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Household Income, Asset Allocation, and the Retirement Decision

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Abstract

We examine the financial condition of households as they move into retirement and the relative influence of wealth and income on the decision to retire. We find no significant difference between the net worth of retired and nonretired households, suggesting that retirees are no more adequately prepared for retirement than the nonretired subsample. With respect to portfolio allocation, retired households have significantly more financial assets, with a concentration in fixed-income securities, but home equity accounts for nearly half of their net worth. In addition, other household members' employment earnings generate approximately 40% of income for retired households. © 2003 Academy of Financial Services. All rights reserved.

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1. Introduction

Within the area of personal finance, several trends have lent emphasis to the importance of individual retirement planning. Among those trends are the aging of the baby-boom generation, a general increase in average life expectancy, and the increasingly apparent burden that both of these issues are placing on the federal Social Security system. Indeed, while the future condition of Social Security is an issue of intense debate, there is general

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agreement that it will not continue in its current form (Tacchino and Saltzman, 2001; Fraser, Jennings and King, 2000). In addition, within private industry there has been consistent movement away from defined benefit retirement plans that are primarily created and administered by employers toward defined contribution plans that require more active employee participation (Bodie and Crane, 1999; Anthes and Most, 1999). The combination of these trends has placed increasing significance on an individual's responsibility to financially plan for his/her retirement years.

In response to these trends, there is a growing body of literature addressing the financial issues of retirement. While the focus of studies has varied, a point of commonality among the literature to date has been the general lack of detailed retirement data. As a result, the majority of studies have been forward-looking, focusing on the process of preparing for retirement, but remaining fairly limited in what can be said once individuals actually reach retirement.

The purpose of this study is to examine what is actually being done to financially prepare for retirement as compared to the theoretical and empirical arguments for what individuals should be doing. Specifically, we use four waves of the Health and Retirement Study (HRS) to analyze the financial condition of a sample of households as they move into retirement. We examine the allocation of assets, sources of income, and the adequacy of the preparation for retirement. We then test for the relative influence of these variables on the decision to retire. Note that while the retirement decision is likely to be significantly influenced by nonfinancial variables (e.g., health status, marital status, utility of leisure, etc.) as well, we leave these issues to be addressed in future research.

The paper proceeds as follows. We provide a review of the relevant literature in Section 2, and an overview of our data and the methodology we employ in Section 3. We present our empirical results in Section 4 and conclude the paper in Section 5.

2. Literature review

The retirement literature most related to this study is the research that examines the allocation of assets in preparation for retirement and the overall adequacy of financial assets to support retirement needs. Asset allocation studies consider the optimal mix of assets to be chosen in preparing for retirement. Retirement adequacy studies estimate the level of resources necessary to meet postretirement consumption needs, and based on these projections, assess the adequacy of preretirement preparation. Both areas of research develop expectations for the financial condition of retirees, and are therefore, the relevant basis for this study.

2.1. Asset allocation

To date, financial practitioners have traditionally recommended that young investors weight their investment portfolio more heavily with equity and then gradually shift the allocation towards fixed-income securities as they approach retirement. For example, a

commonly cited rule of thumb is that the equity allocation in an investor's portfolio should equal 100 minus the investor's age.

With the trends toward increasing longevity and earlier retirement (see Quinn, 2001), however, this traditional advice has recently been called into question. For example, in her assessment of common errors among seniors, O'Neill (1996) argues that a shift towards conservative investment vehicles at retirement is erroneous. She maintains that because the retirement period may realistically span 20 to 30 years, holding equity investments is the best avenue for providing adequate long-term returns. Similarly, Opiela (2001) reviews recent trends among financial planners, and cites several sources supporting a 70% equity allocation among retirees to address the increasingly long retirement period. Finally, Bengen (1996) uses three anecdotal cases to demonstrate his general recommendation that between 50% and 75% of assets be allocated to stocks at the beginning of a client's retirement period.

Greninger, Hampton, Kitt, and Jacquet (2000) conduct a Delphi study of 75 financial planners and 113 university-level financial educators in an effort to gauge the level of consensus in retirement planning advice. Among their results, they find the consensus regarding optimal asset allocation to be relatively weak, with 60% of those surveyed agreeing that it is prudent to move towards more conservative investments three to five years before retirement, but another 20% advising this strategy to never be prudent.

As divergent as the expert opinions regarding asset allocation appear to be, the results of empirical research have also been mixed. For example, Butler and Domian (1991), Thorley (1995), and Bierman (1997) analyze historical returns of different asset classes and find that longer investment horizons should be associated with relatively heavier equity investment while shorter horizons require proportionally more fixed-income securities. Similarly, Musumeci and Musumeci (1999) use historical data and dynamic programming to develop an optimal investment strategy for retirement. While they model the influence of risk aversion and accumulated savings explicitly, their results also support the traditional advice of investing heavily in equity and gradually shifting towards debt as retirement nears.

In contrast, Levy and Gunthorpe (1993) and Hodges, Taylor and Yoder (1997) also analyze historical returns and argue that equity investment should decline as the time horizon increases. In a unique approach, Vora and McGinnis (2000) use historical data to analyze the level of disinvestment that is possible over an estimated retirement period. They conclude that investors are consistently better off with 100% equity investment as opposed to full investment in bonds, and the result is stronger the longer the estimated retirement period. Therefore, these results are in direct opposition to the traditional advice of financial planners.

With respect to empirical studies of actual asset allocation choices, the literature remains relatively limited. Bodie and Crane (1997) examine a sample of retirement accounts among TIAA-CREF participants and find the mean allocation to be consistent with traditional practitioner advice. Specifically, they find that retirement accounts are invested, on average, in a mix of equities and long-term fixed assets, with the proportion of equity holdings declining with age and increasing with wealth.

Waggle and Englis (2000) consider a sample of IRA distributions and, at the mean, find results consistent with those of Bodie and Crane (1997). However, Waggle and Englis (2000) find the distribution of their data to be highly bi-modal, with 67.3% of their sample having no diversification across asset categories. That is, the majority of their sample invests 100%

of IRA holdings solely in cash (26.5% of the sample), in bonds (4.9% of the sample), or in equity (35.9% of the sample).

In sum, efforts to identify the optimal asset allocation strategy for retirement planning have produced mixed results. Advice among financial planners and findings among academic research both appear to lack consensus. In addition, empirical studies of asset allocation choices are few in number and have been hampered by data limitations. For example, Waggle and Englis (2000) argue that because of characteristics unique to TIAA-CREF, the study by Bodie and Crane (1997) may not be representative of the population. With respect to their own research, however, the authors acknowledge that because they do not have access to information regarding savings vehicles other than IRA accounts, their ability to generalize their asset allocation results is necessarily limited.

Our contribution to this literature is to examine the actual income sources and asset allocation choices for a representative sample of households as they retire. Based on the body of asset allocation literature as a whole, we generally expect to find a significant distribution of wealth across both fixed-income and equity securities. In addition, we hypothesize that both asset classes significantly influence the retirement decision. If the more traditional branch of practitioner advice and research hold, we would expect the average retiree portfolio to be more heavily weighted in fixed-income securities than in equity. However, if the contrary research holds, the opposite should be true.

2.2. *Retirement adequacy*

In general, retirement adequacy studies are based on a life cycle model and the assumption that individuals prefer to smooth consumption over their lifetime. Given this premise, these studies estimate postretirement consumption and the level of accumulated resources, and then determine the adequacy of these resources in financing consumption needs (for a detailed development of the methodology, see Yuh, Hanna, and Montalto, 1998). To estimate postretirement consumption, most studies specify the proportion of preretirement income necessary to maintain the consumption level after retiring. This percentage is commonly referred to as the "replacement ratio."

The Greninger, Hampton, Kitt, and Jacquet (2000) study previously cited addresses expert advice regarding retirement adequacy. These results reflect a relatively strong consensus, with 81% of those surveyed agreeing with using a replacement ratio of between 70% and 89% of current income when projecting retirement needs. Their replacement ratio results appear to be generally supported by the literature, with a number of studies using estimates ranging between 70% and 90% of preretirement income (see Palmer, 1989; Mitchell and Moore, 1998; Li, Montalto, and Geistfeld, 1996).

As for empirical research of retirement adequacy, a number of studies focus on projecting future retirement wealth for a sample of currently preretired households. In general, results suggest that preretired individuals are not financially prepared for retirement. For example, using sample data from the 1995 *Survey of Consumer Finances*, Yuh, Hanna, and Montalto (1998) find that based on mean (pessimistic) lognormal asset growth projections and current contribution rates, only 52% (42%) of households are adequately preparing for retirement. Furthermore, they find that the level of household spending is significantly related to the

adequacy ratio, and 51% of their sampled households report spending at or above their reported income level.

Using the 1992 wave of HRS data, Mitchell and Moore (1998) estimate savings shortfalls and prescribed savings rates separately for married couples, single males, and single females. In each case, they find significant shortfalls in wealth accumulation and argue that savings rates substantially higher than documented rates are necessary in order for the median household to meet retirement consumption needs. In a related study, Moore and Mitchell (2000) find that for retirement at age 62, the median household would have to save an additional 16% of earnings to maintain preretirement consumption levels during the retirement period. When dividing their sample into deciles based on initial wealth, this rate rises significantly (to a range of 24% to 38%) for the four lowest deciles. When initial earnings are used, they find that actual savings rates are roughly one-third of prescribed rates across all deciles.

In this study, we move beyond the projections of adequacy studies and provide a detailed analysis of actual asset accumulation for households moving into retirement. Our purpose is to then examine the influence of accumulated wealth on the decision to retire. If the projections of the adequacy literature hold and the average household lacks adequate financial resources to meet retirement needs, it may be that our wealth measures lack significant influence, and the retirement decision may instead be more heavily influenced by nonfinancial factors.

3. Data and methodology

The formation of our sample from the HRS data is described below. To examine the influence of financial variables on the decision to retire, we utilize a probit analysis. A description of our methodology and the models we test follows.

3.1. Data

We draw our data sample from the HRS database, an extensive survey of a cross-section of older Americans. Specifically, the HRS survey was first administered in 1992 to approximately 7,600 households in which at least one respondent was between the ages of 51 and 61. The survey has since been readministered, and the data disbursed, for three additional "waves" dated 1994, 1996, and 1998. To date, the majority of studies using the HRS database draw their samples from only the first wave of data. In contrast, we use all four waves of data.

In developing our retired and nonretired subsamples, we confine our analysis to information provided by the designated "financial respondent" for the household. Accordingly, a household is categorized as "retired," "semiretired," or "nonretired" based on the financial respondent's self-reported retirement status. In an effort to capture within our retired subsample those individuals who have ceased working entirely, and to exclude those who may have retired from their primary career but have since assumed another work-for-pay position, we omit from our study the semiretired category. We also omit from the study those households reporting either nonpositive earnings or nonpositive net worth.

Table 1
Retired and Non-Retired Households by HRS Data Wave

	Number of Households		Average Age	
	Newly Retired	Non-Retired	Newly Retired	Non-Retired
Wave 1	617	3,380	60.3	55.1
Wave 2	402	2,534	60.5	56.6
Wave 3	389	2,103	61.8	58.1
Wave 4	435	1,696	63.4	59.6

Data is from the *Health and Reitrement Study (HRS)*, a survey that was first given in 1992 (Wave 1) to a cross-section of households in which at least one respondent ranged in age from 51 to 61 years. The survey was readministered in 1994 (Wave 2), 1996 (Wave 3), and 1998 (Wave 4). Retired and non-retired categories are determined by the response of the designated financial respondent for each household. For Wave 2–Wave 4, the newly retired category designates the number of households who have retired since the immediately preceding survey.

Table 1 provides a breakdown of the retired and nonretired categories by wave. We define the newly retired subsample as those financial respondents who are newly categorized as retired within each respective wave. For example, the 402 households categorized as retired in Wave 2 of the data are those financial respondents who did not consider themselves retired in Wave 1, but whose status has changed to retired in Wave 2. The sample of 389 (435) newly retired households in Wave 3 (Wave 4) is similarly defined. For Wave 1, the 617 households in our newly retired category are all households whose financial respondent was retired at the time of the initial survey. Note that as the sample ages from wave to wave, the number of nonretired households declines from a high of 3,380 in Wave 1 to 1,696 by Wave 4. The mean age of the newly retired households exceeds that of the nonretired households in each wave, with surveyed respondents retiring in their early 60s and working respondents generally being in their mid- to late-50s.

3.2. Methodology

The purpose of our probit analysis is to test the financial factors that influence the decision to retire within each wave of the HRS data. As noted above, the decision to retire is therefore identified as having been made by households who are newly retired within each respective data wave. To estimate the *ex ante* influence of our financial variables on the retirement decision, we then use the financial data from Wave 1 to estimate the retirement decision in Wave 2, and define the tests for Wave 3 and Wave 4 in a similar manner. Because of the absence of data preceding the first wave of the database, a probit analysis of Wave 1 is necessarily omitted.

When projecting the level of wealth available to finance postretirement consumption, retirement adequacy studies have used measures of total financial wealth, and the present value of expected income streams from pensions and Social Security (see Yuh, Hanna, and Montalto, 1998; Moore and Mitchell, 2000). In modeling the financial factors that influence the retirement decision, we follow a similar methodology. However, because of the restricted

availability of pension and Social Security income data, these factors are necessarily omitted from our study.

Our probit model assumes the following form:

$$\pi = \alpha + \beta_1 \text{LIQUID} + \beta_2 \text{ANN} + \beta_3 \text{STOCK} + \beta_4 \text{BUSREAL} + \beta_5 \text{HEQU} + \beta_6 \text{AGE} + \beta_7 \text{EARN} + \beta_8 \text{RETINC} + \beta_9 \text{SOCIAL} + \epsilon$$

where π takes a value of 1 if the household is newly categorized as retired and is 0 otherwise. For each wave of the HRS survey, the financial respondent reports his/her estimate of the total current value of each asset and the actual dollar value of income received. All values are reported at the household level, and where necessary, we annualize income reported as a monthly figure. For the purposes of this study, the asset and income variables are grouped and defined as follows.

LIQUID is the current value of all certificates of deposit, checking account balances, savings account balances and bond holdings. Note that for purposes of comparison to the asset allocation literature, we would prefer to analyze bond holdings as a stand-alone variable. While bond holdings are separately reported in the HRS data, a significant portion of these are zero balances. Therefore, for informational purposes, we report bond holdings in the descriptive statistics. However, we group bond holdings with other fixed-income assets in the probit model rather than excluding the data entirely from our analysis.

ANN is the current value of all Individual Retirement Accounts (IRAs) and Keogh plans. (Note that information regarding expected benefits from employment-related pensions or retirement savings vehicles provided by the HRS is very limited, and is necessarily excluded from our analysis). STOCK is the household's total market value of all equity holdings. BUSREAL is the equity value of any family business, farm, and any real estate excluding the respondent's primary residence. HEQU is the equity value of the household's primary residence.

Because the majority of people do not sell their home for the purposes of gaining a retirement stream of income, it is arguably inappropriate to include net housing equity in our analysis. However, Yuh, Hanna, and Montalto (1998) and Reichenstein (1998) contend that because home equity constitutes a significant portion of total household wealth in the U.S., and the residence could potentially be an income source even in the absence of a sale (e.g., through a second mortgage, a reverse mortgage, or a home equity line), it is a relevant measure. Consistent with this and other studies (see also Moore and Mitchell, 2000; Li, Montalto, and Geistfeld, 1996) we, therefore, include housing equity in our analysis.

Regarding the income variables of our analysis, EARN is the total employment-related earnings generated by the household on an annual basis and RETINC is annual income generated from retirement pensions. SOCIAL accounts for annual Social Security income for the household, and may include any combination of retirement benefits and/or disability benefits collected. Recall that a household is defined as being retired or nonretired based on the status of the appointed financial respondent. Therefore, even if the financial respondent collects no form of Social Security, it is possible that a nonretired household will report a positive value for SOCIAL if any other household member does collect. Alternatively, a

retired household may report a positive value for EARN if any household member other than the financial respondent remains actively employed. Finally, while financial factors are the focus of our study, we acknowledge that the financial respondent's age will significantly influence the decision to retire. We therefore include AGE as a control variable in our probit analysis.

Because accumulated wealth may have different implications for the retirement decision when considered in relation to the household's income stream (e.g., $100,000 of net worth for a household with $30,000 in earnings versus a household with $80,000 in earnings), we scale each asset variable by household earnings (EARN) and repeat our probit analysis. In doing so, we proxy for the adequacy of wealth accumulation and its influence on the retirement decision. Our revised model takes the following form:

$$\pi = \alpha + \beta_1 \text{LIQUID/EARN} + \beta_2 \text{ANN/EARN} + \beta_3 \text{STOCK/EARN} + \beta_4 \text{BUSREAL/EARN} + \beta_5 \text{HEQU/EARN} + \beta_6 \text{AGE} + \epsilon$$

Finally, the above models assume that households diversify their holdings across security classes and that each asset type influences the retirement decision. To allow for the possibility that individual households utilize only one or two asset types (Waggle and Englis, 2000) and make their retirement decision based on these concentrated holdings, we aggregate the LIQUID, ANN, and STOCK variables (TOTFIN) and test a final form of the probit model:

$$\pi = \alpha + \beta_1 \text{TOTFIN/EARN} + \beta_2 \text{BUSREAL/EARN} + \beta_3 \text{HEQU/EARN} + \beta_4 \text{AGE} + \epsilon$$

Our results are documented below.

4. Empirical results

In this section, we first provide descriptive statistics for the asset allocation and income variables of both newly retired households and nonretired households. We then present results of our probit analysis, which measures the influence of these financial variables on the decision to retire. Finally, because the asset data are highly skewed, we extend our probit analysis to both the top and bottom quartiles of the sample based on total net worth.

4.1. Descriptive statistics

Table 2 shows summary statistics for the asset allocation and income variables of both the newly retired and nonretired subsamples by wave. In addition to the variables previously defined, we report cumulative variables as well. Specifically, TOTFIN reflects the sum of the household financial assets (LIQUID, ANN, and STOCK). NHEQU is total net worth excluding the equity value of the primary residence and TOTNW is total household net

Table 2
Household Asset Allocation and Annual Income Means by Wave

Panel A	Wave 1		Wave 2		Wave 3		Wave 4	
Household Asset Allocation	Newly Retired	Non-Retired	Newly Retired	Non-Retired	Newly Retired	Non-Retired	Newly Retired	Non-Retired
BOND	$ 4,536	$2,620 (0.182)	$ 7,190	$3,883 (0.143)	$ 3,806	$3,062 (0.708)	$ 3,556	$3,254 (0.856)
LIQUID	$ 36,486	$23,681** (0.000)	$ 40,278	$28,214** (0.014)	$ 30,414	$21,132* (0.032)	$ 29,351	$37,073 (0.613)
ANN	30,859	18,895** (0.000)	39,131	29,149* (0.032)	48,481	29,352** (0.011)	60,657	35,729** (0.002)
STOCK	32,354	19,742** (0.006)	51,333	26,445 (0.060)	37,836	26,534 (0.207)	87,170	39,039 (0.087)
TOTFIN	$ 99,698	$62,318** (0.000)	$130,742	$83,809** (0.005)	$116,731	$77,019* (0.016)	$177,178	$111,841 (0.076)
BUSREAL	56,317	94,065** (0.001)	69,367	98,837* (0.054)	43,454	72,913* (0.020)	52,744	114,643 (0.097)
NHEQU	$156,015	$156,383 (0.981)	$200,109	$182,645 (0.506)	$160,185	$149,932 (0.644)	$229,923	$226,484 (0.956)
HEQU	76,468	62,714** (0.000)	73,080	72,978 (0.985)	73,324	75,408 (0.646)	85,387	94,708 (0.465)
TOTNW	$232,483	$219,096 (0.414)	$273,190	$255,623 (0.539)	$233,509	$225,340 (0.741)	$315,310	$321,192 (0.927)

Panel B	Wave 1		Wave 2		Wave 3		Wave 4	
Annual Household Income	Newly Retired	Non-Retired	Newly Retired	Non-Retired	Newly Retired	Non-Retired	Newly Retired	Non-Retired
EARN	$18,155	$46,883** (0.000)	$23,987	$55,140** (0.000)	$23,281	$54,112** (0.000)	$20,830	$55,566** (0.000)
RETINC	6,394	949** (0.000)	13,136	3,241** (0.000)	10,255	2,579** (0.000)	10,474	2,946** (0.000)
SOCIAL	3,280	378** (0.000)	6,159	1,045** (0.000)	7,487	1,372** (0.000)	8,709	1,920** (0.000)
CAPITAL	4,620	3,565* (0.047)	$ 4,113	3,207 (0.225)	2,430	2,025 (0.656)	3,261	1,887* (0.044)
TOTHOUINC	$32,449	$51,775** (0.000)	$47,395	$62,633** (0.000)	$43,453	$60,087** (0.000)	$43,274	$62,319** (0.000)

Wave 1 reflects household survey responses from the *Health and Retirement Study* (HRS) database in 1992 while waves 2, 3, and 4 correspond to years 1994, 1996, and 1998, respectively. For Wave 2–Wave 4, "newly retired" designates the number of households who have retired since the immediately preceding survey. BOND is the value of bond holdings and LIQUID is the sum of all CDs, checking/savings accounts and bonds. ANN is the value of all IRAs and Keoghs, and STOCK is the value of equity. TOTFIN is the sub-total of these three. BUSREAL is the equity value of any family business/farm/real estate excluding the primary residence, and NHEQU is the sub-total of TOTFIN and BUSREAL. HEQU is primary residence equity value and TOTNW is total net worth. EARN is employment-related earnings, RETINC is retirement pension income, CAPITAL is all capital income, and SOCIAL is Social Security income for the household. P-value results indicating the statistical significance of the difference in mean values between the retired and non-retired sub-samples within each wave are in parentheses.

**,* indicate the means of the retired and non-retired sub-samples are statistically different at the 1% and 5% level of significance, respectively.

worth. For the income variables, CAPITAL includes all sources of capital income (e.g., dividends, interest income, etc.) and TOTHOUINC is total household income. (Note that CAPITAL is included in the summary statistics to better describe the dataset. However, CAPITAL is excluded from our probit analysis because it is an income stream derived from LIQUID and STOCK, and therefore gives rise to multicollinearity).

We begin our analysis with the mean household asset allocation values summarized in Panel A. For Wave 1, our sample of recent retirees generally has accumulated a significantly higher level of financial assets than our nonretired sample. In particular, the mean values of all liquid accounts, IRAs and Keoghs, and stock holdings for the retired sample are significantly higher than those of nonretired households. All differences are significant at the 1% level.

The average retired household also has a significantly higher home equity value as opposed to the nonretired household. Despite the general dominance of asset accumulation for retirees, however, note that the mean value of total nonhousing net worth for the retired households is not significantly greater than for nonretired households. This result appears to be driven by the significantly higher mean value of family business/farm/real estate equity for nonretired households as compared to retired households. Consequently, this same pattern flows through the total net worth averages.

For the Wave 2 and Wave 3 data in Panel A, the pattern of significantly higher mean balances for newly retired households continues for both liquid assets (LIQUID) and for IRAs and Keoghs (ANN). The difference in mean values of STOCK between the two subsamples is significant at the 10% level in Wave 2 and lacks statistical significance in Wave 3. In total, the mean of all financial assets (TOTFIN) for the newly retired households is significantly higher than that of nonretired households in Wave 2 and in Wave 3. In contrast, BUSREAL for nonretired households continues to significantly exceed that of newly retired households in Wave 2 and Wave 3, and there is no longer a significant difference in HEQU between the two samples.

By Wave 4, the mean of ANN is again significantly different, with a value of $60,657 for newly retired households and $35,729 for nonretired households. Also, the mean values of the newly retired households' STOCK and TOTFIN exceed those for nonretired households with marginal significance in the difference. Finally, the nonretired BUSREAL continues to exceed that of newly retired households with significance at the 10% level. The diminished significance for STOCK, TOTFIN, and BUSREAL in Wave 4 is consistent with these asset classes' particular susceptibility to wide dispersion of value, especially with the cumulative effect of marked economic growth throughout the 1990s.

Panel B of Table 2 reflects the mean value of income sources for the newly retired and nonretired households by wave. With the exception of capital income, the difference in the mean values between recently retired and nonretired households is statistically significant across each income category and across each wave. As expected, the mean value of employment earnings (EARN) is significantly higher for nonretired households than for retired households while the mean value of retirement income streams (RETINC) and collected Social Security benefits (SOCIAL) are each higher for newly retired households than for nonretired households.

The mean value of total household income is everywhere lower for newly retired

households than for nonretired households, with the retired means ranging between 63% and 75% of the nonretired averages. To the extent that we may assume the consumption levels between the two subsamples to be relatively comparable, this proportion proxies for a replacement ratio. Note particularly the proportions of 72% and 69% for Wave 3 and Wave 4, respectively. This is the time that the average age of our newly retired households is approximately 62 years, which corresponds with the projected retirement age used in retirement adequacy studies. Our results are, therefore, consistent with the prescribed replacement rate of 69% projected by Moore and Mitchell (2000) in particular, and are generally consistent with the 70% to 90% range previously cited.

In sum, the descriptive statistics of Table 2 show that on average, the total net worth of the newly retired and nonretired subsamples does not significantly differ, suggesting that the retired subsample is no more adequately prepared for retirement than the nonretired subsample. When considering the composition of assets, however, there are significant differences. In each data wave, newly retired households have accumulated significantly more financial assets than nonretired households, on average. In contrast, nonretired households have significantly higher values in family businesses, farms, and real estate. One possible explanation for the differences is that BUSREAL reflects assets that are relatively illiquid and that may be difficult to convert to resources to be used for consumption purposes.

To assess the relative allocation of total net worth to each asset class, Panel A of Table 3 reflects each asset class as a percentage of total net worth. Note that for both retired and nonretired households, net housing equity accounts for roughly 40% to 50% of average total net worth in each data wave and is never significantly different between the two subsamples. This result, combined with the general lack of significant differences in housing equity shown in Table 2, is consistent with retirees aging in place, or maintaining preretirement levels of primary housing. Consistent with the results in Table 2, financial assets comprise a relatively larger portion of net worth for retired households (TOTFIN ranges from 39% to 47%) than for nonretired households (34% to 37%).

Note that within the TOTFIN category, LIQUID consistently accounts for over 20% of total net worth for newly retired households and is significantly higher than the mean percentage of nonretired households in Wave 2 through Wave 4. In contrast, STOCK accounts for only 7% to 10% of net worth for newly retired households and is significantly higher than that of nonretired households in Wave 1 and Wave 2 only. These finding are generally consistent with traditional practitioner advice and asset allocation studies that recommend fixed-income securities as a part of the retirement portfolio. In addition, the BOND and LIQUID results are consistent with both Quinn (2001), who argues that the most popular investment vehicles among seniors are savings accounts, money market accounts, and CDs, and with Waggle and Englis (2000), who find that a relatively large proportion of IRA holdings are concentrated in cash. Finally, consistent with the results in Table 2, the mean proportion of BUSREAL ranges from 10% to 14% of net worth for newly retired households, but is significantly larger for nonretired households, ranging between means of 15% and 21% of total net worth.

Panel B of Table 3 shows the mean contribution of each income category to the total household income stream. Not surprisingly, the mean proportion of employment earnings for nonretired households significantly exceeds that of newly retired households while the mean

Table 3
Household Asset Allocation and Annual Income Means by Percentage and Wave

Panel A	Wave 1		Wave 2		Wave 3		Wave 4	
Household Asset Allocation	Newly Retired	Non-Retired	Newly Retired	Non-Retired	Newly Retired	Non-Retired	Newly Retired	Non-Retired
BOND	0.85%	0.54%	1.04%	0.62%	0.62%	0.52%	0.36%	0.53%
		(0.091)		(0.098)		(0.639)		(0.270)
LIQUID	20.5%	19.4%	25.3%	18.2%**	22.9%	18.4%*	21.9%	18.0%*
		(0.348)		(0.000)		(0.030)		(0.026)
ANN	10.7%	9.1%*	12.1%	12.1%	15.0%	11.8%**	14.6%	11.6%*
		(0.027)		(0.971)		(0.009)		(0.024)
STOCK	7.6%	5.4%**	9.9%	7.1%**	6.9%	6.3%	7.3%	7.1%
		(0.001)		(0.009)		(0.500)		(0.779)
TOTFIN	**38.8%**	**33.9%****	**47.3%**	**37.3%****	**44.9%**	**36.6%****	**43.8%**	**36.6%****
		(0.001)		(0.000)		(0.000)		(0.001)
BUSREAL	11.4%	18.1%**	14.4%	20.7%**	10.0%	15.2%**	11.5%	15.6%**
		(0.000)		(0.002)		(0.000)		(0.001)
NHEQU	**50.2%**	**52.0%**	**61.7%**	**58.0%**	**54.9%**	**51.8%**	**55.2%**	**52.2%**
		(0.443)		(0.312)		(0.173)		(0.146)
HEQU	49.8%	48.1%	38.3%	42.0%	45.1%	48.2%	44.8%	47.8%
		(0.443)		(0.312)		(0.173)		(0.146)
TOTNW	**$232,483**	**$219,096**	**$273,190**	**$255,623**	**$233,509**	**$225,340**	**$315,310**	**$321,192**

Panel B	Wave 1		Wave 2		Wave 3		Wave 4	
Annual Household Income	Newly Retired	Non-Retired	Newly Retired	Non-Retired	Newly Retired	Non-Retired	Newly Retired	Non-Retired
EARN	41.5%	91.0%**	35.8%	78.2%**	38.8%	88.3%**	48.1%	85.5%**
		(0.000)		(0.000)		(0.000)		(0.000)
RETINC	24.3%	2.0%**	27.8%	5.6%**	24.5%	4.7%**	24.2%	5.2%**
		(0.000)		(0.000)		(0.000)		(0.000)
SOCIAL	20.6%	1.7%**	28.1%	4.2%**	32.6%	4.5%**	20.1%	6.7%**
		(0.000)		(0.000)		(0.000)		(0.000)
CAPITAL	13.6%	5.3%**	8.3%	11.9%**	4.2%	2.6%*	7.5%	2.6%**
		(0.000)		(0.001)		(0.040)		(0.011)
TOTHOUINC	**$32,449**	**$51,775**	**$47,395**	**$62,633**	**$43,453**	**$60,087**	**$43,274**	**$62,319**

Wave 1 reflects household survey responses from the *Health and Retirement Study* (HRS) database in 1992 while waves 2, 3, and 4 correspond to years 1994, 1996, and 1998, respectively. For Wave 2–Wave 4, "newly retired" designates the number of households who have retired since the immediately preceding survey. BOND is the value of bond holdings and LIQUID is the sum of all CDs, checking/savings accounts and bonds. ANN is the value of all IRAs and Keoghs, and STOCK is the value of equity. TOTFIN is the sub-total of these three. BUSREAL is the equity value of any family business/farm/real estate excluding the primary residence, and NHEQU is the sub-total of TOTFIN and BASREAL. HEQU is primary residence equity value and TOTNW is total net worth. EARN is employment-related earnings, RETINC is retirement pension income, CAPITAL is all capital income, and SOCIAL is Social Security income for the household. Percentages may not sum to 100% due to rounding errors. P-value results indicating the statistical significance of the difference in mean percentage values between the retired and non-retired sub-samples within each wave are in parentheses.

**,* indicate the means of the retired and non-retired sub-samples are statistically different at the 1% and 5% level of significance, respectively.

proportion of income arising from pensions and Social Security for newly retired households significantly exceeds that of nonretired households. The mean proportion of income from capital investments is also significantly higher for newly retired households.

It is interesting to note that employment earnings still account for between 35% and 48% of total household income for households in which the financial respondent has recently retired. Moreover, the mean contribution from retirement pensions and annuities is approximately 25% of household income while Social Security ranges from 20% to 33% of the total. The results suggest that while privately funded pensions and Social Security account for comparable portions of income for the average retired household, the level of income would be drastically affected in the absence of employment earnings from other household members. This finding is consistent with the savings shortfalls projected by Mitchell and Moore (1998), Yuh, Hanna, and Montalto (1998), and Moore and Mitchell (2000).

In sum, the results of Table 3 suggest that, on average, home equity value comprises a substantial portion of total net worth for both the newly retired and nonretired subsamples. In addition, liquid assets are weighted more than twice as heavily as stock in the average portfolio of each subsample, suggesting a general preference for relatively lower risk, fixed-income securities. With respect to household income, our sample of recent retirees is heavily dependent upon the employment earnings of other household members, and appears to be nearly equally dependent upon retirement pensions and Social Security as sources of additional income.

4.2. Regression results

Recall that in our probit analysis, we test three versions of the model for completeness. Model 1 includes the respondent's age, as well as the asset and income variables previously defined. Model 2 and Model 3 standardize the asset variables with work-related earnings, and as such, attempt to proxy for the adequacy of wealth accumulation and its influence on the retirement decision. Table 4 reflects our results.

For Model 1, the income variables EARN, RETINC, and SOCIAL are statistically significant in each data wave. The sign of EARN is negative, indicating that the higher the preretirement level of household income from employment, the less likely is the financial respondent's decision to retire. This result is consistent with the findings documented in Montalto, Yuh, and Hanna (2000). In contrast, the coefficients of RETINC and SOCIAL both are positive and significant, indicating that the higher the *ex ante* level of income from retirement savings vehicles, the more likely is the retirement decision. Because these measures precede the financial respondent's retirement decision, they should represent retirement income streams of other household members. Therefore, our results are consistent with outside income sources positively influencing the respondent's decision to retire. It may also be that these measures proxy for the proclivity of the respondent to retire when other household members are also retired. In any event, the results for SOCIAL are consistent with the findings of Mitchell and Moore (1998), and Fraser, Jennings, and King (2000), who argue that Social Security remains a significant source of retirement income for the majority of households.

With respect to the asset categories, ANN has a positive and significant coefficient in

Table 4
Probit Analysis of the Retirement Decision

	Wave 2			Wave 3			Wave 4		
	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3	Model 1	Model 2	Model 3
Intercept	−7.485**	−7.835**	−7.839**	−7.430**	−8.213**	−8.198**	−7.935**	−8.547**	−8.659**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LIQUID	−0.0001	0.0006		0.0011*	0.0079*		−0.0004	−0.0058	
	(0.816)	(0.931		(0.035)	(0.027)		(0.636)	(0.155)	
ANN	0.0013*	0.0028		0.0001	0.0021		0.0010*	0.0033	
	(0.018)	(0.664)		(0.835)	(0.679)		(0.032)	(0.582)	
STOCK	0.0004	0.0001		0.0007	0.0124		0.0006*	0.0147	
	(0.194)	(0.964)		(0.179)	(0.100)		(0.036)	(0.060)	
TOTFIN			0.0003			0.0058*			0.0026
			(0.786)			(0.019)			(0.141)
BUSREAL	−0.0001	−0.0014	−0.0015	−0.0003	−0.0075	−0.0061	0.0000	0.0068*	0.0085**
	(0.207)	(0.451)	(0.420)	(0.057)	(0.059)	(0.084)	(0.807)	(0.035)	(0.009)
HEQU	−0.0008**	0.0041	0.0046	−0.0001	−0.0013	−0.0007	0.0010*	0.0040	−0.0019
	(0.013)	(0.252)	(0.175)	(0.718)	(0.644)	(0.793)	(0.042)	(0.163)	(0.146)
AGE	0.1145**	0.1180**	0.1181**	0.1113**	0.1239**	0.1236**	0.1187**	0.1277**	0.1299**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EARN	−0.0038**			−0.0026**			−0.0040**		
	(0.0001)			(0.007)			(0.000)		
RETINC	0.0214**			0.0058**			0.0055**		
	(0.000)			(0.003)			(0.0008)		
SOCIAL	0.0357*			0.0272**			0.0129		
	(0.018)			(0.013)			(0.069)		

Data is from the *Health and Retirement Study* (HRS) database for the years 1992, 1994, 1996, and 1998. For Wave 2–Wave 4, a household is categorized as retired and the dependent variable assumes a value of one if the financial respondent has retired since the immediately preceding survey. We use the financial data from Wave 1 to estimate the retirement decision in wave 2, and define the tests for Wave 3 and wave 4 similarly. LIQUID is the current value of all CDs, checking/savings accounts and bonds, ANN is the value of all IRAs and Keoghs, and STOCK is the market value of equity. TOTFIN is the sum of these three. BUSREAL is the equity value of any family business, farm, and real estate excluding the primary residence, and HEQU is the equity value of the primary residence. AGE is the age of the financial respondent. EARN is employment-related earnings, RETINC is income generated from retirement pensions, and SOCIAL is Social Security income for the household. Model 1 is as shown. Model 2 and Model 3 are standardized by dividing each respective variable by EARN. P-values based on the χ^2 statistic are reported in parentheses.

**,* indicate statistical significance at the 1% and 5% level, respectively.

Wave 2 (0.0013) and Wave 4 (0.0010). LIQUID has a significant coefficient of 0.0011 in Wave 3 and STOCK has a significant coefficient of 0.0006 in Wave 4. Each of these results indicates that the higher the preretirement accumulation of each respective asset, the more likely is the retirement decision. However, the lack of consistency in the results suggests that, on average, the accumulated holdings for any one of these asset categories has limited impact on the retirement decision.

When the asset variables are standardized by employment-based earnings in Model 2, LIQUID has a positive and significant coefficient of 0.0079 in Wave 3 and the STOCK coefficients of 0.0124 in Wave 3 and 0.0147 in Wave 4 are marginally significant. When the standardized assets are cumulated in Model 3, the coefficient for TOTFIN is statistically

significant in Wave 3 only. Therefore, the results are consistent with those of Model 1 in that the holdings for any one of the asset classes appears to have limited impact on the retirement decision, on average. In addition, to the extent that Model 2 and Model 3 proxy for the adequacy of financial preparation for retirement, our results are not inconsistent with the inadequate wealth accumulations documented in the retirement adequacy literature. Finally, note that in both Model 2 and Model 3, the coefficients for BUSREAL are negative and marginally significant in Wave 3, and are positive and significant in Wave 4. We suspect that the possibly illiquid and/or lumpy nature of this asset class may factor into the mixed results, however, we leave this issue to future research.

4.3. Extended results

In their study of retirement adequacy, Moore and Mitchell (2000) break the first wave of HRS data into wealth deciles and find a wide disparity. For example, the mean value of their total wealth estimate for the top decile is 45 times larger than that of their lowest decile. Venti and Wise (1998) also analyze the first wave of HRS data and attempt to explain the substantial dispersion in wealth. Consistent with these studies, net worth data for both our newly retired and nonretired samples is significantly skewed to the right. Because of this skewness, it is possible that the influence of financial assets on the retirement decision may differ across the distribution.

To assess this possibility, we first present asset allocation descriptive statistics for newly retired households in Table 5. Specifically, Panel A shows the mean and median measures for each asset variable and the TOTFIN, NHEQU, and TOTNW summary variables. To be consistent with the use of *ex ante* measures used in our probit analysis, Table 5 reflects the *ex ante* measures of the asset variables from the immediately preceding wave of data. That is, the Wave 2 data reflects descriptive statistics for each asset variable from Wave 1 for those households categorized as newly retired in Wave 2. The data for Wave 3 and Wave 4 are similarly defined. With the possible exception of housing equity (HEQU), the difference between mean and median measures shows that each asset category is skewed towards the wealthiest households in each wave of data.

Panel B shows the mean values of each asset category for newly retired households that fall in the top quartile of the full sample and for newly retired households that fall in the remaining portion of the full sample based on total net worth. With the exception of bond holdings in Wave 3 of the data, the mean value of each asset is consistently and significantly greater for the retired households in the wealthiest quartile as opposed to all other retired households.

Because total net worth and its composite assets are significantly greater for retired households in the wealthiest portion of the sample, it is possible that the retirement decision is made differently by these households than by the retired households in the remainder of the sample. To test for this, we isolate the top quartile of all sample households based on total net worth and repeat our probit analysis of the retirement decision for this subset of the data. As a basis of comparison, we repeat the analysis for the bottom quartile of the sample as well. Results for the tests of this extended model are presented in Table 6. (Note that because there is a positive correlation between earnings and wealth, and because Model 2 and Model 3

Table 5
Asset Allocation Descriptive Statistics for Newly Retired Households by Wave

Panel A	Wave 2		Wave 3		Wave 4	
	Mean	Median	Mean	Median	Mean	Median
BOND	$ 4,984	$ 0	$ 6,292	$ 0	$ 5,036	$ 0
LIQUID	$ 29,631	$ 8,000	$ 28,420	$ 9,500	$ 23,243	$ 5,000
ANN	24,819	0	27,370	4,800	36,862	0
STOCK	29,360	0	29,721	0	43,893	0
TOTFIN	$ 83,810	$ 25,980	$ 85,511	$ 30,000	$103,998	$ 23,000
BUSREAL	78,213	0	60,897	0	63,180	0
NHEQU	$162,023	$ 49,000	$146,408	$ 46,200	$167,178	$ 36,000
HEQU	58,647	56,000	66,733	55,000	79,953	60,000
TOTNW	$220,670	$105,500	$213,141	$110,484	$247,132	$113,200

Panel B	Wave 2		Wave 3		Wave 4	
	Mean		Mean		Mean	
	Bottom 75%	Top 25%	Bottom 75%	Top 25%	Bottom 75%	Top 25%
BOND	$ 739	$ 16,991* (0.027)	$ 304	$ 22,486 (0.152)	$ 370	$ 17,283** (0.002)
LIQUID	$14,345	$ 72,869** (0.000)	$13,049	$ 69,997** (0.001)	$ 9,508	$ 59,298** (0.000)
ANN	9,237	68,894** (0.000)	12,910	66,482** (0.000)	10,774	105,344** (0.000)
STOCK	7,631	90,824** (0.000)	5,270	95,854** (0.000)	3,489	149,954** (0.000)
TOTFIN	$31,213	$232,587** (0.000)	$31,229	$232,333** (0.000)	$23,770	$314,595** (0.000)
BUSREAL	19,127	245,342** (0.000)	12,167	192,701** (0.000)	7,360	209,708** (0.000)
NHEQU	$50,340	$477,928** (0.000)	$43,396	$425,033** (0.000)	$31,131	$524,303** (0.000)
HEQU	33,430	129,975** (0.000)	44,893	125,804** (0.000)	48,182	163,353** (0.000)
TOTNW	$83,770	$607,904** (0.000)	$88,289	$550,837** (0.000)	$79,313	$687,657** (0.000)
N	297	105	284	105	315	120

Wave 2 reflects ex-ante household survey responses from the *Health and Retirement Study* (HRS) database in 1992; waves 3 and 4 correspond to years 1994 and 1996, respectively. "Newly retired" designates the number of households who have retired since the immediately preceding survey. BOND is the value of bond holdings and LIQUID is the sum of all CDs, checking/savings accounts and bonds. ANN is the value of all IRAs and Keoghs, and STOCK is the value of equity. TOTFIN is the sub-total of these three. BUSREAL is the equity value of any family business/farm/real estate excluding the primary residence, and NHEQU is is the sub-total of TOTFIN and BUSREAL. HEQU is primary residence equity value and TOTNW is total net worth. Panel A reports the mean and median for each measure in each wave. In Panel B, the sample in each wave is divided into the top 25% and bottom 75% based on total household net worth. Newly retired households are then identified within each sub-sample and the means are reported. N is the number of newly retired households in each sub-sample. P-value results indicating the statistical significance of the difference in mean values between the newly retired households within each sub-sample are in parentheses.

**,* indicate the means are statistically different at the 1% and 5% level of significance, respectively.

Table 6
Probit Analysis of the Retirement Decision: Top Quartile and Bottom Quartile of Total Net Worth

	Wave 2		Wave 3		Wave 4	
	Top Quartile	Bottom Quartile	Top Quartile	Bottom Quartile	Top Quartile	Bottom Quartile
Intercept	−6.565**	−7.263**	−6.728**	−7.625**	−7.756**	−8.655**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
LIQUID	−0.0002	0.0063	0.0011*	0.0130	−0.0008	−0.0022
	(0.684)	(0.617)	(0.050)	(0.261)	(0.402)	(0.873)
ANN	0.0012*	−0.0609	0.0000	−0.0214	0.0006	0.0180
	(0.054)	(0.057)	(0.984)	(0.148)	(0.240)	(0.262)
STOCK	0.0002	−0.0075	0.0012*	−0.0342	0.0007*	−0.1044
	(0.474)	(0.788)	(0.054)	(0.321)	(0.027)	(0.165)
BUSREAL	−0.0002	0.0058	−0.0002	−0.0008	0.0000	0.0046
	(0.079)	(0.282)	(0.214)	(0.953)	(0.837)	(0.754)
HEQU	−0.0005	0.0026	−0.0017*	0.0004	0.0007	0.0035
	(0.485)	(0.536)	(0.035)	(0.825)	(0.261)	(0.539)
AGE	0.0999**	0.1139**	0.1003**	0.1120**	0.1176**	0.1297**
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
EARN	−0.0040**	−0.0139**	−0.0020	−0.0017	−0.0046**	−0.0067
	(0.014)	(0.002)	(0.090)	(0.657)	(0.001)	(0.124)
RETINC	0.0315**	0.0365*	0.0054	−0.0047	0.0221**	0.0068
	(0.002)	(0.036)	(0.196)	(0.673)	(0.002)	(0.674)
SOCIAL	0.0432	0.0322	0.0457*	0.0617**	−0.0098	0.0494*
	(0.157)	(0.309)	(0.045)	(0.009)	(0.589)	(0.016)

Data is from the *Health and Retirement Study* (HRS) database for the years 1992, 1994, 1996, and 1998. For Wave 2–Wave 4, a household is categorized as retired and the dependent variable assumes a value of one if the financial respondent has retired since the immediately preceding survey. We use the financial data from Wave 1 to estimate the retirement decision in Wave 2, and define the tests for Wave 3 and Wave 4 similarly. LIQUID is the current value of all CDs, checking/savings accounts and bonds. ANN is the value of all IRAs and Keoghs, and STOCK is the market value of equity. BUSREAL is the equity value of any family business, farm, and real estate excluding the primary residence, and HEQU is the equity value of the primary residence. AGE is the age of the financial respondent. EARN is employment-related earnings, RETINC is income generated from retirement pensions, CAPITAL is all capital income, and SOCIAL is Social Security income for the household. P-values based on the χ^2 statistic are reported in parentheses.

**,* indicate statistical significance at the 1% and 5% level, respectively.

standardize net worth by earnings, these two models consolidate the distribution of the data. We, therefore, repeat the probit analysis for Model 1 only.)

For the top quartile, LIQUID is positive and significant in Wave 3 (0.0011), ANN is positive and significant in Wave 2 (0.0012), and STOCK is positive and significant in Wave 3 (0.0012) and Wave 4 (0.0007). Overall, the results for the asset variables are generally consistent with those in Table 4, suggesting that for even the relatively limited evidence of statistical significance found among the asset variables, the wealthiest households may be driving the results. Consistent with this, the results for the bottom quartile show that the asset variables lack statistical significance in every data wave.

Finally, with respect to the income variables, the top quartile results show the EARN coefficients to be negative and statistically significant in Wave 2 and Wave 4, and marginally

significant in Wave 3. The coefficient of RETINC is positive and significant in Wave 2 and Wave 4, while the coefficient of SOCIAL is positive and significant in Wave 3 only. It is interesting to note that for the bottom quartile, EARN and RETINC are statistically significant only in Wave 2, while SOCIAL is significant in Wave 3 (0.0617) and Wave 4 (0.0494). These results are generally opposite of what we see for the top quartile, which suggests that the level of employment earnings and retirement pension income collected by the household significantly influences the financial respondent's retirement decision for the wealthiest of households, while the level of Social Security income for the household is relatively more significant in the retirement decision of the least wealthy households.

5. Summary and conclusion

The purpose of this study is to extend the existing finance literature that focuses on retirement planning and projecting the adequacy of retirement preparation by empirically examining what is actually being done as households move into retirement. That is, we use data from the 1992, 1994, 1996, and 1998 waves of the HRS database to analyze the financial condition of households as they move into retirement and to determine the asset and income variables that may significantly influence the retirement decision.

We find that the total net worth of retired and nonretired households does not differ on average, suggesting that retired households are not more adequately prepared for retirement than nonretired households. Retired households, however, have accumulated significantly more financial assets, while nonretired households have substantially more value tied to family businesses and real estate holdings.

Among the assets of the newly retired, home equity accounts for more than half of the average portfolio's value. Despite the bull market of the 1990s, stock holdings account for less than 10% of total net worth and highly liquid assets account for approximately 25%, which is consistent with a preference for fixed-income securities over equity securities traditionally advised by practitioners and documented in the asset allocation literature.

Total household income of the newly retired sample ranges from 63% to 75% of total household income for the nonretired sample, which is comparable to the replacement ratios of the retirement adequacy literature. However, roughly 40% of total income for the average retired household is generated by the employment earnings of other household members, which is consistent with other studies' findings of inadequate preparation for retirement.

In making the decision to retire, we find that the level of employment earnings for the household have a negative effect, while retirement pension and Social Security income have a positive effect, on average. More notably, employment earnings and pension income significantly influence the retirement decision for the most wealthy households while Social Security appears to be the most influential source of income for the least wealthy households.

With respect to wealth accumulation, the level of fixed-income securities, IRAs and Keoghs, and stock holdings positively influence the decision to retire. However, the lack of consistency in the results suggests that the effect from any one of these assets is limited. When proxying for the adequacy of wealth accumulation, our results are similar.

It may be that, as found in the retirement adequacy literature, the accumulation of wealth

among retirees lacks the level of adequacy to exert a significant influence over the retirement decision. It may also be that the retirement decision is more significantly influenced by nonfinancial factors than by financial variables. We leave these issues to be addressed in future research.

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