Age, Investing Horizon and Asset Allocation

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In contrast to standard financial advice, most empirical evidence suggests that stockholding increases with age. One difficulty in interpreting this is that age may not effectively proxy for investing horizon or that age may be proxying for other effects, such as increases in financial sophistication. Using data from the most recent Survey of Consumer Finances this paper finds that age is not closely related to reported investing horizon and that proxies for investment horizon and financial sophistication are significant for stockholding.

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1. Introduction

1.1 Overview

One of the basic questions in household finance is how age should affect the allocation of household assets. Standard financial advice is that the share of assets held as stock should diminish as the investor gets older. Reasons given for this include the possibility that labor income allows investors to adjust to poor investment results (Bodie, Merton and Samuelson, 1992) and also the presence of negative serial correlation in stocks over the long run could cause investors with longer investment horizons to face less risk (Cochrane, 1999).

However, in contrast to standard advice, empirical evidence suggests that the fraction of assets held as stock increases as investors get older. One difficulty in judging the importance of this result is that the theoretical models make predictions based on investment horizon while the empirical research uses investor age. While it is plausible that younger investors have longer investment horizons, it may not necessarily be the case. For example, younger investors may be saving for a house or for college for their children giving them relatively short investment horizons. In addition, as individuals get older they may become more financially sophisticated, and there is strong evidence that education, and so presumably financial sophistication, affects asset allocation.

This paper investigates this issue using data from the Survey of Consumer Finances (SCF). The SCF asks households both what their investment horizon is and why they are investing, which can be used to separate out the effects of investment

horizon and age. The survey also asks about various investment and employment activities, which can be used as proxies for financial sophistication.

This paper shows that age is not simply related to reported investment horizon. Age and investment horizon are almost uncorrelated in the data set as both older and younger households tend to have shorter investment horizons. This affects how regressions of stockholding on age are interpreted. Studies that are testing the effect of investment horizon on stockholding by using age as a proxy are probably testing a different relationship instead. To investigate this, the paper regresses stockholding on age along with a number of proxies for investment horizon and financial sophistication. The inclusion of these variables substantially reduces the magnitude and statistical significance of the coefficient on age. The coefficients on the variables for investment horizon and financial sophistication are generally of the expected sign. This regression shows that the empirical evidence is not necessarily inconsistent with standard financial advice.

1.2 Literature Review

Basic financial theory (e.g. Samuelson, 1969) suggests that expected lifetime should not matter for the portfolio decisions of individuals. However, this contrasts markedly with traditional investment advice, that as individuals get older they should reduce their holdings of risky assets. Furthermore, within the category of risky assets, it is recommended that investors shift their holdings to less risky investments, such as from stocks to bonds. Both ideas contrast with the empirical evidence that tends to find

stockholding increase with age, at least up to a point. Two broad approaches have been taken in response to these contradictions. First, some have argued theoretically that age *should* affect stockholding, either positively or negatively. Second, it may be that age is not a good proxy for investment horizon in empirical studies.

In the public sphere, the theoretical justification often given for young people holding more stock is long-run negative autocorrelation in stock prices (Siegel, 1998, Cochrane, 1999). Stocks are relatively less risky compared with bonds over longer horizons making them more appropriate for young investors with long investment horizons.

Academic arguments have tended to focus on the interactions between labor markets and investment returns. Bodie, Merton and Samuelson (1992) point out the labor income can allow individuals flexibility in responding to poor investments results – if stock market returns are low, individuals can compensate by working more. Viciera (2001) offers an alternate implication for labor income. Risk-free labor income is in effect a "forced" investment in a risk-free asset, leading individuals to take a riskier position with their financial wealth. As individuals age, the lifetime importance of labor income diminishes and (to the extent that risk-free pension income is lower than labor income) should cause individuals to reduce the risk of their financial portfolio. In contrast, Benzoni, Collin-Dufresne and Goldstein (2007) argue that labor income is cointegrated with dividend payments, so that labor income is a stock-like investment, which makes young households want to hold less of their financial wealth as stock. From simulations, they find that optimal stock holding should have a "hump shape", first increasing with age and then decreasing with age. Cvitanic, Goukasian, Zapatero, (2006)

also find a hump-shaped pattern for stockholding in a continuous time model of portfolio choice with labor flexibility. Heaton and Lucas (2000) point out that certain kinds of jobs may have higher labor risk and so this would lead individuals with those jobs to invest less in stock.

Most empirical studies of portfolio decisions include age as an explanatory variable, with the assumption that older individuals have a shorter life expectancy and investing horizon. Broadly, studies find that stockholding increases with age until near retirement. After that, results tend to be inconclusive. Cohn, Lewellen, Lease, Schlarbaum (1975), Kullmann, Siegel, (2003) Wang and Hanna (1997) find that stockholding increases with age. Riley and Chow (1992) find that it increases with age until age 65. The evidence from Bertaut Star-McCleur suggests that being older and younger reduces stock holding compared with middle-age individuals. Ameriks and Zeldes (2001) find a similar hump shape.

Shum and Faig (2006) use SCF data find a hump-shaped pattern for age. They add in dummy variables for eight different reported savings motives. They find that households with retirement as a motive (and presumably a longer investment horizon) tend to hold a larger share of their wealth as stock while those who are investing to purchase a home (presumably with a shorter investment horizon) hold less wealth in stock.

Several studies have looked at how health, along with a number of other factors including age, affects the stockholding decisions of older individuals. Rosen and Wu (2004) generally find conflicting or insignificant results for age. Berkowitz and Qiu (2003) also find conflicting and insignificant results for married couples but age

decreases stockholding for singles. Edwards (2003) also finds that stockholding decreases with age for this age group.

Of course, there are a number of factors that age can proxy for, which can effect the interpretation of these studies. Most important may be "cohort" effects. With improvements in financial technology, the cost of investing in non-bank assets has fallen. Younger individuals may have grown up in an environment more conducive to investing in stock. Also, wealth increases with age, and for some utility functions, higher wealth implies lower risk aversion and so greater stockholding. And if there are transactions costs associated with becoming a stock holder or managing more sophisticated financial instruments, greater wealth could make individuals more likely to hold stock. Alternatively, if financial sophistication is developed by experience, in addition to formal education, older individuals may have accumulated more familiarity with financial products and may be more willing to invest in risky assets.

Most studies generally include controls for wealth and education. Both higher wealth and greater education are found to increases stockholding. The importance of education suggests that financial sophistication may be important for the portfolio allocation decision.

1.3 Survey of Consumer Finances

This paper uses the most recent (2004) round of the SCF. The SCF is performed triennially by the Federal Reserve and focuses on obtaining detailed financial information from the respondents. The manner in which the data is collected and reported has several

special features that must be taken into account when performing statistical analysis. First, the survey oversamples wealthy households. The reason for this is certain financial decisions of interest are much more likely to be made by wealthier households and so enough households of this type need to be included in the sample to make the results meaningful. Because of this, averages calculated from the data do not reflect population averages.

A second feature of the data set is that missing values are replace by "imputed values". The Federal Reserve uses a multiple imputation procedure (Montalto and Sung, 1996), which creates five observations from each initial observation. This makes the size of the data set look five times larger then it actually is, making the standard errors smaller then they really are. The suggested procedure for dealing with this comes from Montalto and Sung (1996), which is to run five separate regressions with each imputed data set and then determine the appropriate average values of the standard errors and coefficients.

2. Age, Investing Horizon and Reasons for Investing

A common hypothesis is that investment horizon should affect the share of wealth invested in stock. Typically, age is used as a proxy for investment horizon with the expectation that older individuals have shorter horizons. The finding that investors tend to hold more stock as they get older has led to a theoretical reconsideration of the relationship between horizon and stock holding. However, the importance of this result depends on the quality of age as a proxy for investment horizon.

The SCF is able to provide some insight into this issue. The SCF asks households the following question:

> "In planning (your/your family's) saving and spending, which of the time periods listed on this page is most important to [you/you and your (husband/wife/partner)]?" with the choices being: "1. Next few months, 2. Next year, 3. Next few years, 4. Next 5-10 years, 5. Longer than 10 years".

This paper will combine time periods 1-3, rescaling the answers to be: 1. short run (combining answers 1, 2 and 3), 2. medium run (answer 4), and 3. long run (answer 5). Table 1 reports the distribution of responses in the data set. Again, it should be noted that the survey oversamples higher-income individuals, and so the distribution of investment horizons in the data may not match the distribution of the investment horizons in the population at large.

Table 1. Distribution of investment horizons

	#
< 5 years	12,004
5- 10 years	6,513
> 10 years	4,078

If age is a good proxy for investment horizon then we should see a high degree of correlation between the two variables. However, the correlation of average age with investment horizon in this data set is 0.03. There is basically no relationship between age

and investment horizon. Studies that are using age as a proxy for investment horizon are then likely misinterpreting the reason for the significance of age. Theoretical studies that are trying to explain why stockholding increases as investment horizon decreases are trying to explain the wrong fact.

We can break down investing horizon and age by categories. Table 2 shows the proportion. Older and younger households tend to have the shortest investment horizons.

Table 2. Investing horizon by age.

Age	Short	Medium	Long
21-40	63%	21%	16%
41-60	45%	34%	21%
Over 60	57%	29%	14%

To examine this further, we can use an additional question from the SCF. Households are asked why they invest. The specific question is:

> "Now I'd like to ask you some questions about your attitudes about savings. People have different reasons for saving, even though they may not be saving all the time. What are your most important reasons for saving?"

Households are asked to choose from a list of reasons (Table A1 in the appendix). For this paper, the reasons are divided into four categories: (1) Spending: which involves saving in order to buy a particular item such as a house, or to pay for expenses such as education, (2) Liquidity: saving in order to accumulate assets to have on hand in case of

an emergency or a sudden need for money (3) Retirement: saving for retirement, and (4) Other: responses that do not fit into the other three categories.

Households are allowed to give up to six reasons for saving. This reflects the fact that people do have several reasons for saving, but makes it difficult to evaluate which are primary and secondary motives. However, the number of reasons given drops off dramatically after the first two. Because the distributions of the first and second reason are similar, the first reason given will be taken as the primary motive for saving.

Table 3 contains the distribution of investment motives. Table 4 cross-tabulates the reason for saving with the investing horizon. Saving for retirement is the most common category; however, the majority of people do not list it as their first reason.

Table 3. Distribution of investment motives.

	#
Spending	5,471
Liquidity	5,184
Retirement	8,243
Other	2,948

Table 4. Primary reason for investing and investment horizon.
(all households, percent of total, 1 = shortest horizon)

	Investing Horizon			
	1	2	3	N
Spending	63	24	13	5471
Liquidity	60	25	15	5184
Retirement	41	35	23	8243

Other	55	27	18	3697

Table 5. Primary reason for investing and investment horizon.
(for households with stock, percent of total)

	Investing Horizon			
	1	2	3	N
Spending	51	29	20	2691
Liquidity	48	30	22	2853
Retirement	36	37	26	6277
Other	41	33	26	1981

Those saving for retirement tend to have longer horizons, although the effect is not pronounced. When the sample is restricted to stockholders (Table 5) the effect is slightly larger, although still not great. The majority of households do not list retirement saving as their primary reason for saving, and for those who do, they still report a relative short investment horizon. This is a likely reason that age is not a good proxy for investment horizon, young people who are commonly assumed to have long investment horizons may actually have shorter-run savings goals.

The interaction between horizon and saving motive is complicated by the fact that young people saving for a distant retirement and old people saving for an upcoming retirement will have vastly different investment horizons. However, the correlation between age and investing horizon, for households who list “Retirement” as their primary saving motive, is small and negative (-0.08).

3. Education and Financial Sophistication

Age may also affect the financial sophistication of the investor. As an investor gets older, they accumulate more knowledge about investing options and strategies, which may lead them to be more likely to invest in relatively more sophisticated assets such as stocks and bonds. It is well established that increased education leads to an increased asset allocation towards stocks, presumably because a better education makes it easier to evaluate more complicated financial assets (e.g., Rosen and Wu, 2004, Bertaut and Start-McCluer, 2000, Wang and Hanna, 1997).

The difficulty in measuring this effect is the lack of a good measure of financial sophistication. In addition to education, the SCF offers several possible proxies. The first question addresses how active the household is in shopping for the best financial deals:

> When making major saving and investment decisions, some people shop around for the very best terms while others don't. What number would (you/your family) be on the scale? 1. ALMOST NO SHOPPING 2. 3. MODERATE SHOPPING 4. 5. A GREAT DEAL OF SHOPPING.

Presumably a household that shops more extensively when making savings and investment decisions would be more financially sophisticated.

A second question asks if the household gets outside advice or information when making investment decisions.

> How do you (and your [husband/wife/partner]) make decisions about saving and investments? (Do you call around, read newspapers, magazines, material you get in the mail, use information from television, radio, an online service or advertisements? Do you get advice from a friend, relative, lawyer, accountant, banker, broker, or financial planner?

Households that report getting advice from accountants, bankers, brokers or financial planners are assumed to get financially sophisticated advice. Being in an investment club or attending investment seminars is also listed as an option, which seems ideal as a measure of financial sophistication, but too few households report this to be useful.

Individuals may also become financially sophisticated if they work in jobs in the financial services industry. The public data set for the CFS aggregates industries at a rather broad level. Industry category 5 includes generally "white collar/service" industries: software publishing, data processing, finance, insurance and real estate, leasing, employment services, investigation, and repair. Unfortunately, finance, insurance and real estate are not available independently, making this a relatively crude measure. However, it may carry some content about financial sophistication.

Table 6 shows the average values of education, willingness to shop around (1-5), professional advice (0/1) and works in sophisticated (category 5) industry (0/1) for each age category. As can be seen, middle-aged investors tend to be more sophisticated than other groups.

Table 6. Average values of financial sophistication measures by age.

Age	Education in years	Shop Around (1-5)	Get Professional Advice (0/1)	Work in sophisticated industry (0/1)
21-40	13.55	3.05	0.45	0.17
41-60	14.27	3.09	0.58	0.22
Over 60	13.47	2.88	0.61	0.18

An alternate approach is to look at the level of sophistication exhibited by the investing decisions taken by the household. Holding individual stocks and bonds, in contrast to stock and bond mutual funds, likely requires a greater degree of effort and financial sophistication. In principle, holding individual stocks and bonds does not bias the investor towards holding stocks, since one could still hold stocks by holding mutual funds. In practice, this may not be so. The number of households who hold individual stocks is much larger than the number who hold individual bonds.

4. Regressions

4.1 Overview

Since investing horizon is not closely connected to age, it is valuable to determine whether investing horizon has the predicted effect on stockholding, and what, if any, effect age has once investment horizon is controlled for. This section reports the results of regressions of the share of financial wealth held as stock on age, investment horizon

and selected other control variables. Because age may be proxying for more than just investment horizon, proxies for financial sophistication as discussed in section 3, along with other socioeconomic variables, will be added.

4.2 Financial Variables

The measure of financial wealth is constructed following the measure used by the Federal Reserve Board and provided on their webpage (Survey of Consumer Finances, 2007). Financial wealth consists of checking accounts, savings accounts, money market deposit accounts, money market mutual funds, call accounts at brokerages, certificates of deposit, non-money-market mutual funds, stocks held directly, bonds held directly, and what are referred to quasi-liquid retirement accounts (IRA's, 401(k)'s, 403(b)'s and other thrift-type accounts), savings bonds, cash value of whole life insurance and other managed assets (trusts, annuities and managed investment accounts).

The amount of financial wealth invested in stock consists of stock held directly or in stock mutual funds, along with a share of the value of other assets allocated to stock. Households with less than $10,000 in financial assets will be excluded from the regressions as it would be more difficult for them to hold stocks.

4.3 Other Variables

Other variables in the regression have been added if it has been suggested that they may matter for stockholding based on *a priori* reasons or have been found to be significant in other studies. Summary statistics are given in Table 7.

Wealth will be positively correlated with age and may have an effect on asset allocation. Richer households may be less risk averse (resulting in an increase in stockholding) or may find it more advantageous to invest in tax-advantage assets such as municipal bonds (resulting in a decrease in stockholding). The paper uses financial wealth (as discussed in section 4.2) as the measure of wealth. Income is self-reported income from tax statements, including wages, rents, business income, unemployment compensation, child support, public income, but not income from investments (due to endogeneity issues)

It is likely that better-educated individuals will be better able to learn about how to invest in stocks. The paper will use the average number of years of education of the principals (respondent and spouse, or just the respondent for single households) of the household as the measure of education.

Table 7. Data Summary

	Mean	Standard Deviation	Min	Max
Age	52.8	13.8	21	95
Wealth*	5,139,269	2.18	10,000	6.50e08
Income	798,540	3,794,631	-729,000	1.02e08
Black	0.05	0.22	0	1
Hispanic	0.04	0.18	0	1
Married	0.76	0.43	0	1
Single Female	0.13	0.34	0	1
Investing Goal = Retirement	0.45	0.50	0	1
Have Retirement Account	0.80	0.40	0	1
Long Investing Horizon	0.23	0.42	0	1
Short Investing Horizon	0.43	0.50	0	1
Shop Around When Investing	3.16	1.38	1	5
Get Professional Advice	0.65	0.48	0	1
Work in Industry 5	0.24	0.43	0	1
Hold individual Stocks	0.50	0.50	0	1
Share of Wealth As Equity	0.37	0.32	0	1

*Median = 237,050, income = 87,500; n=15,213

Several other variables reflecting financial sophistication will be added including how much the household shops around when investing (ranging from 1 to 5), whether they get professional advice and whether they work in a "sophisticated" industry (see section 3 for a description of these variables).

Shum and Faig (2006) found that including a dummy variable indicating if retirement was an investing goal predicted higher stockholding. This variable will be added to the regression along with a variable that takes the value of 1 if the household has funds in a retirement plan, which would indicate that they are actively thinking about retirement.

There is some evidence that shareholding differs across ethnic groups. Dummy variables for Black and Hispanic will be included in the regression as controls. Marital status will also be controlled for by including a dummy variable for married households. Also, since it has been argued that stockholding may be dependent on sex, a dummy variable for being single and female will be added.

One factor that cannot be controlled for is cohort effects (Ameriks and Zeldis, 2001). It may be that economic circumstances affecting the desirability of holding stock have changed over time. For example, with the recent reduction in the transactions cost of purchasing stock and the general increase in stockholding, it may be the case that people become familiar with stock at a younger age. In this case, young people may be more willing to hold stock than older people who were socialized about investing in a time where stock was a less common investment. If it was found that young people are more likely to hold stock, it would be difficult to separate this explanation from the explanation that investors are following standard investment advice. However, the

evidence is that people hold more stock as they get older, so the cohort explanation just increases the puzzle.

4.4 Regression Results

The results of the ordinary least squares regressions are reported on Table 8 (the regressions were also repeated with a Tobit specification; however, the results were very similar and so are not reported here). Standard errors are calculated following Montalto and Sung (1996) to correct for the multiple imputation procedure used for the SCF. The dependent variable is the share of financial wealth held as equity. The results for the base specification are reported in the first column of Table 8. For this specification, the independent variables include wealth, income, age and education, but do not include the other proxies for investment horizon and financial sophistication. We see that stockholding increases with age, although at a decreasing rate – the traditional humped-shaped pattern. The other results are also consistent with previous studies. Higher wealth leads to greater stockholding. Income is not significant, but that may reflect the fact that temporary fluctuations in income should not strongly affect wealth or asset allocation (the correlation of wealth and income in the sample is 0.35 which suggests that much of the differences in income reflect changes over the lifecycle or year-to-year factors). Higher education leads to more stockholding, with about an additional 3 percentage points per year of education. Being Black or Hispanic leads to less stockholding. As with similar regressions, the R^2 for the stockholding regressions is low, indicating that while a number

of the variables are statistically significant, they are not explaining the majority of stockholding behavior.

To see if age is capturing the effect of investment horizon or financial sophistication, additional variables are added that proxy for these factors. The results are reported in the second column of Table 8. In general, the coefficients on the control variables are of the expected sign, but are of relatively small magnitude and sometimes

Table 8. Regression Results – OLS: Dependent variable is percent of wealth held as equity[a]

	(1) All Households	(2) All Households	(3) Only Stockholders	(4) Only Stockholders	(5) Only Retirement Funds
Age	0.011***	0.004	0.002	0.002	0.004
	(0.003)	(0.003)	(0.003)	(0.003)	(0.005)
Age Squared	-0.0001***	-0.0000	-2.37e-6	-3.07e-6	-0.0000
	(0.0000)	(0.000)	(0.0000)	(0.0000)	(0.0000)
Wealth	0.033***	0.031***	0.021***	0.017***	0.016*
	0.008	0.007	0.006	(0.006)	0.008
Wealth Squared	-8.25e-18**	-7.58e-18**	-5.21e-18**	-4.19e-18**	-3.98e-18
	(3.50e-18)	(3.34e-18)	(2.61e-18)	(2.33e-18)	(3.28e-18)
Income	-0.006	-0.013	-0.007	-0.24	0.005
	0.032	0.031	0.033	0.032	0.046
Income Squared	-0.005	-0.004	-0.004	-0.002	-0.005
	0.005	0.005	0.005	0.004	0.006
Black	-0.121***	-.101***	-0.079**	-0.056	-0.120***
	(0.031)	(0.030)	(0.040)	(0.040)	(0.043)
Hispanic	-0.078**	-0.0053*	0.003	0.021	-0.061
	(0.031)	(0.030)	(0.040)	(0.040)	(0.050)
Married	0.010	-0.017	-0.030	-0.031	-0.057**
	(0.018)	(0.023)	(0.020)	(0.020)	(0.028)
Single Female	-0.034	-0.030	-0.036	-0.025	-0.081**
	(0.024)	(0.023)	(0.028)	(0.027)	(0.037)
Education	0.032***	0.028***	0.020***	0.017***	0.025***
	(.003)	(0.003)	(0.003)	(0.003)	(0.005)
Investing Goal = Retirement		0.027**	0.021*	0.020	0.010
		(0.012)	(0.012)	(0.012)	(0.017)
Have Retirement Account		0.154***	0.010	0.027	
		(0.013)	(0.020)	(0.020)	
Long Investing Horizon		0.031**	0.032*	0.027	0.038*
		(0.015)	(0.017)	(0.016)	(0.022)
Short Investing Horizon		-0.016	-0.005	-0.003	-0.015
		(0.014)	(0.015)	(0.015)	(0.021)
Shop Around When Investing		0.003	0.004	0.002	0.007
		(0.004)	(0.005)	(0.004)	(0.006)
Get Professional Advice		0.018	0.002	0.001	0.024
		(0.012)	(0.013)	(0.012)	(0.017)
Work in Industry 5		0.039***	0.024*	0.016	0.068***
		(0.013)	(0.014)	(0.014)	(0.022)
Hold Individual Stocks				0.106***	
				(0.016)	
N	15,213	15,213	12,797	12,797	12,140

R^2	0.10	0.15	0.05	0.07	0.05
F	31.74***	29.24***	8.09***	11.81***	7.74***

Standard errors in parentheses. *** significance at the 1% level, ** significance at the 5% level, * significance at the 10% level.

[a]For columns (1) and (2), the dependent variable is the share of financial assets held as equity. For columns (3) and (4), the dependent variable is the share of financial assets held as equity and the regressions include only households who hold positive amounts of equity. For column (5), the dependent variable is the share of retirement assets held as equity and the regression only includes households who have retirement assets. In all regressions, households with financial wealth less than $10,000 were excluded.

not statistically significant. If the household reports that their saving goal is "retirement", it only increases the equity share by around 3 percentage points. Actually having a retirement account does make a significant decision in stockholding. Those with retirement accounts are likely to make investment decisions based on planning for a longer-term future, in other words, having longer investment horizons. In addition, setting up a retirement account actively involves the individual in making decisions about investing for the future where stocks are often given as an explicit option. Households that report long investing horizons hold more stock and households that report short investing horizons hold less stock (although this coefficient is not significantly significant), but switching from a short horizon to a long horizon only increases stockholding by about 4-1/2 percentage points. Households that shop around when they invest or get professional advice do not hold statistically significantly more stock but working in a "sophisticated" industry does lead to more stockholding, although the effect of 4 percentage points is relatively small.

Adding the various proxies reduces the magnitude of the coefficient on age substantially and eliminates its statistical significance. An explanation of this is that as you get older you are more likely to be thinking about retirement and to be financially sophisticated. While nominally you may have a shorter investment horizon, as a practical matter your investing behavior may have a longer-run focus. This longer-run focus leads you to hold more stock. Overall, the results of the augmented regression equation are consistent with standard financial advice.

Column 3 restricts the regression to only those households who hold stock. The results are similar although the dummy variable for having a retirement account loses

magnitude and statistical significance. This suggests that an important part of the process of thinking about retirement is to get individuals to consider holding stock at all.

Column 4 adds to the stockholders-only regression a dummy variable for whether the household owns stocks and bonds outright or just in mutual funds. This variable is highly significant and of appreciable magnitude. Households that own stocks and bonds outright have 10% more of their wealth held as stock. Presumably holding stocks outright requires greater financial sophistication which leads to a greater willingness to hold stock.

Column 5 reports the results for a regression with the dependent variable being the share of retirement funds ("quasi-liquid retirement accounts") held as equity. The sample was restricted to households who have such accounts. Limiting the dependent variable to retirement funds may be interesting since retirement is clearly an investing goal for these assets. Because of the different tax treatments, households may not want the same mix of assets in their tax-deferred accounts as in their non-tax-deferred accounts. Dammon, Spatt and Zhang (2004) argue that tax-advantaged retirement accounts, such as IRAs, should have a larger fraction of their assets in bonds rather than stocks, and indeed in some cases should consist of nothing but bonds. This is because income from bonds is subject to immediate taxation while the tax obligations of the capital gains for stock can be deferred even if not in a tax-advantaged account. However, money in retirement accounts is more clearly targeted towards retirement (and presumably a longer investment horizon) and so may be more likely to be invested in stock. Bergstrosser and Poterba (2004), using data from prior SCFs, find that retirement accounts have substantial amounts of equity and that asset allocation in taxable and tax-

deferred accounts are similar. This paper also does not find a bias against holding equity in retirement accounts. For the data examined in this paper, the share of retirement accounts held as equity (for those with retirement accounts) is 0.47 (standard deviation = 0.39) contrasted with 0.33 (standard deviation of 0.33) in their non-retirement accounts.

Again, the results from the regression are similar, although having retirement as a goal loses statistical significance, not surprisingly since having a retirement account is already a strong indicator of retirement saving as a goal. The magnitude of the coefficients for "single female" and "married" increase significantly and they now are statistically significant. Presumably this reflects a higher risk tolerance for single men in retirement planning. This may be of some concern as a practical matter, as the long life span of women may argue for a more aggressive approach to investing rather than a more conservative one.

5. Conclusion

Common financial advice is that people should hold less stock as they get older; however, empirical evidence shows an opposite effect. A variety of reasons have been suggested for this. This paper investigates two ideas: that young investors are saving for other reasons besides retirement, which means they have shorter investing horizons, and that young investors are less financially sophisticated.

The paper finds that investment horizon is not closely connected to age. Regressions also show that households who say that they have longer investing horizons, or are investing for retirement, *do* hold more stock, although the magnitude of the effect

is not terribly large. This suggests that theories that are trying to construct an explanation for why stockholding increases with age by focusing on investment horizon are solving the wrong puzzle. Stockholding reacts to investment horizon in the predicted direction. It's the effect of age, after controlling for investment horizon, that needs to be explained.

The data also suggest that experience may play a significant role in asset allocation. Education is the variable that is the most consistently statistically significant across the regressions in predicting shareholding. Also, the statistical significance of age disappears when looking at asset allocation in retirement accounts. It may well be that planning for retirement and making financial decisions for specialized accounts will result in individuals with a greater knowledge of financial opportunities and a willingness to hold stock. While theories of optimal stockholding tend to focus on wealth and risk aversion, certainly important factors, there needs to be an increased emphasis on behavioral factors in explanations of individual financial management.

Appendix

Table A1. Categorization of SCF investing motives.

SPENDING
Children's education; education of grandchildren Own education; spouse/partner's education Wedding, Bar Mitzvah, and other ceremonies To have children/a family To move Buying own house Purchase of cottage or second home for own use Buy a car, boat or other vehicle Home improvements/repairs To travel; take vacations; take other time off Buy durable household goods, appliances, home furnishings; hobby and recreational items; for other purchases not codable above or not further specified;"buy things when we need/want them"; special occasions Burial/funeral expenses Charitable or religious contributions "To enjoy life" Buying (investing in) own business/farm; equipment for business/farm To meet contractual commitments (debt repayment, insurance, taxes, etc.), to pay off house Ordinary living expenses/bills Pay taxes To give gifts; "Christmas"
LIQUIDITY
Reserves in case of unemployment In case of illness; medical/dental expenses Emergencies; "rainy days"; other unexpected needs; for "security" and independence Liquidity; to have cash available/on hand
RETIREMENT
Retirement/old age
OTHER
"For the children/family", n.f.s.; "to help the kids out"; estate Investments reasons (to get interest, to be diversified, to buy other

forms of assets)
"To get ahead;" to advance standard of living
No particular reason
"For the future"
Like to save
Don't wish to spend more
Had extra income; saved because had the money left over -- no other purpose specified
Wise/prudent thing to do; good discipline to save; habit
"Wealth preservation"; maintain lifestyle
No Saving

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