

# Retirement Consumption: Survey Evidence on Expectations and Outcomes

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## Abstract

We present results from a new survey concerning retirement consumption. We find that the expected level of retirement consumption among working households is significantly lower than that reported by those already retired. We confirm that unexpected stock market appreciation plays a significant role in explaining the gap between expectation and outcome. Surprisingly high expenditure needs also appear to play a role. We find evidence that careful planning can reduce the impact of this second factor.

## 1 Introduction

It is well known that many households undergo significant reductions in spending when they retire (Hamermesh [1984], Mariger [1987]). Proponents of the classical life cycle model argue that this only to be expected, since retirement is a relatively inexpensive life phase. In contrast, Banks, Blundell, and Tanner [1998]) argue that the fall in consumption reflects unanticipated negative wealth shocks around the time of retirement. They base their conclusion on an analysis of the time-series pattern of consumption expenditures. Bernheim, Skinner, and Weinberg [1997] use cross-sectional evidence on the size of the nature of the observed fall in consumption to arrive at the same conclusion. They propose that many individuals who arrive at retirement:

“take stock of their finances only to discover that their resources are insufficient to maintain their accustomed standard of living.”

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The key issue in the literature on retirement consumption is how to separate expected from unexpected outcomes. In principle, it seems that debate might be advanced by use of appropriate survey data on expectations. Yet as Manski [1990] describes, there is a long history of skepticism within economics concerning the use of survey data as opposed to data on actual choices. This skepticism is starting to erode: there is growing evidence that well-designed survey questions on expectations, in particular those involving probabilistic answers, can be of great value in microeconomic applications (Juster [1966] and Manski [1990]). Such questions are now included in such important data sets as the Health and Retirement Survey and the National Longitudinal Survey of Youth (Dominitz and Manski [1999]). Going further afield, Barsky, Kimball, Juster, and Shapiro [1997] have explored the use of survey measures of preference parameters in the context of consumption and asset holding.

In this paper we investigate how much insight survey data on expectations can add to the retirement consumption debate. We posed a number of questions concerning expectations of retirement consumption in a recent survey of some 2,000 TIAA-CREF participants. Our results provide compelling evidence that survey measures can be profoundly helpful in distinguishing between expected and unexpected levels of consumption.

Our first key finding is that the working households in our sample generally expect consumption to fall at retirement by an average of around 10%. These expectations vary widely across the population, with roughly one in every nine households expecting a fall of 30% or more, and a similar proportion anticipating an increase in consumption rather than a decline. Our second key finding is that the reported drop in consumption at retirement among retired households is only 4% rather than 10%. These findings seem to turn the wealth shock hypothesis on its head. Rather than having lower than expected consumption due to negative wealth shocks, many retired households appear to be consuming more than they had expected.

To what extent does the unexpectedly high consumption result from the stock market boom causing a significant unanticipated appreciation in the asset values of retired households? By combining our expectational data with measures of stock ownership, we are able to confirm that indeed much - but probably not all - of the gap between expectation and outcome can be accounted for in this way. The finding of a large effect of portfolio shares on reported consumption sheds light on another important issue: for the retired households in our sample, the marginal propensity to consume out of increases in equity values has been large and positive.

While in many ways our sample households appear well-prepared for their retirements, the picture that emerges from our data is not altogether clear-cut. We find that many households enter retirement profoundly uncertain about how their change in work status will impact their consumption needs. When this uncertainty is resolved, the data reveal an asymmetry. More households are surprised by how high are expenditure needs in retirement rather than by how low they are. The finding that spending needs generally exceed their expected levels may explain the remaining gap between expected and realized spending levels that is not accounted for by stock ownership.

Does the unexpectedly high level of post-retirement spending represent an unpredictable shock (say unpredictably high health expenditures), or does it represent a bias in expectations? We find some intriguing evidence supporting the bias theory. In comparison with those who did little retirement planning, those who spent more time planning were far less biased toward underestimation of needs. With enough prior planning, one may be able to arrive at a more accurate, and higher, estimate of retirement expenses. This last finding suggests an intriguing channel for understanding the apparently positive impact of planning on wealth accumulation (Lusardi [2000] and Ameriks, Caplin, and Leahy [2001]). If planning reduces underestimates of retirement spending, it presumably raises the level of wealth needed to finance the retirement period.

After describing our survey in section 2, we detail the basic facts concerning expected consumption levels among working households in section 3. Section 4 exhibits the fundamental gap between the expected and the realized fall in consumption, and shows that this gap cuts across gender, marital status, educational, and occupational barriers. In section 5 we confirm that post-retirement consumption outcomes are profoundly impacted by the households' holdings of equities. Section 6 details the systematic underestimation of retirement consumption needs in the period preceding retirement, and outlines the connection with financial planning. Section 7 concludes.

## 2 The Sample and the Survey

The data used in this paper are primarily drawn from two surveys sent to a sample of TIAA-CREF participants: the Survey of Participant Finances sent out in January 2000 (henceforth SPF), and the Survey of Financial Attitudes and Behavior (henceforth FAB). The SPF was designed to examine in detail the type and the amount of financial assets owned by TIAA-CREF participants. With this information in place, we designed the FAB to dig deeper into participants financial preferences, expectations, and attitudes. To understand exactly who participated in these two surveys requires us to first describe the history of the "TIAA-CREF Research Panel".

### 2.1 The TIAA-CREF Research Panel

In 1993, 60,000 TIAA-CREF participants were selected from TIAA-CREF's participant database as prospective participants in the TIAA-CREF Research Panel project. These participants were randomly selected from three sub-groups of the overall population of TIAA-CREF participants. The first sub-group, the "premium-paying sample," consisted of 30,600 individuals drawn from the population of participants for whom TIAA-CREF was receiving regular periodic contributions to one or more deferred annuity contracts. Contributions could be coming from either the participants themselves, their employer, or both. The second sub-group, the "paid-up sample," consisted 19,200 individuals selected randomly from the population of participants with deferred annuity contracts for which contributions were no

longer being regularly received. The third group, the “annuitant sample” consisted 10,200 retired individuals drawing annuity income from at least one of their TIAA-CREF contracts.

In early 1993, these 60,000 individuals were mailed a letter requesting their participation in the panel along with a survey containing questions regarding demographic and other characteristics. A total of 9,847 responses were received; these individuals became the first members of the Research Panel. These panel members were sent follow-up surveys in 1995, 1997, 1998, and 1999 prior to the SPF and the FAB.

The questions asked in the 1995-1999 surveys focused to a large extent on household demographic characteristics. The response rates to the were in the 12%-21% range, so that the sample had to be replenished several times in order to maintain a universe of adequate size. The replenishment rules were designed to maintain a balance not only between the three subsamples, but also to maintain adequate representation of groups with particularly low response rates to the earlier surveys. At the end of each survey, the Research Panel was re-defined as those who had responded to at least one prior survey, and who were still TIAA-CREF participants.

## 2.2 The 2001 FAB Response Rate

At the end of 1999, the Research Panel comprised some 9,234 households. The SPF was mailed out to this group. In total, 2835 households responded to that survey, for an overall response rate of 30.7%. The universe for the FAB comprised 2687 of the 2835 households who had responded to the SPF: the difference of some 148 households being accounted for by changes of address, death, requests to be removed from the panel, etc. We were concerned worried about the possibility of an inadequate response, in light of the prior difficulties in getting panel members to respond. These worries were further enhanced by the somewhat intricate nature of the survey itself: it comprised 6 pages crammed with unfamiliar questions, including complex hypothetical choice scenarios. In addition we requested detailed numerical information on expectations and subjective uncertainty in a wide variety of different arenas.<sup>1</sup>

We took great pains to follow the procedures suggested by Dillman [1977] to increase our response rate. The cover letter and its relationship to the survey itself were modeled on his suggestions, as was our use of a follow-up letter to those who did not respond to the first request. The initial surveys were sent out in the first week of February 2001, and the second, sent only to those that had not yet responded, in the first week of March 2001. Table 1 records the date of receipt of the survey answers according to whether they were responses to the first or to the second letter.

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<sup>1</sup>The entire survey can be found on Caplin’s home page under the title “Savings, Asset Portfolios, and Planning: A Psychological Approach” [<http://www.econ.nyu.edu/user/caplina/PAPERS/FinalQuestionnaire.pdf>]

**Table 1**  
**Response Frequencies and Rates,**  
**by Mailing and Date of Receipt**

Date received	First		Second		Total	
	Letter		Letter			
Date	(n)	(%)	(n)	(%)	(n)	(%)
2/11–2/16	977	36.4	0	0.0	977	36.4
2/17–2/23	358	13.3	0	0.0	358	13.3
2/24–3/2	222	8.3	0	0.0	222	8.3
3/3–3/9	116	4.3	48	1.8	164	6.1
3/10–3/16	52	1.9	184	6.8	236	8.8
3/17–3/23	9	0.3	54	2.0	63	2.3
3/24–3/28	4	0.1	10	0.4	14	0.5
After 3/28	0	0.0	30	1.1	30	1.1
Total responses	1,738	64.7	326	12.1	2,064	76.8

Source: Authors' tabulation of 2001 survey data.

Note: The survey was sent to a total of 2,687 individuals.

As the table shows, the overall response rate to the survey was above 75%, which exceeded even our highest expectations. More than that, many of the more difficult questions were filled in by the majority of respondents (although not without error: see section 2.6 below). While the design process doubtless contributed to the high response rate, there must have been other contributing factors. The fact that large parts of the survey were personal in nature (“tell us about your beliefs, attitudes, and feelings”) might have served to heighten respondents’ interest. The unusually high degree of difficulty may have been more than compensated for by the unusually high level of personal engagement.

### 2.3 The Sample: Demographic and Financial Characteristics

Since our central interest is in the impact of retirement, we divide our sample into two groups based on labor force participation. A key question is how exactly to define retirement at the level of the household rather than the individual. To keep the distinction between groups as clear as possible, we define the household to be working if neither member is retired, and to be retired only if both are retired. Labor force data are gathered as of January 2001 for the respondent. Spousal labor force data are from January 2000. Of the 2064 who filled out the FAB, 1074 were fully working, and 751 fully retired. The remaining 239 households were either partially retired, or provided insufficient data to be clearly categorized, and are therefore left out of the analysis.

**Table 2**  
**Demographic Characteristics of 2001 Survey Respondents**

Characteristic	Working		Retired		Total	
	(n)	(%)	(n)	(%)	(n)	(%)
Gender						
Female	480	44.7	341	45.4	821	45.0
Male	594	55.3	410	54.6	1,004	55.0
Marital Status						
Curr. married	690	64.6	474	63.2	1,164	64.0
Prev. married	179	16.8	188	25.1	367	20.2
Never married	199	18.6	88	11.7	287	15.8
Education						
College or below	281	26.2	248	33.0	529	29.0
Masters or Prof.	411	38.3	250	33.3	661	36.2
Ph.D.	382	35.6	253	33.7	635	34.8
Occupation						
Teaching faculty	382	35.6	331	44.4	713	39.2
Mgmt., Sen. Admn.	216	20.1	118	15.8	334	18.4
Other Tech./Prof.	267	24.9	124	16.6	391	21.5
Other	207	19.3	173	23.2	380	20.9
Age						
Below 35	112	10.5	0	0.0	112	6.2
35-44	209	19.6	0	0.0	209	11.5
45-54	382	35.8	10	1.3	392	21.6
55-64	272	25.5	122	16.3	394	21.7
65-74	84	7.9	396	52.9	480	26.4
75+	9	0.8	221	29.5	230	12.7
Income (\$000)						
Below \$25	72	6.9	627	83.8	699	39.2
\$25-\$50	216	20.8	44	5.9	260	14.6
\$51-\$75	255	24.6	35	4.7	290	16.3
\$76-\$100	197	19.0	20	2.7	217	12.2
\$101-\$125	132	12.7	11	1.5	143	8.0
\$126-\$150	65	6.3	3	0.4	68	3.8
\$151+	99	9.6	8	1.1	107	6.0
Net worth (\$000)						
Below \$100	117	19.1	9	2.8	126	13.5
\$100-\$300	140	22.8	39	12.3	179	19.2
\$301-\$500	109	17.8	46	14.5	155	16.6
\$501-\$750	69	11.2	57	18.0	126	13.5
\$751-\$1,000	53	8.6	37	11.7	90	9.7
\$1,001-\$1,500	48	7.8	53	16.7	101	10.8
\$1,501+	78	12.7	76	24.0	154	16.5

Source: Authors' tabulations of 2001 survey data.

Table 2 shows the basic demographic and economic characteristics of sample households. It is clear that our sample is extremely well-educated. Unlike those with Ph.D's, the group with high school education alone is not large enough to warrant a separate category: the lowest level of education we tabulate is college or below. In terms of employment, more than 1 in 3 are teaching faculty, with the majority of the others having management or professional positions. The "other" employment category corresponds to secretarial, maintenance, and other support positions. The gender, marital status, educational, and occupational characteristics of the retired households in our sample are very similar to those of the working households.

Households' economic characteristics are derived largely from our survey measures. In the FAB, we asked households to provide estimates of their overall taxable income from employment in 2000: this is our measure of income. Note that median income among working households is about \$75,000, while income is very close to zero for the vast majority of retired households. As a wealth measure we use a broad-based measure of net worth, including real estate and netting out all debts. The wealth measure includes almost all categories of financial wealth, both in and out of retirement plans, but excludes measures of social security or defined benefit pensions. As we would expect, the retired households are on average significantly wealthier than the non-retired households, with a median of some \$800,000 as opposed to \$350,000.

## 2.4 Key Questions on Retirement Consumption

We designed our fundamental questions on retirement expectations (16a and 16b) to extract both qualitative and quantitative information. We asked respondents to provide not only their expectations, but also to provide information on their degree of subjective uncertainty. The following general preamble (prior to question 12) explained our three quantitative measures of expectations and subjective uncertainty:

- Because of the uncertainty that is inherent in any question about your financial future, the following questions ask you to provide three estimates:
  - a **LOW** estimate, where you are 90% sure that the correct answer is **above** this number
  - your **CLOSEST** estimate of the most accurate answer
  - a **HIGH** estimate, where you are 90% sure the correct answer is **below** this number.<sup>2</sup>

The retirement questions themselves were designed to focus respondents' attention on the changing expenditures associated with the event of retirement itself, not with the broader

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<sup>2</sup>This formulation was imported from the literature on "overconfidence": the apparent tendency of many to use narrow confidence intervals even when they are profoundly ignorant. We have no strong reason to believe that this phenomenon was important in the current survey, given how wide were the reported confidence intervals.

long term pattern of aging. We were aware that such questions could be read differently depending on whether or not the respondent was retired. While acknowledging this fundamental difference, our goal was to aim for as complete a symmetry as possible between those who were not yet retired and those who were already retired, in order to make their answers comparable. Before asking for their responses on retirement consumption, we strove first to place respondents into as clear a frame of mind as possible on whether or not they were retired. In this sense, question 15 below should be viewed as a necessary prelude to the two questions on retirement consumption.

- 15: At approximately what age do you plan to begin retirement? If you are currently retired, at what age did you begin retirement? *By “retirement” we mean that point in your life at which you substantially reduce the time you spend working.*
- 16a: For many households, overall spending changes dramatically upon retirement. Please indicate below (what) your experience has been (if you are retired), or what your expectations are (if not retired)
  - My household had (or expects to have) no change in consumption at retirement
  - My household has spent (or will spend) more after retirement than before (also answer 16b)
  - My household has spent (or will spend) less after retirement than before (also answer 16b).
- 16b: About how much more or less (as a percentage of your annual pre-retirement spending)?
  - Low Estimate
  - Closest Estimate
  - High Estimate

The overall response rates to questions 16a and 16b are set out in table 3, in which we record both the number answering each question, and the proportion of those eligible to answer the question who in fact did so. As the table indicates, more than 90% of respondents answered question 16a, and of those who expected a change in consumption at retirement, almost 90% provided a closest estimate. The response rate on the high and low estimates was significantly lower. In total, almost 75% of those returning the survey provided answers to all parts of question 16 that were asked of them.



**Table 3**  
**Response Frequencies and Rates,**  
**Questions on Retirement Expectations/Experience**

Question	Eligible (n)	Responses (n)	Rate (%)
Q16a. Spending higher, lower, or same?	2,064	1,885	91.3
Q16b. Best spending change estimate	1,134	1,005	88.6
Q16b. Low spending change estimate	1,134	835	73.6
Q16b. High spending change estimate	1,134	791	69.8

Source: Authors' tabulation of 2001 survey data.

## 2.5 A Data Correction

There are some answers to question 16b that appear implausible, and are suggestive of misinterpretation. One issue that shows up is the relatively large number of households who report expected falls in consumption of either 80% or 90%. Not only do such huge falls in consumption seem a priori unlikely, but there were very few households in the 51%-69% range, suggesting even more strongly that there is something suspicious in the second mode of the distribution.

We believe that some households may have essentially misread the question, filling in the more familiar “replacement rate” (the ratio of retirement consumption to pre-retirement consumption) rather than answering the question about the change per se. When reading our survey question about consumption in retirement relative to current consumption, these numbers may therefore be reported because they are so salient, even though a careful reading of the question shows that the number that was called 100 less the replacement rate.

We use two different procedures to correct for this error. The more intricate approach, detailed in the Appendix, is to use a maximum likelihood procedure based on the assumption of lognormality to correct for all reporting errors, including a possible bias associated with the rounding process. Given our identifying assumptions, we can then estimate the distribution of the “correct” answers to the survey.

While this procedure is rigorous and complete, it is also highly artificial. The results may be misleading if either the identifying assumptions or the underlying statistical model is incorrect (e.g. the assumption of lognormality). For this reason we use also a simpler cutoff-rule method of error correction. We assume that all expected consumption declines above some critical cutoff are really replacement rates, while answers below that cutoff are as intended. Since the complete maximum likelihood procedure strongly suggests that almost all of the data lying at 50 and above is the result of reporting error, this is the cutoff that we use in our simpler procedure. In the body of the paper, we use the cutoff-rule for simple tabulations of the data. In general the difference appears to be minimal.

## 3 Expectations of the Working Population

### 3.1 Basic Facts

Table 4 contains the basic data on retirement consumption expectations of the working population as a whole, and by gender, marital status, education, occupation, and income. The first column records the number of households of the given type who answered question 16a.<sup>3</sup> The next three columns record the proportions answering this qualitative question with each of the three answers. The fundamental finding is that well over 50% of households expect consumption to fall, while only 10% expect it to rise in retirement.

The final column of the table presents a simple estimate of the within-group expected change. This is a simple arithmetic average of the expected changes reported at the individual level. It is calculated by averaging the closest estimates in question 16b for those who expect a change, and weighting these together according to their proportionate representation in the population as a whole. For those expecting a decline, the expected fall is on the order of 25%, with a very similar number among those expecting a rise. The end result is a mean fall of some 9.5%. As explained in section 3.4 below, we estimate that this represents an underestimate of the true expected fall of some 1%, when one corrects for the large number of those who report no expected change in consumption who in fact expect a fall of some magnitude.

Looking across demographic categories, we see a broadly similar pattern of expectations within all subgroups. Within all demographic categories, a majority of the working population expect consumption to fall, and no more than 15% in any group expect it to rise (the exception is that only 49.2% of those who have never been married expect to spend less!). The end result is that there is little variation across groups. Those who have never been married have the smallest expected fall in consumption: this may be due to the difference in child-bearing behavior, or to distinct patterns of social life. Apart from this, faculty stand out as expecting smaller than average fall of 7.3%. Of course, the very notion of retirement may be somewhat unique for faculty members. For all other demographic categories, the range from minimum to maximum is 3.4%: from 8.4% to 11.8%.

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<sup>3</sup>The numbers recording answers to the various different demographic and economic questions are somewhat different. This accounts for the variations in total households from category to category, and from table to table.

**Table 4**  
**Working Households' Expected Changes in**  
**Spending after Retirement, by Demographic Category**

	Responses	Spend Less	Spend Same	Spend More	Arith. Mean
Characteristic	(n)	(%)	(%)	(%)	(%)
All working households	1,003	54.6	35.3	10.1	-9.5
Gender					
Female	440	53.9	36.6	9.5	-9.7
Male	563	55.2	34.3	10.5	-9.5
Marital Status					
Curr. married	649	55.6	36.5	7.9	-10.3
Prev. married	165	57.0	28.5	14.5	-10.4
Never married	183	49.2	36.6	14.2	-6.0
Education					
College or below	256	54.3	34.4	11.3	-10.0
Masters or Prof.	388	57.2	34.0	8.8	-10.1
Ph.D.	359	52.1	37.3	10.6	-8.7
Occupation					
Teaching faculty	360	50.0	38.3	11.7	-7.3
Mgmt., Sen. Admn.	203	60.6	31.5	7.9	-11.8
Other Tech./Prof.	254	57.9	33.1	9.1	-11.5
Other	184	52.7	36.4	10.9	-8.4
Income (\$000)					
Below\$25	66	45.5	40.9	13.6	-8.7
\$25-\$50	205	48.3	36.6	15.1	-6.1
\$51-\$75	242	49.6	38.0	12.4	-7.8
\$76-\$100	187	58.8	33.7	7.5	-11.3
\$101-\$125	125	65.6	31.2	3.2	-12.7
\$126-\$150	61	60.7	37.7	1.6	-13.0
\$151+	96	58.3	32.3	9.4	-12.1

Source: Authors' tabulations of 2001 survey data.

The final rows of the table deals with the relationship between retirement expectations and income. The table suggests that those with the highest incomes generally have the largest expected declines in consumption at retirement. To some extent, this pattern is connected to our next finding: those who are youngest appear to be most optimistic, and also have the lowest incomes. The relationship with income turns out to be far weaker for older households who are closer to retirement than it is for younger households who are further from retirement.

### 3.2 Age and Years to Retirement

Age has a powerful impact on the expected change in consumption at retirement. There is a U-shaped pattern with the highest expectations for retirement found among the youngest and oldest households, and the lowest expectations for those of ages 45-55.

**Table 5**  
**Working Households' Expected Changes in**  
**Spending after Retirement, by Age Category**

Age	Responses	Spend Less	Spend Same	Spend More	Arith. Mean
(Yrs.)	(n)	(%)	(%)	(%)	(%)
Below 35	103	45.6	35.9	18.4	-4.6
35-39	100	42.0	44.0	14.0	-6.3
40-44	100	58.0	32.0	10.0	-9.3
45-49	147	67.3	27.2	5.4	-13.6
50-54	206	63.1	31.1	5.8	-11.8
55-59	152	57.2	32.9	9.9	-11.4
60-64	107	45.8	43.9	10.3	-8.7
65+	83	41.0	44.6	14.5	-5.1

Source: Authors' tabulations of 2001 survey data.

What explains the optimistic expectations of younger households? One possibility is that younger households are naively optimistic (in the sense of O'Donoghue and Rabin [1999]) about their ability to save for their old age. In the middle years, their naivete gives rise to the realistic assessment that they find it hard not to spend what they intended to save for their retirement. A second important line of explanation involves liquidity constraints. When these are currently binding, households may look forward to retirement as a time of relatively high consumption in which these constraints have been removed. Liquidity constraints of this form may also explain the connection between low income and expectations of a smaller fall in retirement consumption among younger households. There are other alternative explanations, involving broader differences in behavior across cohorts. Further exploration of these age and income findings is beyond the scope of the current paper, but provides a natural subject for future research.

What explains the up-turn in expectations for older households? Part of this appears to lie in the very unusual nature of the older households who are not retired: they have very high wealth, and they include a disproportionate number of faculty members. Almost 30 of these households do not fill in an anticipated age of retirement even though they report an expected change in consumption at retirement! It is therefore of interest to move to a different measure of ageing, more directly related to retirement itself. Table 6 shows the pattern of expectations according to estimated years to retirement for those who answered question 15 on the expected age at retirement. While the same general pattern is evident, the U-shaped pattern is far less pronounced.

**Table 6**  
**Working Households' Expected Changes in**  
**Spending after Retirement, by Years to Retirement**

Years to retirement	Responses	Spend Less	Spend Same	Spend More	Arith. Mean
(Yrs.)	(n)	(%)	(%)	(%)	(%)
0-5	184	50.5	37.5	12.0	-9.6
6-10	171	57.3	35.7	7.0	-10.4
11-15	161	62.7	31.1	6.2	-11.9
16-20	124	59.7	33.9	6.5	-11.8
21-25	97	55.7	30.9	13.4	-8.0
26-30	74	62.2	23.0	14.9	-10.0
31+	102	37.3	49.0	13.7	-4.3

Source: Authors' tabulations of 2001 survey data.

We take one important cautionary lesson from the above tables. If we are interested in making a meaningful comparison of the expectations of those prior to retirement with the realizations of those after retirement, we would do well to focus on a relatively narrow window. In the analysis that follows, we pay particular attention to those who are within 10-15 years of retirement. As the table above indicates, working households who are close to retirement have expectations that closely mirror those of the working population as a whole. If anything, they appear to expect somewhat larger falls in retirement consumption than do those who are further from retirement.

### 3.3 Wealth

One would generally expect those with higher wealth (appropriately normalized) to have higher hopes for retirement consumption relative to current consumption. While this is true, it turns out that the relationship between expected retirement consumption and net worth depends dramatically on years to retirement. Table 7 shows the strong relationship between expected consumption at retirement and net worth for households within fifteen years of retirement.

**Table 7**  
**Working Households' Expected Changes in**  
**Spending after Retirement, by Net Worth, for**  
**Households with 15 Years or Less to Retirement**

Net worth	Responses	Spend Less	Spend Same	Spend More	Arith. Mean
(\$000)	(n)	(%)	(%)	(%)	(%)
Below \$100	10	90.0	10.0	0.0	-24.2
\$100-\$300	42	66.7	26.2	7.1	-14.5
\$301-\$500	56	57.1	41.1	1.8	-11.5
\$501-\$750	49	65.3	24.5	10.2	-12.7
\$751-\$1,000	34	55.9	35.3	8.8	-11.3
\$1,001-\$1,500	31	48.4	38.7	12.9	-6.2
\$1,501+	62	37.1	48.4	14.5	-3.2

Source: Authors' tabulations of 2001 survey data.

There are two entirely different explanations possible for the strong positive relationship between wealth and expected consumption in retirement for those within fifteen years of retirement. The first is that those who believe that they will have expensive retirements are accumulating more wealth precisely in order to pay for it: the exogenous variable is the expectation, with wealth accumulation being endogenous. The alternative possibility is that it is wealth itself that is the driving force. Those who accumulate high wealth also become more optimistic about their retirement expenditures. We believe there to be some truth in both explanations. One slight weakness of this second explanation is the issue of why households who accumulate unexpected wealth would not use a great deal of it in the period before retirement. There is another reason for believing that the second explanation is not fully satisfactory, as will be made clear when we analyze the impact of equity holdings.

While the positive relationship between wealth and expected retirement consumption is as expected, table 8 below shows that the relationship is far less powerful, possibly even inverted, for those who are further from retirement. One possible explanation for the importance of years to retirement in conditioning wealth effects is the possible confounding effect of highly patient households having to wait longer than others to begin the process of wealth accumulation. Even more important is the connection with age. Younger households are not as wealthy, and have higher expectations of retirement consumption.

**Table 8**  
**Working Households' Expected Changes in**  
**Spending after Retirement, by Net Worth, for**  
**Households with More than 15 Years to Retirement**

Net worth	Responses	Spend Less	Spend Same	Spend More	Arith. Mean
(\$000)	(n)	(%)	(%)	(%)	(%)
Below \$50	44	50.0	34.1	15.9	-7.2
\$50-\$100	54	48.1	37.0	14.8	-7.9
\$101-\$200	57	57.9	24.6	17.5	-8.9
\$201-\$400	54	61.1	33.3	5.6	-8.6
\$401-\$600	16	50.0	43.8	6.2	-8.1
\$601+	39	53.8	41.0	5.1	-8.1

Source: Authors' tabulations of 2001 survey data.

### 3.4 The Estimated Distribution

As already outlined, there are a number of reasons (especially systematic rounding error) that we cannot use the raw data themselves to generate valid information on the underlying distribution of expectations. The original distribution is in figure A1: in the tabulations above we have simply taken all of those reporting expected falls of over 50% and treated them as if they were replacement ratios. In the Appendix we provide details of a more sophisticated maximum likelihood procedure to estimate parameters of the true process underlying the actual survey answers.

Figure A3 in the appendix shows our estimated distribution as the smooth graph. The notion that falls of over 50 are mis-stated is completely supported by our estimation procedure. The main change is that the large mass of zeros in the reported data are shifted predominantly into the negative column, since the mean of the distribution is negative. The other big difference, which to some extent works in the other direction, is that the numbers estimating a precisely 50% fall are clearly overstated, and our distribution smooths them to be smaller than 50% falls.<sup>4</sup> On balance, these two corrections adding 0.5% - 1.0% to the expected fall in consumption at retirement.

Figure A3 contains a third graph in addition to the raw data and our best fit estimate. What this graph corresponds to is inverting the estimated distribution to recover the predicted distribution of answers. There are some systematic misses: in particular our procedure does not build in the apparent attraction of some other focal numbers, such as 25% and 50%. Ultimately, a complete rounding correction would need to build in the excessive attraction of these numbers in addition to the rounding to zero. We believe that experimental techniques will prove helpful in developing better models of the rounding process.

<sup>4</sup>Ultimately, a complete rounding correction would need to build in the excessive attraction of this particular rounding in addition to the rounding to zero. We believe that ultimately experimental techniques will be employed to develop a closer understanding of the actual process of rounding.

## 4 Outcomes among the retired

### 4.1 The Gap Between Expectation and Outcome

Table 9 presents the analog to table 2, this time focused on retired households. The second to last column records the mean expected change for each group. The final column incorporates information from the equivalent group of working households, and records the gap between the mean for the non-retired and the retired members of the group. Note that we do not tabulate according to the level of income, since this is essentially meaningless for the retired households.

**Table 9**  
**Retired Households' Reported Changes in**  
**Spending after Retirement, by Demographic Category**

	Responses	Spent Less	Spent Same	Spent More	Arith. Mean	"Gap"
Characteristic	(n)	(%)	(%)	(%)	(%)	(%)
All retired households	676	36.4	44.1	19.5	-3.7	5.8
Gender						
Female	300	38.3	44.3	17.3	-4.5	5.1
Male	376	34.8	43.9	21.3	-3.1	6.4
Marital Status						
Curr. married	436	33.3	45.4	21.3	-2.4	7.9
Prev. married	163	47.9	36.8	15.3	-8.3	2.1
Never married	77	29.9	51.9	18.2	-1.6	4.3
Education						
College or below	215	43.3	41.9	14.9	-7.2	2.8
Masters or Prof.	227	38.8	42.7	18.5	-4.1	6.0
Ph.D.	234	27.8	47.4	24.8	-0.2	8.4
Occupation						
Teaching faculty	295	32.2	43.1	24.7	-0.8	6.5
Mgmt., Sen. Admn.	112	46.4	35.7	17.9	-7.3	4.5
Other Tech./Prof.	114	39.5	46.5	14.0	-4.8	6.8
Other	153	34.6	50.3	15.0	-6.0	2.4
Years from retirement						
0-5	198	34.8	48.0	17.2	-2.8	na
6-10	171	39.8	40.4	19.9	-5.2	na
11-15	137	29.2	45.3	25.5	-1.0	na
16+	33	33.3	51.5	15.2	-2.7	na

Source: Authors' tabulations of 2001 survey data.

The table shows that on average, all groups have a decline in consumption. Yet there is considerably more cross-group variation in outcomes than there was in expectations. Two of the smallest declines are found among those who were never married and teaching faculty,



which were the two groups expecting the smallest declines. The largest declines are found among those with the least education, those who were previously married, and particular non-faculty professional groups.

Despite the differences in outcomes, one constant is that the retired members of all demographic group report higher levels of retirement consumption than did their working counterparts. The basic finding is that consumption outcomes among the retired appear to lie significantly above the expectations held by those who are not yet retired. The group with the smallest gap between expectation and outcome are those who were previously married. Retired members of this group are likely to include a number of recently widowed singles, who may have had an altogether shocking set of experiences on both the income and consumption front. There are also systematic effects of education, with the gap generally being larger for those with higher education.

While there are indeed systematic differences across demographic groups in our estimate of the gap between expectations and outcomes, composition effects appear to be minimal. If we break our universe down into demographic subcategories and calculate the average gap, it makes minimal difference if we use population weights corresponding to the working population, or to the retired population. What we are left with is always a gap of some 6% between expectations and outcomes in our population.

The final rows of the table refer to the impact of years since retirement on consumption outcomes. In combination the data from tables 4 and 9 shows that the difference between the expectations of those within five years of retirement and the outcomes of those who retired less than five years ago is 6.8%, which is larger than the difference between the two populations when one does not condition on proximity to retirement.

## 4.2 Retirement Age: Some Considerations

Is it possible that the endogeneity of retirement explains some of the difference between expectations and outcomes? On the one hand, it may be that households who get unusually positive wealth shocks tend to retire quickly: that means that prior expectations will be lower than realizations because the lucky ones have moved on (the fact that the non-retired elderly have above average wealth, even conditioning on age, already argues against this). On the other hand, as Bernheim, Skinner, and Weinberg [1997] discuss, it may be that retirement corresponds to the negative wealth shock of being fired. If so, one would expect prior expectations to systematically exceed outcomes.

Our preliminary investigation suggests that endogenizing retirement would not profoundly impact the current investigation. As Phelan and Rust [1997] have shown, there are two ages that attract the largest number of retirees: ages 62 and 65. These ages correspond to important changes in Social Security and Medicare coverage. In our sample, fully 1/3 of retirees who report a retirement date give one of these two ages, while close to 40% of those who are still working report expecting to retire at one of these two ages. It is reasonable to conjecture that most who retired on these dates did so according to a prior vision little impacted by recent wealth events or shocking job events, and that those who intend

to retire at these dates are similarly determining the date without giving great regard to local shocks. The following simple tabulations suggest that differences previously identified between expectations and outcomes survive essentially unchanged if we restrict attention to these groups.

**Table 10**  
**Retirement Spending Expectations and Experience,**  
**Focus on Households with Retirement Age of 62 or 65**

Employment Status & Retirement Age	Responses	Spent Less	Spent Same	Spent More	Arith. Mean
Characteristic	(n)	(%)	(%)	(%)	(%)
Working households					
All	1003	54.6	35.3	10.1	-9.5
Age 62 or 65	370	54.3	34.9	10.8	-8.9
Retired households					
All	676	36.4	44.1	19.5	-3.7
Age 62 or 65	187	32.6	46.5	20.9	-3.0

Source: Authors' tabulations of 2001 survey data.

### 4.3 The Impact of Net Worth

On the surface, the sudden shift from expectations immediately prior to retirement to realizations immediately after retirement is suggestive of systematic errors: either significant error of expectations; or systematic biases in the answers to the survey questions. Yet given how much the stock exchange increased in the 10 years prior to sample date, those retired households who retained significant stock holdings will have experienced unanticipated increases in wealth. To get a first indication of whether this effect is important, we simply tabulate answers to question 16 according to household net worth.

**Table 11**  
**Retired Households' Reported Changes in**  
**Spending after Retirement, by Net Worth**

Net worth	Responses	Spent Less	Spent Same	Spent More	Arith. Mean
(\$000)	(n)	(%)	(%)	(%)	(%)
Below \$100	9	88.9	0.0	11.1	-21.2
\$100-\$300	35	48.6	42.9	8.6	-10.8
\$301-\$500	44	38.6	45.5	15.9	-5.5
\$501-\$750	53	34.0	49.1	17.0	-3.0
\$751-\$1,000	35	42.9	37.1	20.0	-4.8
\$1,001-\$1,500	50	38.0	36.0	26.0	-2.2
\$1,501+	74	14.9	58.1	27.0	4.1

Source: Authors' tabulations of 2001 survey data.

The results are even more dramatic than in the case of those who are working, but are within 15 years of retirement. What is not immediately clear is whether this is a direct wealth effect, or rather an effect of stock market appreciation. Those who have high wealth must include a disproportionate number of those who benefited from asset appreciation, while those with negative wealth suffered include those with unusually bad outcomes. Fortunately we can find more direct evidence on the importance of the wealth shock channel by incorporating some of our data on household portfolio shares.

#### 4.4 A Simple Distribution of Outcomes

Just as for the working population, the crude data for the retirees needs to be corrected for systematic reporting and rounding errors. The Appendix details the maximum likelihood procedure involved, and shows the key parameters of the underlying distribution. Figure A2 illustrates the initial distribution, and figure A4 illustrates the ultimate distribution, as well as the inverted version of the estimated distribution. Again the correction points in the direction of lower realized consumption. However the drop is smaller than in the case of the working households.

## 5 Wealth Shocks and Retirement Consumption

### 5.1 Equity Holdings

Our data on household portfolio shares comes from two primary sources. In addition to the SPF, we have gone directly to TIAA-CREF data to extract a precise value for the TIAA-CREF holdings of all respondents as of the survey date of this wealth survey. In the empirical work below we use two different measures of stock shares. There is a narrower measure of the proportion of equities in the retirement portfolio, and a broader measure of the proportion among all financial assets. In addition to reducing the number of observations and raising

issues of data reliability, use of the broader definition raises the issue of whether or not financial wealth is the appropriate denominator. Fortunately the results are very similar whichever measure we use.

Table 12 characterizes equity holdings for the retired and the working households in our survey. In comparison with the general population, equity holdings are unusually large. Very few households hold no equities. The median working household has around 40% of financial wealth in equity, while the median retired household has somewhat less.

**Table 12**  
**Equity Allocations of 2001 Survey Respondents**

Portfolio and % equity	Working Households		Retired Households		Total	
	(n)	(%)	(n)	(%)	(n)	(%)
Total portfolio						
0%-10%	73	11.8	75	23.1	148	15.7
11%-30%	142	22.9	70	21.5	212	22.5
31%-50%	188	30.4	82	25.2	270	28.6
51%-70%	145	23.4	72	22.2	217	23.0
71%-100%	71	11.5	26	8.0	97	10.3
Retirement portfolio						
0%-10%	49	6.4	97	22.3	146	12.1
11%-30%	42	5.5	38	8.7	80	6.6
31%-50%	87	11.3	59	13.6	146	12.1
51%-70%	191	24.8	106	24.4	297	24.7
71%-100%	400	52.0	135	31.0	535	44.4

Source: Authors' tabulations of 2001 survey data.

There are some fascinating features of the equity share data: table 12 indicates that risk is taken predominantly in the retirement portfolio rather than in the other financial assets. Taking a richer look at this data, and using it to deepen insight into the propensity to spend out of stock exchange wealth is a priority in further research.

## 5.2 Equities, Expectations, and Outcomes

Among those already retired, the fundamental finding is as suggested by table 11 above: stock ownership had massive impact on the actual pattern of spending.

**Table 13**  
**Retired Households' Reported Changes in**  
**Spending after Retirement, by Equity Exposure**

	Responses	Spent Less	Spent Same	Spent More	Arith. Mean
(Portfolio and % equity)	(n)	(%)	(%)	(%)	(%)
Total portfolio	306	34.3	45.8	19.9	-3.0
0%-10%	70	52.9	32.9	14.3	-10.5
11%-30%	67	29.9	52.2	17.9	-3.5
31%-50%	77	36.4	48.1	15.6	-2.8
51%-70%	68	19.1	52.9	27.9	1.8
71%-100%	24	29.2	37.5	33.3	6.4
Retirement portfolio	399	33.8	46.1	20.1	-2.8
0%-10%	86	47.7	40.7	11.6	-9.8
11%-30%	35	37.1	40.0	22.9	-5.0
31%-50%	55	32.7	50.9	16.4	-2.2
51%-70%	101	31.7	48.5	19.8	-2.5
71%-100%	122	25.4	47.5	27.0	2.5

Source: Authors' tabulations of 2001 survey data.

While table 13 suggests that post-retirement wealth shocks are important, this same pattern of expectations may characterize those who are not yet retired and who own stocks. If they regard their retirement portfolios as essentially off-limits for pre-retirement consumption, then the appreciation in stock values may influence them just as much as it influences those who are already retired. Even if they do not have mental accounts of this form, for those who are close to retirement, the wealth shock will feed into a relatively short period pre-retirement and a relatively long period post-retirement, potentially raising their estimated post retirement consumption relative to pre-retirement consumption. To explore whether such effects are in operation, table 14 repeats the equity share calculation for those who are approaching retirement.

**Table 14**  
**Working Households' Expected Changes in**  
**Spending after Retirement, by Equity Exposure, for**  
**Households with 15 Years or Less to Retirement**

	Responses	Spend Less	Spend Same	Spend More	Arith. Mean
(Portfolio and % equity)	(n)	(%)	(%)	(%)	(%)
Total portfolio	284	58.1	33.5	8.5	-10.6
0%-10%	27	66.7	29.6	3.7	-16.3
11%-30%	54	55.6	37.0	7.4	-10.9
31%-50%	95	62.1	31.6	6.3	-11.3
51%-70%	78	57.7	33.3	9.0	-10.5
71%-100%	30	43.3	36.7	20.0	-3.3
Retirement portfolio	367	58.3	32.4	9.3	-10.8
0%-10%	23	69.6	30.4	0.0	-18.8
11%-30%	28	57.1	32.1	10.7	-7.6
31%-50%	49	67.3	26.5	6.1	-13.4
51%-70%	87	56.3	36.8	6.9	-12.5
71%-100%	180	55.6	32.2	12.2	-8.7

Source: Authors' tabulations of 2001 survey data.

The table indeed suggests that share ownership has some effect on expected retirement expenditures for those close to retirement, albeit considerably weaker than in the post-retirement period. There appears to be absolutely no such relationship for those more than 15 years from retirement.

**Table 15**  
**Working Households' Expected Changes in**  
**Spending after Retirement, by Equity Exposure, for**  
**Households with More than 15 Years to Retirement**

	Responses	Spend Less	Spend Same	Spend More	Arith. Mean
(Portfolio and % equity)	(n)	(%)	(%)	(%)	(%)
Total portfolio	266	53.8	34.2	12.0	-7.7
0%-10%	29	41.4	44.8	13.8	-4.7
11%-30%	78	61.5	26.9	11.5	-10.4
31%-50%	71	53.5	36.6	9.9	-8.3
51%-70%	53	56.6	34.0	9.4	-9.8
71%-100%	35	42.9	37.1	20.0	0.0
Retirement portfolio	307	53.7	34.2	12.1	-7.8
0%-10%	11	54.5	27.3	18.2	-7.7
11%-30%	11	45.5	36.4	18.2	-7.4
31%-50%	30	43.3	43.3	13.3	-6.8
51%-70%	73	68.5	27.4	4.1	-13.9
71%-100%	182	50.0	35.7	14.3	-5.5

Source: Authors' tabulations of 2001 survey data.

### 5.3 Some Regressions

While the simple tabulations above are suggestive, it is clearly important to account for wealth effects and equity effects jointly. For the moment we use a simple procedure to correct for the response rate differences on question 16b between those who expect no change, and those who expect either an increase or a decrease in consumption. If the respondent expects a change in consumption but does not fill in a number, we fill in the conditional average response to the quantitative question for those who provided the same answer to the qualitative question.

The following simple regression shows that the nature of the connection between wealth, equity holdings, and consumption at retirement depends on whether or not the household is retired.

**Table 16**  
**OLS Regression Model for Expected**  
**Spending Change after Retirement**

Variable	Working hhlds.			Retired hhlds.		
	Coeff.	<i>t</i>	Pr>  <i>t</i>	Coeff.	<i>t</i>	Pr>  <i>t</i>
Constant	43.883	3.666	0.000	102.944	0.372	0.372
Age	-2.181	-4.340	0.000	-3.572	-1.054	0.293
Age squared	0.019	3.808	0.000	0.028	1.107	0.269
Net worth	0.004	3.610	0.000	0.005	3.419	0.001
Share equities	0.049	1.538	0.125	0.106	2.185	0.030
$R^2$		0.067			0.092	
N		536			270	

Source: Authors' tabulations of 2001 survey data.

Note that the U-shaped pattern of expectations in age prior to retirement is strongly in evidence. Note also that wealth is important both before and after retirement, with the coefficient not significantly changed. The impact of equities does change significantly before and after retirement. The coefficient rises by .056 from 0.049 before retirement to 0.105 after retirement, and in the process gains statistical significance. The above regressions appear robust to the addition of income, and of demographic variables.

We have already seen indications that the regression results in table 16 may be quite sensitive to years to retirement among the working population. This turns out to be true. Even more than that, the findings are sensitive to years since retirement among retired households. When we run the same regressions above conditioning on years since retirement among the retired, and years to retirement among those prior to retirement, there is a predictable monotonic pattern. Among working households, those who are closest to retiring show the largest impact of equity shares. Similarly, those who retired most recently show higher impact than those who have been retired for the longest periods (we use 5 years as the smallest reasonable window). In the table below, we only record the coefficients on the share of equities and on wealth in the regressions for the various different horizons.



**Table 17**  
**OLS Regression Model for Expected Spending Change after Retirement, Controlling for Years to/from Retirement**

Status, Years to/from Ret.	N	Equity Share			Wealth		
		Coeff.	<i>t</i>	Pr>  <i>t</i>	Coeff.	<i>t</i>	Pr>  <i>t</i>
Working households							
15 or less	251	0.047	0.9	0.38	0.005	3.7	0.00
10 or less	170	0.067	1.0	0.31	0.006	3.4	0.00
5 or less	88	0.124	1.3	0.18	0.003	1.2	0.24
Retired households							
5 or less	123	0.183	2.2	0.03	0.005	2.1	0.04
10 or less	194	0.143	2.3	0.02	0.005	2.9	0.00
15 or more	254	0.120	2.3	0.02	0.004	2.9	0.01

Source: Authors' tabulations of 2001 survey data.

In addition to the ever increasing importance of the 90's stock boom as one is closer to the retirement event, note that the idea that there is a shift of around 0.06 in the coefficient on equity holds up remarkably well in this disaggregation. Finally, the stability of the coefficient on wealth is notable, particularly for those who are in the retirement period.

## 5.4 How Much do Equity Shares Explain?

A crude estimate of the average gap between expectations and outcomes is that it amounts to some 6% of pre-retirement spending. How much of this can be explained by the stock market boom? Given the change in the estimated coefficient on the equity share of some 0.06 as a result of retirement, and average shareholdings in the 40% range, a best guess for the impact of equities would be to explain some 2%-3% of the gap between the expectations of the working population and the outcomes among the retired. Of course there is an additional common effect, since even the expectations of the working population appear to have been systematically raised by a few percentage points, especially those who are themselves close to retirement.

The first pass suggestion is that equity appreciation explains some, but probably not all, of the difference between expectations and outcomes. This conclusion is further bolstered when we recognize that there are two particularly optimistic groups of working households who are of limited relevance to the study. Very young households are very optimistic about retirement consumption; whatever the reason for this, comparing them with retired households has limited relevance. Very old households and in particular those who do not report an intended age of retirement are also very optimistic about retirement consumption. If both groups are excluded, the gap to be explained increases by some 1% to 2%.

Since equities alone do not seem to do the complete job of explanation, we turn our attention to a second and completely different type of explanation based on spending rather than resources.

## 6 Underestimation of Spending Needs in Retirement

### 6.1 Questions on Spending

In question 17 we asked retired households to answer direct qualitative and quantitative questions on whether or not their spending needs in retirement aligned with their prior expectations. Our focus on needs rather than expenditures was an effort to get at essentially unexpected costs, as opposed to high spending due to shocks such as higher than expected wealth.

- 17a. If you are currently retired, how do your spending needs in retirement compare with those you expected before you retired:
  - About what you expected
  - Higher than you expected (also answer 17b)
  - Lower than you expected (also answer 17b)
- 17b: About how much more or less (as a percentage of your expected spending)?
  - Low Estimate
  - Closest Estimate
  - High Estimate

Table 18 summarizes the response rates to this question. While the qualitative question and the closest estimates were well answered, the high and the low estimates were typically missing.

**Table 18**  
**Response Frequencies and Rates,**  
**Questions on Unexpected Spending Needs in Retirement**

Question	Eligible (n)	Responses (n)	Rate (%)
Q17a. Spending needs higher, lower, or same as expected?	751	709	94.4
Q17b. Best estimate of unexepected needs	176	147	83.5
Q17b. Low estimate of unexepected needs	176	76	43.2
Q17b. High estimate of unexepected needs	176	76	43.2

Source: Authors' tabulation of 2001 survey data.

Table 19 presents the basic data. While the majority report not being surprised, there is a telling bias in the direction of surprise among those who were.

**Table 19**  
**Unexpected Retirement Spending Needs,**  
**by Demographic Category**

Characteristic	Responses (n)	Less than Expected (%)	As Expected (%)	More than Expected (%)
All retired households	709	9.6	75.2	15.2
Gender				
Female	316	9.5	73.4	17.1
Male	393	9.7	76.6	13.7
Marital Status				
Curr. married	459	9.2	76.3	14.6
Prev. married	168	10.1	70.8	19.0
Never married	82	11.0	78	11.0
Education				
College or below	226	11.1	71.2	17.7
Masters or Prof.	239	7.5	78.7	13.8
Ph.D.	244	10.2	75.4	14.3
Occupation				
Teaching faculty	314	10.5	74.8	14.6
Mgmt., Sen. Admn.	116	6.0	76.7	17.2
Other Tech./Prof.	119	9.2	77.3	13.4
Other	158	10.8	72.8	16.5
Years from retirement				
0-5	198	5.6	81.8	12.6
6-10	174	14.9	71.8	13.2
11-15	143	6.3	78.3	15.4
16+	36	5.6	80.6	13.9

Source: Authors' tabulations of 2001 survey data.

## 6.2 What is the Average Underestimate?

The simplest way to compute a population average underestimate of consumption expenditures is to repeat the procedure that we used in calculating the results in table 16. We simply compute the conditional average underprediction and overprediction for each segment of the population, weight these up according to their population weights, and compute the resulting average. When we do this, the results suggest an average underestimate of expenses of some 0.8% for the population as a whole.

We have very limited faith in this calculation. The answers to question 16 show a tremendously high level of ex ante uncertainty concerning retirement consumption. The difference between high and low estimates of the change in retirement at consumption averages between 25% and 35% of current consumption.<sup>5</sup> While some of this uncertainty is likely to

<sup>5</sup>There are a number of subtle issues involved in estimating this number from our survey answers. This

be resource related, much of it appears to be related to uncertainty about the costs of retirement: uncertainty falls only minimally for those who are strongly risk averse and hold minimal stocks.

Given the finding of vast prior uncertainty, the numbers reporting that consumption needs were as predicted seems excessive. The household may interpret “about what you expected” to mean within a wide range. But the problems may be deeper than that. To give either of the alternative answers is to admit that one was in error. Even if one admits this, to give a large estimate of one’s error may be viewed as casting one’s abilities in a bad light. Households may even display a form of hindsight bias in which they recall having been correct, or at least close to correct, when in fact they were mistaken.

In qualitative terms, it is clear that these corrections are likely to increase the estimate of the average size of the underestimate. Since the majority of those reporting errors say they underestimated expenditures, this same would likely be true of those who in fact made errors, but failed to so report. In addition, the understated size of all errors is biasing the simple statistic above toward zero.

While the qualitative nature of a correction seems clear enough, we have too little information to perform interesting quantitative calculations. We would need to make strong identifying assumptions while having no external grounds for checking their validity. It is our belief that experimental procedures may ultimately prove extremely valuable in this respect.

### **6.3 Portfolio and Wealth Effects**

Question 17 was designed to focus on shocks to the costs of retirement, not the level of wealth available. To find evidence on whether this interpretation was followed by respondents, it is of interesting to look at surprise in relation to economic as well as demographic variables. Table \* looks at the impact of equity shares. Since those with higher levels of equity appear to have spent more than they expected, there might be an artificial bias toward the finding that consumption needs were more expensive than expected simply because spending levels were higher than expected.

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is an important subject in and of itself, and beyond the scope of the current investigation.

**Table 20**  
**Retired Households' Unexpected Changes in**  
**Spending after Retirement, by Equity Exposure**

	Responses	Less than Expected	As Expected	More than Expected
(Portfolio and % equity)	(n)	(%)	(%)	(%)
Total portfolio	315	8.9	77.1	14.0
0%-10%	72	11.1	75.0	13.9
11%-30%	69	5.8	79.7	14.5
31%-50%	79	10.1	79.7	10.1
51%-70%	71	8.5	74.6	16.9
71%-100%	24	8.3	75.0	16.7
Retirement portfolio	416	8.9	75.7	15.4
0%-10%	91	8.8	78.0	13.2
11%-30%	36	5.6	86.1	8.3
31%-50%	58	10.3	69.0	20.7
51%-70%	104	9.6	76.0	14.4
71%-100%	127	8.7	74.0	17.3

Source: Authors' tabulations of 2001 survey data.

The results provide encouraging evidence that the question was interpreted literally. Even though those with higher equity shares ended up spending far more than those with lower shares, there is absolutely no systematic pattern in the answers to question 17 based on these shares. The numbers reporting surprise do not differ significantly by equity share, nor does the tendency toward underestimation of retirement expenses.

Table 21 looks at the answers to question 17 according to level of net worth. Again, there appears to be no systematic pattern in the bias toward underestimation: the only group for which this does not hold are those at an intermediate level of wealth. There is a small systematic pattern in the proportion making errors: wealthier people generally report fewer surprises than do the less wealthy. Yet overall, we conclude that standard economic variables do not appear to have much impact on the answers to question 17.

**Table 21**  
**Retired Households' Unexpected Changes in**  
**Spending after Retirement, by Net Worth**

Net worth	Responses	Less than Expected	As Expected	More than Expected
(\$000)	(n)	(%)	(%)	(%)
Below\$250	36	11.1	69.4	19.4
\$251-\$500	57	5.3	75.4	19.3
\$501-\$750	57	14	75.4	10.5
\$751-\$1,000	35	8.6	71.4	20
\$1,001-\$1,500	53	11.3	73.6	15.1
\$1,501-\$2,000	34	5.9	88.2	5.9
\$2,001+	38	2.6	81.6	15.8

Source: Authors' tabulations of 2001 survey data.

## 6.4 The Underprediction Bias of Low Planners

Many questions in the survey were focused on the extent of household planning activities. The various measures used and their connections to wealth accumulation are the subject of a companion paper (Ameriks, Caplin, and Leahy [2001]). The most straightforward summary measure of planning activity is a question that is entirely qualitative. We asked respondents to indicate which of six statements (disagree strongly, disagree, disagree somewhat, agree somewhat, agree, and agree strongly) best characterized their attitude toward the assertion in question:

- Question 1a: I have spent a great deal of time developing a financial plan.<sup>6</sup>

The following table shows that unlike our economic and demographic variables, self-reported planning activity had a strong and predictable impact on the answer to question 17: we amalgamate the very small number who disagree strongly into the disagree group in order to keep rows of relevant size.

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<sup>6</sup>One important point to note is the personal question in a household setting. To measure relevance, have asked questions on the extent the individual who filled out the survey sees planning and spending as under their control (see section ... below).

- I take the lead in making investment decisions in my household.
- I take the lead in making discretionary spending decisions in my household.

**Table 22**  
**Retired Households' Unexpected Changes in**  
**Spending after Retirement, by Intensity of Planning**

Has spent a lot of time planning	Responses	Less than Expected	As Expected	More than Expected
(Agreement, 1-6 scale)	(n)	(%)	(%)	(%)
Disagree	100	9.0	67.0	24.0
Disagree somewhat	85	9.4	76.5	14.1
Agree somewhat	243	7.8	77.0	15.2
Agree	194	11.3	75.3	13.4
Agree strongly	85	11.8	77.6	10.6
All	707	9.6	75.1	15.3

Source: Authors' tabulations of 2001 survey data.

The striking finding concerns the asymmetry. For those who have planned the most, the asymmetry is entirely absent. For those at intermediate levels of planning, the asymmetry matches its level in the broader population. For those who have done the least planning, the asymmetry is significantly more marked than it is in the broader population.

To test for the statistical significance of the planning effect, we do a simple regression of the quantitative error estimate in question 17b on planning. We use the same procedure as for question 16 to correct for the response rate differences on question 17b depending on the answer to question 17a. If the respondent reports expenses to have been other than as expected, but does not fill in a number, we fill in the conditional average response for those who provided the same answer to the qualitative question.

**Table 23**  
**Unexpected Spending Changes after Retirement:**  
**OLS Estimates of the Effect of Planning**

	Retired hhlds.		
Variable	Coeff.	<i>t</i>	Pr>  <i>t</i>
Constant	4.017	2.5	0.01
Planning	-0.793	-2.2	0.03
$R^2$		0.007	
N		707	

Source: Authors' tabulations of 2001 survey data.

The regression confirms that planning reduces the asymmetry in predictions of consumption expenses. The estimated coefficient of -0.79 is significant at the 3% level. The constant in the regression is 4. It appears that an individual who does no planning at all will significantly underestimate the level of retirement expenses, while one who does a great deal of planning (a qualitative answer of 5 or 6) will have no systematic error whatsoever. This

findings suggests that higher than expected expenses may be the result of systematic misperceptions that one can rectify with sufficient work. Clearly this is a topic that deserves further investigation.

## 7 Concluding Remarks

We present results from a new survey concerning retirement consumption. We find that the expected level of retirement consumption among working households is significantly lower than that reported by those already retired. We confirm that unexpected stock market appreciation plays a significant role in explaining the gap between expectation and outcome. Surprisingly high expenditure needs also appear to play a role. We find evidence that careful planning can reduce the impact of this second factor.

It is important to bear in mind that our sample is far from representative. Nevertheless, it is our belief that the main methodological lessons, as well as several of the substantive findings, will apply more generally.

## 8 Appendix

To estimate the underlying distribution of responses to question 16b, we begin by noting that the propensity to answer question 16b varies with the response to question 16a. All of those who answered that they expected no change were automatically assigned an answer of zero to question 16b. The response rate on question 16b conditional on responding to question 15 was therefore 100%. A higher percentage of those who said that they expected consumption to rise answered question 16b, than those who expected consumption to fall. For the non-retired these percentages are 95% and 92% respectively, and for the retired 85% and 82%. To account for these differences we make the assumption that conditional on their state (retired/non-retired) and their answer to question 16a, the non-respondents are distributed in the same manner as the respondents. This amounts to reweighting the answers to question 16b by the inverse of the conditional response rate.



Figure A1

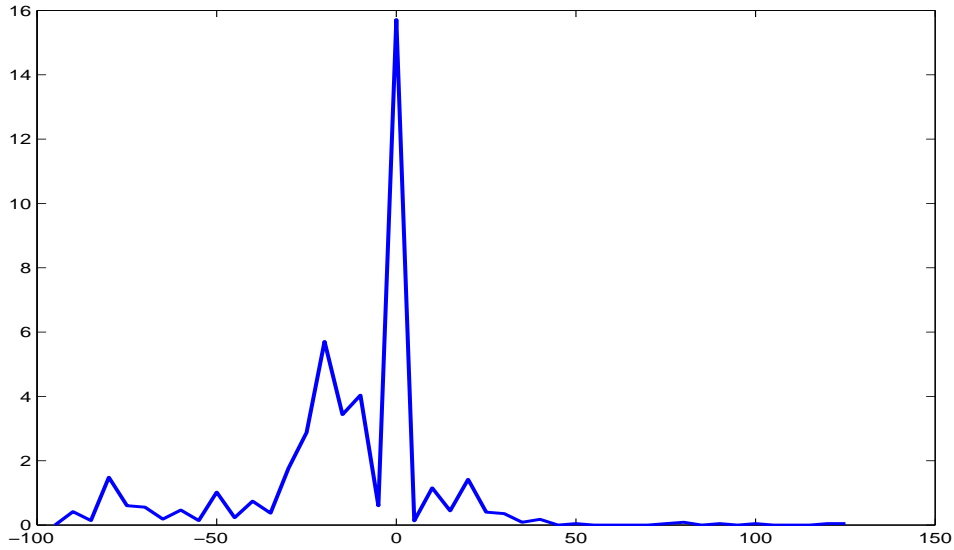
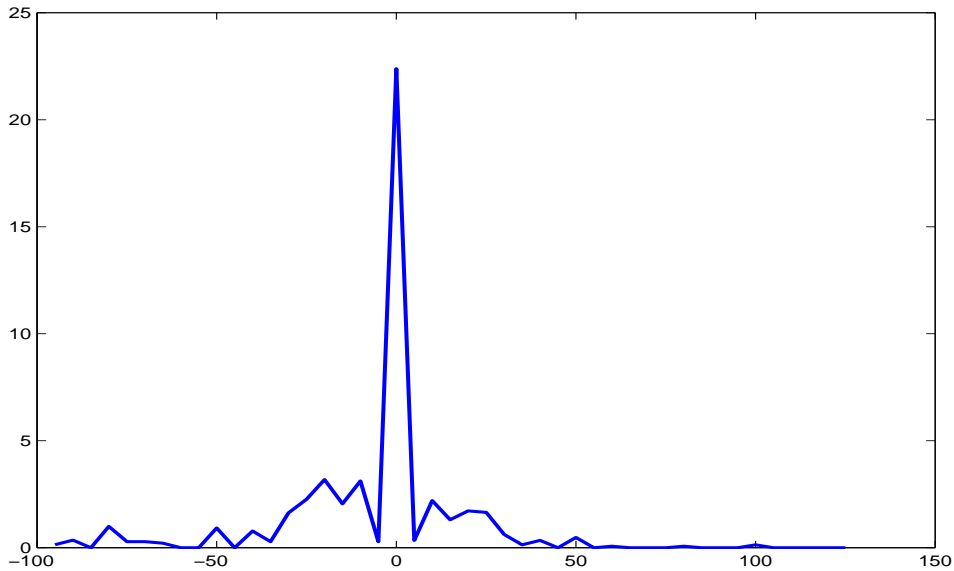


Figure A2



Figures A1 and A2 show the reweighted distributions of answers to question 16b for non-retirees and retirees respectively. Two features stand out. First, answers are generally rounded. Most of those who gave positive or negative values gave answers that are rounded to the nearest five, but some may have rounded to the nearest ten. More importantly, there appears to be a fairly generous interpretation of “no change”. The spike at zero is quite large and seems to draw mass from a fairly wide range about the origin. In the case of the non-retirees, respondents are more likely to answer  $\pm 20$  than  $\pm 5$ ,  $\pm 10$ , or  $\pm 15$ . Second, there is a hump in the distribution below  $-50\%$  centered at  $-80\%$ . These declines are implausibly

large. It appears that these agents provided the replacement ratio rather than the percent change in consumption.

We estimate the underlying distribution of responses by maximum likelihood, allowing for the behavior noted in the previous paragraph. If  $x$  is the underlying change in consumption, we assume that  $x + 100$  is log-normally distributed. We allow the mean and the variance of this distribution to depend on whether or not the respondent is retired. Let  $\mu_N$  and  $\sigma_N^2$  denote the mean and variance of the non-retired and  $\mu_R$  and  $\sigma_R^2$  the mean and variance of the retired. To handle the rounding to the nearest 5, we round all  $x$ 's to the nearest 5. Leaving the unrounded numbers has very little effect on the estimated coefficients. To handle the rounding to zero, we assume that respondent's with  $x \in [-15, 15]$  round to zero with probability  $1 - p(x)$ . We restrict  $p$  to be symmetric about zero and to be the same for both retired and non-retired. To handle the observations below -50, we assume that conditional on reporting that consumption will fall, respondents give the correct  $x$  with probability  $q$  and mistakenly report  $1 - x$  with probability  $1 - q$ . The probability  $q$  is assumed to be the same for both retired and non-retired and to be independent of  $x < 0$ .

The results of the estimation are as follows

**Table A1**  
**Maximum Likelihood Parameter Estimates for**  
**Distribution of Expected Change in Spending at Retirement**

Parameter	Value.
$\mu_N$	4.4777
$\sigma_N^2$	0.0403
$\mu_R$	4.5471
$\sigma_R^2$	0.0404
$q$	0.8407
$p(5)$	0.0863
$p(10)$	0.6922
$p(15)$	0.5192

Figures A3 and A4 show the data, the fitted distribution, and the underlying distribution. The mean of  $\mu_N$  corresponds to a geometric average of the changes in consumption of -11.97, whereas  $\mu_R$  corresponds to -5.64. A likelihood ratio test strongly rejects the equality of the two means. The test statistic of 53.8 is distributed  $\chi^2(1)$  and has a p-value below .001. These numbers understate the numbers in the text because means are negative, so that the zeros are more likely to be shifted below zero. This latter effect is small, however. If  $p(x)$  is restricted to one the mean drop for the non-retired becomes -11.25, whereas for the retired it equals -5.14.

Figure A3

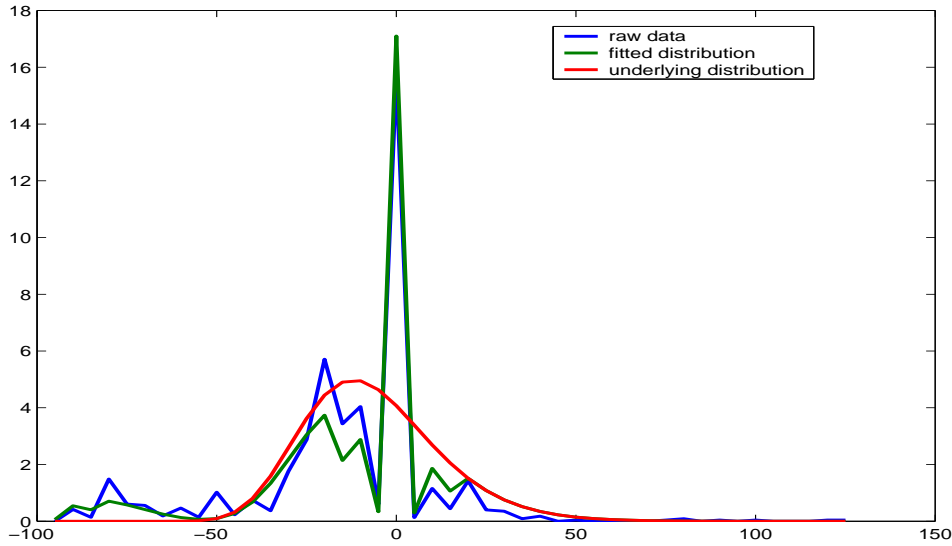
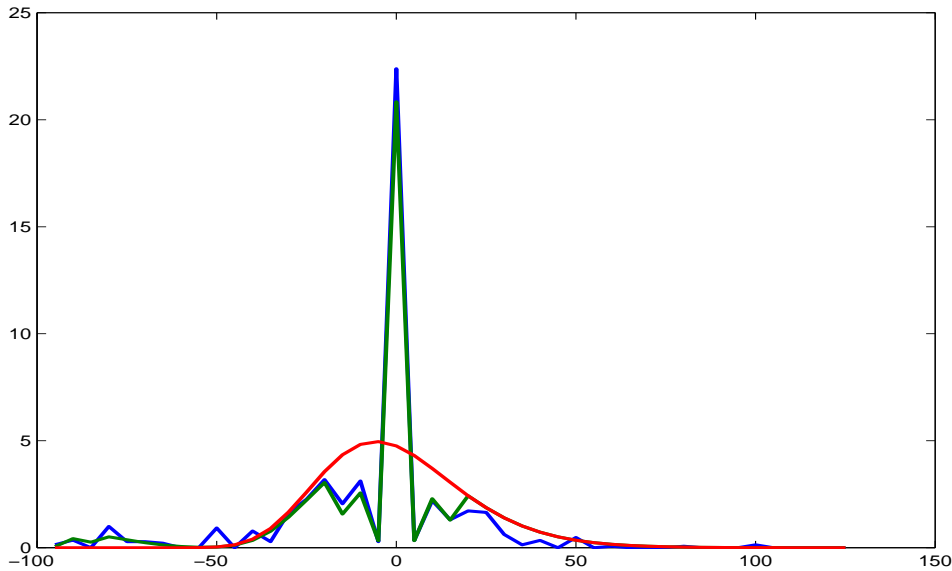


Figure A4



The estimation fits the hump below -50% fairly well. Most of the observations below -50% are ascribed to reporting error. The estimation fits generally well around zero. The propensity to round from  $\pm 5\%$  is estimated to be close to 85%. There is a greater propensity to round from 15 than from 10. One place that the model fails is in predicting the number at -50%. This answer is probably a focal point. It is clear that more work needs to be done on the propensity to round.

One implication of this procedure is to suggest that there few systematic errors would be made if we first assumed that all observations of expected falls above 50% were in fact

replacement ratios, and then ran the smoothing procedure. Indeed if we replaced the assumption of rounding error with the assumption that that all observations with  $x < -50$  are incorrect, the results are practically identical.  $\mu_N$  and  $p(15)$  rise very slightly to 4.4779 and 0.5193 respectively, and  $\mu_R$ ,  $p(5)$  and  $p(10)$  are essentially unchanged.

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