>Successful Planners:</i> Were you able to stick to the plan?	18.5				

Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

few years away from leaving the workforce (Lusardi, 1999, 2002, 2003). Our results also confirm a widespread lack of retirement planning, even among the educated (Yakoboski and Dickemper, 1997; Ameriks et al., 2004). It is also consistent with work by Mitchell (1988) and Gustman and Steinmeier (1999), who found that workers seem to know very little about their Social Security and pension benefits, two of the most important components of retirement wealth. In fact, close to half of workers in the HRS analyzed by Gustman and Steinmeier (2004) could not report their type of pension plan, and an even larger portion was ignorant of future Social Security benefits.⁸

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A key advantage of our module, compared to previous core HRS questions and other surveys, is that we probe further to inquire about the outcomes associated with undertaking planning and related calculations. Panel 1 of Table 2.2 indicates that only 58 percent of those who tried to develop a plan actually did so, while a small group ‘more or less’ developed a plan (9 percent). Both of these groups we refer to later as the *Serious Planners*. The high failure rate, so far as developing a plan is concerned, underscores the fact that retirement projections are difficult to do. If we consider those who responded positively to the question, as many as half of Simple Planners did not succeed in developing a plan, another disappointing finding. Furthermore, of the subset of Serious Planners, only one-third (38 percent) were always able to stick to their plan, while half were ‘mostly’ able to stick to their plans (later we call these respondents *Successful Planners*). In the sample as a whole, this represents a meager 19 percent rate of successful planning. Of course, households may face unexpected shocks, making them deviate from plans, but the fact remains that few respondents do what the economic models suggest that they should. In other words, planning for retirement is difficult, few do it, and fewer still think they get it right.

To further evaluate what planning means and what people actually do when planning for retirement, we also asked respondents to indicate which tools they used in the process. It is possible that those who used crude or inaccurate tools were also those who had low planning success. In fact, respondents used a wide variety of tools to calculate their retirement needs (see Panel 1 of Table 2.3; note that these questions were asked only to those who reported they attempted retirement saving calculations). Results show that between one-quarter and one-fifth of respondents talked to family/relatives or coworkers/friends, while one-third or more used formal means such as retirement calculators, retirement seminars, or financial experts. *Successful Planners* were more likely to use formal means (over 40 percent), whereas *Simple Planners*—some of whom tried and failed—tended to rely on less formal approaches. The table also shows that financial literacy is correlated with planning tools, although unevenly. The list of tools does not exhaust what people might do; in fact, as many as one-quarter of the self-reported planners indicated that they did not use any of the listed tools.

Those who were correct regarding interest rate and inflation were more likely to have attended a retirement seminar, suggesting that such seminars may provide information (without further control variables we cannot hold constant other background variables). Those knowledgeable about risk diversification also tend to use formal rather than informal tools for planning. Panel 2 of Table 2.3 also reveals what the correlations were between planners’ levels of financial literacy and the tools they used in their planning efforts. Those who used more sophisticated tools were always more likely to get the literacy questions right, as compared to

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TABLE 2.3 Links between planning tools, planning success, and financial literacy in the Health and Retirement Study

Link	Response					
<i>Panel 1: Tools planners report using (% and correlation)</i>						
	Simple Planners (n = 397)	Successful Planners (n = 235)				
Talk to family or friends	21.1 (0.409)	17.4 (0.380)				
Talk to coworkers or friends	24.7 (0.432)	21.3 (0.410)				
Attend retirement seminar	35.3 (0.479)	40.4 (0.492)				
Use calculator or worksheet	37.8 (0.485)	43.4 (0.497)				
Consult financial planner	39.0 (0.488)	49.4 (0.501)				
<i>Panel 2: Correlation between planning, tools used, and financial literacy (%)</i>						
	Simple Planners (n = 397)	Talk to family or friends (n = 84)	Talk to coworkers or friends (n = 98)	Attend retirement seminar (n = 140)	Use Calculator or worksheet (n = 150)	Consult financial planner (n = 155)
Correct on interest rate	75.3	65.5	69.4	77.9	83.3	80.6
Correct on inflation	84.4	82.1	88.8	88.6	89.3	86.5
Correct on stock risk	52.2	65.5	71.4	80.0	79.3	73.5
<i>Panel 3: Budgeting questions: all respondents (%)</i>						
	Always	Mostly	Rarely	Never	Refuse/ Don't know	
Track spending	43.2	30.8	14.7	11.0	0.3	
Set spending budget	23.6	27.6	22.4	26.0	0.5	

Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

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TABLE 2.4 Planning and wealth holdings in the Health and Retirement Study (US\$ 2004)

	Nonplanners	Simple Planners	Serious Planners	Successful Planners
25th percentile	30,400	107,750	171,000	197,500
Median	122,000	307,750	370,000	410,000
75th percentile	334,500	641,000	715,000	781,500
Mean	338,418	742,843	910,382	1,002,975

Notes: This table reports the distribution of total net worth across different planning types. ‘Simple’ Planners are those who tried to calculate how much they need to save for retirement; ‘Serious’ Planners are those who were able to develop a saving plan; and ‘Successful’ Planners are those who were able to stick to their saving plan. The total number of observations is 1,269. *Source:* Authors’ calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

those who relied on personal communications; furthermore, the knowledge gap was relatively the greatest for the interest rate question. Panel 3 shows that a very large segment—almost three-quarters (74 percent) of the respondent pool—indicates that it always or mostly tracks its spending, and over half (51 percent) always or mostly tries to set spending budget targets. This is impressive, given the low level of planning for retirement. It is unclear whether those undertaking the spending budget efforts did so simply to get through the month without running out of money, or whether these efforts indicate a greater sensitivity of retirement saving needs and plans.

Prior work has established that planning has important implications for wealth accumulation (Lusardi and Mitchell, 2007*a*, 2007*b*). To this end, we report the distribution of total net worth across different planning types in Table 2.4, and emphasize that, at the median, planners accumulate three times the amount of wealth than nonplanners. Moreover, the amount of planning also matters: those who are able to develop a plan and those who can stick to the plan accumulate much more wealth than Simple Planners.

Linking financial literacy and planning

One reason people fail to plan for retirement, or do so unsuccessfully, may be because they are financially illiterate. In this case, they may fail to appreciate the role of (or may have a hard time solving problems with) interest rate calculations, inflation, and risk diversification. Table 2.5 sheds light on the importance of financial literacy and its relationship with planning in a multivariate Probit analysis of three dependent variables:

TABLE 2.5 Probit analysis of Simple, Serious, and Successful Planners in the Health and Retirement Study (marginal effects reported)

	Simple Planners (<i>n</i> = 1,269)			Serious Planners (<i>n</i> = 1,269)			Successful Planners (<i>n</i> = 1,269)		
	I	II	III	I	II	III	I	II	III
Correct on interest rate	0.068** (0.028)	0.032 (0.031)	0.024 (0.032)	0.064** (0.024)	0.037 (0.025)	0.004 (0.027)	0.061** (0.022)	0.037 (0.024)	0.007 (0.024)
Correct on inflation	0.104*** (0.03)	0.079** (0.035)	0.053 (0.037)	0.073*** (0.026)	0.057* (0.029)	0.038 (0.030)	0.072*** (0.024)	0.062** (0.027)	0.043 (0.027)
Correct on stock risk	0.165*** (0.026)	0.109*** (0.038)	0.094*** (0.038)	0.155*** (0.022)	0.101*** (0.032)	0.086*** (0.032)	0.137*** (0.021)	0.088*** (0.031)	0.067*** (0.029)
Don't know interest rate		-0.171** (0.056)	-0.162*** (0.056)		-0.138** (0.042)	-0.127** (0.040)		-0.130** (0.036)	-0.117** (0.032)
Don't know inflation		0.025 (0.080)	0.035 (0.081)		0.036 (0.077)	0.047 (0.078)		0.057 (0.078)	0.068 (0.079)
Don't know stock risk		-0.071* (0.042)	-0.044 (0.043)		-0.070* (0.035)	-0.044 (0.036)		-0.064* (0.033)	-0.038 (0.33)
Demographics	No	No	Yes	No	No	Yes	No	No	Yes
Pseudo R^2	0.048	0.056	0.107	0.060	0.069	0.133	0.060	0.069	0.142

* Estimated coefficient significant at the 10 percent level.
 ** Estimated coefficient significant at the 5 percent level.
 *** Estimated coefficient significant at the 1 percent level.

Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

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who was a planner, who developed a plan, and who was able to stick to a plan.⁹ Column I in each case takes on a value of 1 if the respondent was correct regarding the literacy variables (0 otherwise); Column II adds an indicator equal to 1 if the respondent indicated he or she did not know the answer to the question (0 otherwise); and Column III has the same dependent variable, but adds controls for demographics and specifically age, race, gender, educational attainment, and a dummy for being a Baby-Boomer (the table reports marginal effects).

The reported estimates are interesting along several dimensions. First, financial literacy is strongly and positively associated with planning, and the results are statistically significant at conventional levels. That is, planners of all types are much more likely to give a correct answer to our financial literacy questions (Column I). Second, knowledge about risk diversification best differentiates between sophisticated and unsophisticated respondents. Not only does it have a much larger estimated marginal effect than being able to correctly answer the interest and the inflation questions, but it also remains statistically significant, even after accounting for the demographic characteristics of the respondent. Third, lack of knowledge also matters. Even with respect to those answering incorrectly, those who cannot answer the questions are much less likely to plan and to succeed in their planning effort (Column II). What appears most crucial is a lack of knowledge about the interest rate, which makes sense, as basic numeracy is crucial for doing calculations about retirement saving. Column III reports estimates after controlling for demographic characteristics, and some indicators of financial literacy remain statistically significant even after we account for these factors. For example, financial literacy is clearly linked to planning above and beyond the effect of education. Accordingly, the information provided in the financial literacy variables may prove very useful in explaining the differences we observe among households in their behavior toward retirement wealth accumulation, to which we now turn.

Wealth accumulation and financial literacy

If financial illiteracy leads to poor or no planning, it may also affect wealth accumulation. Lusardi (2003) finds that those who plan accumulate more wealth before retirement and are more likely to invest in stocks. Moreover, planners are more likely to experience a satisfying retirement, perhaps because they have higher financial resources to rely on after they stop working. In Table 2.6 (Panel 1), we report estimates from a simple regression of total net worth on the three dummies measuring financial literacy and a set of demographic characteristics. Here, wealth is defined as the sum of checking and saving accounts, certificate of deposits and other short-

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TABLE 2.6 Wealth accumulation and financial literacy in the Health and Retirement Study

	Total sample	1st quartile	Median	3rd quartile
<i>Panel 1: OLS and quantile regressions</i>				
Correct on interest rate	40.85 (25.66)	19.72 (16.91)	29.18*** (10.43)	21.29 (27.28)
Correct on inflation	31.23 (27.71)	3.44 (7.54)	17.96 (11.28)	34.51 (29.39)
Correct on stock risk	11.68 (23.79)	19.39*** (6.44)	26.95*** (9.67)	20.73 (26.31)
Demographics	Yes	Yes	Yes	Yes
Pseudo R^2	0.32	0.14	0.20	0.24
<i>Panel 2: Probit analysis of stock ownership</i>				
	Total sample	Low education	High education	
Correct on interest rate	0.064** (0.030)	0.041 (0.030)	0.101* (0.051)	
Correct on inflation	0.035 (0.033)	0.001 (0.037)	0.027 (0.057)	
Correct on stock risk	0.121*** (0.027)	0.077** (0.032)	0.202*** (0.042)	
Demographics and wealth	Yes	Yes	Yes	
Pseudo R^2	0.173	0.257	0.168	

* Estimated coefficient significant at the 10 percent level.

** Estimated coefficient significant at the 5 percent level.

*** Estimated coefficient significant at the 1 percent level.

Source: Authors' calculations based on unweighted data from the 2004 Health and Retirement Study, Planning Module; see text.

terms assets, bonds, stocks, other assets, housing equity, other real estate, IRAs and Keoghs, business equity, and vehicles minus all debts.¹⁰ Controls include age, sex, race, education attainment, marital status, place of birth, and income. We estimate the model in both the full sample and also for quartiles of the wealth distribution.

The results indicate that financial illiteracy is particularly pronounced among those with low income, low education, and low wealth holdings. Further, financial literacy is positively correlated with wealth at the bottom of the wealth distribution, which suggests that those who have basic financial knowledge are better able to save. Those having a command of basic numeracy and who understand risk diversification also have higher wealth holdings, something of a remarkable result, given that we control for several of the demographic characteristics that elsewhere have been linked to low financial literacy (race, gender, and low income); we also account for educational attainment.

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Panel 2 of Table 2.6 reports estimates from a Probit model of stock ownership. The hypothesis here is that financial literacy will be influential over portfolio choice: if investors do not understand interest rate, inflation, or risk diversification, they are less likely to invest in complex assets such as stocks. We control for the socio-demographics listed earlier and additionally add total net worth. The findings indicate a strong positive correlation between stock ownership and knowledge of risk diversification, for both the total sample and across education groups. Basic numeracy (interest rate calculations) also plays a role, but mostly for those with high education (defined as having more than a high school degree); this is true even after accounting for education and total net worth. These findings may help explain the ‘puzzle’ of why so few households hold stocks (Haliassos and Bertaut, 1995). Moreover, they may shed light on another puzzling finding in household surveys such as the Survey of Consumer Finances. When asked how much risk respondents are willing to take, a large majority (more than 60 percent) state they are unwilling to take any financial risk. This may be due not only to strong risk aversion but also to the fact that many respondents do not understand risk diversification.

Conclusion

As more individuals approach and cross over the retirement threshold, it is crucial to ascertain whether they actually know how to plan for retirement and whether they seem able to execute these plans effectively. Our HRS module is informative in this regard, as it asks about people’s basic financial literacy in terms of their comprehension of interest rate and inflation, along with the more nuanced concept of risk diversification. It is disturbing that only half of the respondents can correctly answer questions regarding interest rate calculations and inflation, and only one-third can correctly answer both of those two questions and a question about risk diversification. This suggests widespread financial illiteracy among older Americans. When we examine whether people tried to figure out how much they need to save for retirement, whether they devised a plan, and whether they succeeded at the plan, the news is also not good. Less than one-third of this cohort on the verge of retirement had ever tried to come up with a retirement plan, and only two-thirds of these succeeded. In the sample as a whole, less than one in five of these older Americans engaged in successful retirement planning.

Furthermore, we show that financial knowledge and planning are clearly interrelated, and keeping track of spending and budgeting appears conducive to retirement saving. Finally, we evaluate the planning tools people use. It is interesting that the respondents who did plan were *less* likely to

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talk to family/relatives or coworkers/friends, and more likely to use formal means such as retirement calculators, retirement seminars, or financial experts. Inasmuch as planning is an important predictor of saving and investment success, we may have uncovered an important explanation for why household wealth holdings differ, and why some people enter retirement with very low wealth (Mitchell and Moore, 1998; Lusardi, 1999; Moore and Mitchell, 2000; Venti and Wise, 2001). The empirical analysis here suggests that financial literacy can play a key role on both saving and portfolio choice.

Our work has relevance for policy in several directions. First, there has been a long-term growth in financial planning products and service providers (Hung et al., 2011). Further, governments and nonprofits have sponsored programs to spur financial education, and employers are increasingly offering retirement seminars to their workers as well (Clark and D'Ambrosio, 2008; Clark et al., 2011; Collins, 2011). While some researchers suggest that such programs will have only minimal effects on saving, our work suggests that this may be due to the lack of well-targeted content. For example, if financial illiteracy is widespread among particular subsets of employees, a one-time financial education lesson may be insufficient to influence planning and saving decisions. Conversely, education programs targeted specifically to particular subgroups may be better suited to address substantial differences in preferences and saving needs.

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Endnotes

- ¹ See Campbell (2006) for an excellent discussion of the myriad problems households face when making financial decisions.
- ² In conventional economic models, assets in the last period of life will not exceed zero and the consumer does not die in debt.
- ³ Note that these data are derived from an experimental module of the 2004 HRS sample of persons age 50 and older.
- ⁴ For brevity, these tables are not reported.
- ⁵ Other surveys also find similar results concerning knowledge regarding properties of bonds, stocks, and mutual funds (see Agnew and Szykman, 2005).
- ⁶ Similar findings are found internationally; for instance, Miles (2004) shows that UK borrowers also display poor understanding of mortgages and interest rates, and Christelis et al. (2010) use SHARE surveys from several European countries to show that these respondents also score low on financial numeracy and literacy scales.
- ⁷ For brevity, we exclude other minority groups and exclude those who do not answer the questions (a small group).
- ⁸ There is also evidence that knowledge about pensions and Social Security affects retirement decisions; see Chan and Stevens (2003), Duflo and Saez (2003, 2004), and Mastrobuoni (2005).
- ⁹ It is possible that causality may also go the other way: that is, those who plan may also become more financially literate and develop the ability to do retirement calculations; for discussion of endogeneity considerations, see Lusardi and Mitchell (2007a).
- ¹⁰ The analysis herein uses the 2004 wealth data, which included imputes for those who did not report assets or debt.

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