The Impact of Stock and Real Estate Returns on the Propensity of Households to Meet the Capital Accumulation Ratio Guideline

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The current study investigates the impact of substantial economic fluctuations on household portfolios and analyzes how the fluctuations influence households' propensities to meet the capital accumulation ratio threshold of 25%. The 1992 to 2007 Survey of Consumer Finances datasets were analyzed using means tests and a logistic regression. In periods when the stock market increased more than housing prices, the percentage of households meeting the 25% capital accumulation ratio threshold increased from the previous survey year but when housing prices increased more than the stock market, the percentage of households meeting the threshold decreased from the previous period. The patterns are consistent with households reacting passively to changes in housing and stock values rather than using the capital accumulation ratio guideline to adjust their balance sheets.

Key Words: capital accumulation ratio, financial ratios, investing, lifecycle theory of savings, Survey of Consumer Finances

Introduction

Retirement planning is a scary and complex endeavor for many people. Retirement planning involves many unknowns: How long will I live? When will I want to retire? How much money will I be making when I retire? How will my health be in retirement? All of these questions lead up to the main question: How much do I need to save today for retirement? Because of all the complexities and unknown variables involved, most people are not interested in learning the details or do not have the patience to do so. Life is hectic, many people are overworked, and retirement planning tends to take a backseat.

Several rule of thumb guidelines have emerged in an effort to simplify financial decisions. One common retirement rule of thumb suggests setting aside 10% of gross income for savings (Marquit, 2010). A major financial news outlet suggests that people save "10% for basics, 15% for comfort, [and] 20% to escape" (Weston, 2009). Rules of thumb exist because people do not have the knowledge, time, or interest necessary to sort through all of the details in order to make a sound financial plan.

Many may find rule of thumb guidelines useful, because they simplify the financial planning process.

Financial ratios can help simplify financial analysis and provide basic rule-of-thumb guidelines that can be applied to most households. Financial ratios provide a convenient way to analyze the financial condition of households (Greninger, Hampton, Kitt, & Achacoso, 1996) and are a quantitative tool useful in financial decision-making (Yao, Hanna, & Montalto, 2002). The capital accumulation ratio, defined as the proportion of net worth held in investment assets, is intended to identify the share of assets held primarily for future consumption. Lytton, Garman, and Porter (1991) and Garman and Forgue (2000) proposed that the capital accumulation ratio is a good indicator of the ability to achieve future goals. However, the ratio guideline advocated by Garman and Forgue (2000) in previous versions of their textbook is not commonly suggested in more recent financial planning textbooks (Dalton & Dalton, 2011; Garman & Forgue, 2012; Keown, 2009; Madura, 2011). Some financial planning and personal finance texts do not mention any financial ratio guidelines (Ho, Robinson, & Perdue, 2005; Mittra, Sahu, & Crane, 2007).

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Literature Review

The capital accumulation ratio has been used to assess household well-being (DeVaney, 1993), retirement adequacy (DeVaney, 1995; Yao, Hanna, & Montalto, 2003), and change in wealth over the lifecycle (Harness, Finke, & Chatterjee, 2009). Harness, Finke, and Chatterjee (2010) found that a greater standard deviation in the capital accumulation ratio over time is associated with lower changes in net worth. Households with a more stable capital accumulation ratio over a 10-year period were more successful at accumulating wealth over time. Given the positive outcomes associated with the ratio (DeVaney, 1993, 1995; Harness et al., 2009, 2010), the ratio could be a useful tool in financial planning. While it may not be practical for households to shift money around to meet the ratio on a continual basis, households could benefit by creating a ratio baseline (e.g., 35%) and using that as a guideline when making investment and housing decisions. Given the lack of coverage in common personal financial planning textbooks, the capital accumulation ratio does not seem to be an important metric taught to planners. Tracking the ratio over time will provide insight into the stability of the ratio given economic events and could provide some insight into the extent to which the ratio is followed.

The current study considered whether economic conditions and economic events have an impact on a household's ability to meet the capital accumulation ratio threshold of 25% by exploring the time trends of the capital accumulation ratio along with stock and housing indexes. Housing values are a large part of the capital accumulation ratio because they are excluded from the investment asset component of the ratio. Therefore, as housing values rise the capital accumulation ratio is expected to decrease. In order to balance out the capital accumulation ratio, this increase in housing values should be offset by an increase in investment assets. Significant differences in the percentage of households that meet the 25% capital accumulation ratio threshold over time might be an indicator that economic conditions have a bigger impact than individual investment decisions. Given the tumultuous market conditions starting in 2007, it is important to understand the overall portfolio impacts that housing and stock market changes have on households' financial standings. The current study will contribute to the existing literature by examining the market conditions (specifically the housing and stock markets) and the impact these conditions have on households' propensities to meet the capital accumulation ratio threshold.

The current study analyzed the capital accumulation ratio over a 15-year range using the Survey of Consumer Finances (SCF) national dataset for 1992, 1995, 1998, 2001, 2004, and 2007. The study contributes to the existing literature by exploring the impact of economic conditions on the capital accumulation ratio. The focus of this research was whether the likelihood of households meeting the 25% capital accumulation ratio threshold changed in reaction to relative performances of stock and housing returns.

Capital Accumulation Ratio

The capital accumulation ratio is an indicator of how well an individual or household is advancing toward financial goals for capital accumulation. The capital accumulation ratio is defined as investment assets-to-net worth and is calculated from information on investment assets and net worth. As defined in past studies (DeVaney, 1997; Yao et al., 2002), investment assets consist of stocks, bonds, mutual funds, retirement accounts (including IRAs, thrift accounts, and future pensions), certificates of deposit, cash value of life insurance, other managed assets, other nonresidential assets, such as loans owed to the household, artwork, and antiques, and other real estate excluding the home and net business assets. Net worth is the sum of monetary assets, investment assets, and nonfinancial assets minus consumer debt and property debt (Kennickell, Starr-McCluer, & Surette, 2000).

Several studies have been conducted assessing the capital accumulation ratio. Using the 1998 SCF, Yao et al. (2002) identified the effects of household characteristics and attitudes on whether households met capital accumulation ratio guidelines and found that income, education, racial/ethnic status, spending relative to current income, and years until retirement were related to the likelihood of meeting the guidelines. Moon, Yuh, and Hanna (2002) found that U.S. households were more likely than Korean households to meet the 25% capital accumulation guideline. Other studies have focused on finding the ratio of investment assets to net worth that most accurately predicts retirement adequacy and wealth (Harness et al., 2009; Yao et al., 2003; Yuh, Hanna, & Montalto, 1998; Yuh, Montalto, & Hanna, 1998). Another subset of studies analyzed how the capital accumulation ratio predicts different aspects of household financial well-being (DeVaney, 1993, 1995; Greninger et al., 1996). Yao et al. (2003) investigated the relationship between meeting capital accumulation ratio guidelines and retirement adequacy and found that 63% of households had a consistent relationship between retirement adequacy and meeting the 25%

ratio guideline; 46% of all households met the 25% ratio guideline and were prepared for retirement, and 17% of households did not meet the 25% ratio guideline and were not prepared for retirement.

There is some debate as to what should be considered the optimal capital accumulation ratio. Both Lytton et al. (1991) and DeVaney (1993) proposed that the capital accumulation ratio should be at least 25%. Greninger et al. (1996) concluded from a Delphi study of financial planners and of financial educators that the capital accumulation ratio should be just over 50%. Yao et al. (2003) examined retirement adequacy in relation to the capital accumulation ratio and concluded that the 25% guideline was more appropriate than the 50% guideline. Harness et al. (2009) found that meeting the 25% guideline resulted in a 28% increase in net worth over 10 years but did not report how this compared to households that did not meet the guideline.

For the purposes of the current study, the factors related to the likelihood of meeting the capital accumulation ratio were assessed using the threshold guideline of 25%. We were interested in whether the proportion of households meeting the ratio changes over time. The 25% threshold was selected over the 50% threshold because the higher ratio threshold is difficult for many of the younger households to achieve. The 25% guideline may provide more insight than the 50% guideline into changes over time and effects of household characteristics. Furthermore, Yao et al. (2003) found that there was a stronger relationship between retirement adequacy and the 25% capital accumulation ratio guideline than between retirement adequacy and the 50% guideline.

Economic Conditions

Economic conditions and economic events can have an impact on a household's ability to meet the capital accumulation ratio threshold of 25%. Given the construction of the capital accumulation ratio, there were factors that could logically affect the ratio. Since the numerator of the ratio was comprised of investment assets, it is likely that the capital accumulation ratio will increase in response to changes in the stock market. The denominator of the ratio was comprised of net worth, which included both investment assets and housing values. When net worth increased through home values, the capital accumulation ratio is likely to decrease. The ratio may be affected by these market forces and the percentage of households meeting the threshold may change over time.

For the purposes of the current study, we focused specifically on stock indices and housing prices as they change over time. Standard & Poor's 500 stock-market index, the S&P 500, is a practical measure for evaluating the past performance of stock investments, because the index is regarded as a proxy for the large-cap stock market. The Ibbotson SBBI Data Series for Large Company Stocks, constructed from the S&P 500 Composite (with dividends reinvested), was used in this analysis. The components that make up the index included total return, income return, and capital appreciation return (Ibbotson Associates, 2009, p. 5). The Ibbotson Large Stock Index was set at \$1.00 for December, 1925 and reached \$2,049.45 on December 31, 2008 for a compound annual growth rate of 9.6% (Ibbotson Associates, 2009, p. 19). The S&P/Case-Shiller Home Price Indices are the leading measure of United States residential real estate prices (Standard and Poor's, 2010). The index includes indices for different metropolitan areas capturing approximately 75% of residential housing stock in the U.S.

There have been many economic changes over the periods covered in this research. From 1995-1999 the stock market increased substantially, with triple digit total returns (111%) on large stocks (Ibbotson Associates, 2009). Dur-

Table 1. Stock Price Changes VersusHousing Price Changes

Percent change					
Years	S&P 500 index ^a	Case-Shiller index ^b	Relative changes		
1989 - 1992	36.05%	-6.80%	1.46		
1992 - 1995	53.44%	0.08%	1.53		
1995 - 1998	110.85%	17.19%	1.80		
1998 - 2001	-3.06%	37.59%	0.70		
2001 - 2004	11.15%	54.62%	0.72		
2004 - 2007	28.16%	4.64%	1.22		

^a The figures were calculated based on data obtained from the Ibbotson SBBI Data Series for Large Company Stocks (Ibbotson Associates, 2009, p. 215).

^b The figures were calculated based on data obtained from the April 2010 Seasonally Adjusted Tables (S&P 500, 2010). ing the same period housing prices increased, but not at the same accelerated rate as stock prices. Housing values began to climb in 1996 and continued a steady climb until 2006. This pattern was represented by an increase in home equity from 2004 to 2007 of 18.3% and increased home values of 37.6% from 1998-2001 and 54.6% from 2001 to 2004 (Standard and Poor's, 2010). The stock price changes (S&P 500 Index), the housing price changes (Case-Shiller Index), and the relative changes in each time period are shown in Table 1. For instance, in the middle of 1992 the S&P index was 1.36 times as high as it was in the middle of 1989, while the Case-Shiller index was only 0.93 the level of 1989. The last column was calculated by dividing these ratios, so, for the first period, 1.36/0.93 = 1.46.

These changes and patterns may have an impact on a household's propensity to meet the 25% capital accumulation ratio threshold. If households passively react to market changes, they will be more likely to meet the capital accumulation ratio threshold of 25% during periods when stock prices have increased more than housing prices, specifically from 1992-1995, 1995-1998, and 2004-2007. Similarly, households will be less likely to meet the capital accumulation ratio threshold of 25% during periods when housing prices have increased more than stock prices; specifically from 1998-2001 and 2001-2004 (see Table 1 for further reference).

Theoretical Framework and Hypotheses Life Cycle Savings Theory

Classic economic theory assumes that people will behave rationally, which in the case of saving for retirement, means that individuals will attempt to smooth their consumption over time. The life cycle savings theory states that people will save when income is high and dissave when income is low in order to smooth consumption over one's lifetime. The life cycle savings theory includes the assumption that households seek to maximize utility from consumption over their lifetimes (Ando & Modigliani, 1963).

The life cycle savings theory provides for some explanation of larger debt loads among younger households given that younger households are likely to take on substantial debt in order to finance a house, purchase a new car, or pay off student loans. These debts will slowly decrease over time while investment assets and home values will increase. The same concept can be said for the accumulation of assets over time. Assets are accumulated during an individual's work life in order to finance consumption after retirement. Meeting the capital accumulation ratio guideline can be considered, to some extent, a choice to defer consumption. Median and mean net worth generally show a "hump" pattern that peaks in the 55 - 64 age range. This pattern reflects both lifecycle saving behavior and growth in real wages over time (Bucks, Kennickell, Mach, & Moore, 2009). In line with this, the capital accumulation ratio should be lower among younger households, increase as households age, and then decrease after retirement.

Research Hypotheses

If the capital accumulation ratio guideline is a good model for retirement planning and used by households, then there should be no time trend. If households attempt to meet the 25% capital accumulation ratio guideline, then despite the changes in stock and housing prices over time, the proportion meeting the guideline is expected to remain unchanged over time. On the other hand, if households react passively to changes in stock and housing prices or follow the trends of housing and stock prices, then the proportion meeting the guideline is expected to decrease in periods when housing prices increased more than stock prices (i.e., 1998-2001 and 2001-2004) and increase in periods when stock prices increased more than housing prices (the other periods shown in Table 1). Therefore, the following hypotheses are presented related to the percentage of households meeting the 25% capital accumulation ratio threshold:

- H₁: The percentage of households meeting the 25% capital accumulation ratio threshold will not fluctuate significantly between survey years.
- H_{1A}: The percentage of households meeting the 25% capital accumulation ratio threshold will increase from 1992 to 1995.
- H_{1B}: The percentage of households meeting the 25% capital accumulation ratio threshold will increase from 1995 to 1998.
- H_{1C} : The percentage of households meeting the 25% capital accumulation ratio threshold will decrease from 1998 to 2001.
- H_{1D}: The percentage of households meeting the 25% capital accumulation ratio threshold will decrease from 2001 to 2004.
- H_{1E}: The percentage of households meeting the 25% capital accumulation ratio threshold will increase from 2004 to 2007.

These hypotheses were based on an unconditional basis (changes in the actual proportions meeting the guideline) and a conditional basis (changes controlling for household characteristics). Previous empirical research has found a number of household characteristics to be related to the likelihood of meeting the 25% capital accumulation ratio guideline (Yao et al., 2002), and theoretical considerations also suggest that household characteristics related to lifecycle factors should influence the likelihood of meeting the guideline.

Yuh and Hanna (2010) reviewed theoretical considerations related to whether households will save from current income and some of these considerations may relate to meeting the capital accumulation ratio guideline in terms of accumulating investment assets. The life cycle model predicts that a typical household will steadily accumulate investments until retirement, so age should have an influence on meeting the capital accumulation ratio threshold. As households progress through the life cycle the percentage meeting the 25% threshold is expected to increase, up to retirement age, where it is expected to decrease.

Presence of children under 19 was expected to have a negative effect on meeting the threshold, as the marginal utility of consumption may be higher with children than after children have left the home. Married households may have a longer planning horizon than single households, and therefore be more likely to have investments. Education may have several influences, as discussed by Yuh and Hanna (2010), but one effect may be that those with higher levels of education may discount the future at a lower rate than those with lower levels of education, and therefore be more likely to have investments. Those with lower income may have less incentive to invest because of the structure of Social Security and other government benefit programs, so income may strongly influence the likelihood of meeting the capital accumulation ratio guideline. Households with a longer planning horizon were more likely to save and invest for retirement (Rha, Montalto, & Hanna, 2006), so the planning horizon is likely to impact the likelihood of meeting the capital accumulation ratio. As Yuh and Hanna (2010) suggested, it was difficult to construct expectations for racial/ethnic differences based on theory, but controlling for them is of interest for educators and policy-makers.

We controlled for the effects of some basic household characteristics on the likelihood of meeting the capital accumulation ratio guideline, and did not include some attitude and expectation variables included in the Yao et al. (2002) study. Unlike that study, which analyzed one survey year, our focus was on the time trend, and we were controlling for the effects of some household characteristics only to control for any long-term changes, for instance, in the age and racial/ethnic composition of U.S. households. We did not control for the effects of attitudes which could be affected by the same factors that might influence household portfolio choices.

Methods

Data and Sample

The data analyzed in the current study were from six datasets (1992, 1995, 1998, 2001, 2004, and 2007) of the Survey of Consumer Finances (SCF). The SCF, sponsored by the Federal Reserve Board, is a triennial survey of U.S. families designed to provide detailed financial information on American households. These data sets include information on households' assets and liabilities, income, pensions, labor force participation, use of financial services and standard demographic characteristics (Aizcorbe, Kennickell, & Moore, 2003). It should be noted that the Survey of Consumer Finances is a cross sectional dataset, so the household participants are different for each survey year.

Non-response rates in the Survey of Consumer Finances tend to be sizeable given the sensitive nature of the survey. To deal with the problem of missing responses, the Survey of Consumer Finances has employed multiple imputation techniques (Kennickell, 1998). The goal of multiple imputation is to provide data that are the best possible estimate of the missing data. Each survey year used in this analysis consisted of the five complete implicates and thus the number of observations for each survey year is five times the number of respondents. All five implicates were used in this study.

These six years of datasets were combined to test for changes between survey years. The five implicates were combined for each survey year in all analyses and weighted to represent the actual number of households in the survey each year. The sample sizes were 3,906 in 1992, 4,299 in 1995, 4,305 in 1998, 4,442 in 2001, 4,519 in 2004, and 4,418 in 2007, for a total sample size of 25,889 households over the six survey years.

Dependent Variable

The capital accumulation ratio is defined as investment assets-to-net worth and is calculated from information on investment assets and net worth. If net worth is zero or negative, then the capital accumulation ratio is defined as equal to the value of investments, in other words, the denominator will be assumed to be equal to one. This approach is consistent with similar studies (DeVaney, 1997; Yao et al., 2002). DeVaney (1997) suggested that it is reasonable to define a ratio as equal to the numerator if the denominator is zero or negative. The rationale is that if a household has zero or negative net worth and positive investment assets, assets should be growing and therefore the household should be considered to have met the guideline. The capital accumulation guideline was coded as 1 if the ratio was greater than or equal to 25% and coded as 0 otherwise. The current study focused on whether households meet the threshold and not on exact values of the ratio; therefore, the extreme values of the ratio did not inappropriately influence the results.

Investment assets consisted of stocks, bonds, mutual funds, retirement accounts including IRAs, thrift accounts and future pensions, certificates of deposit, cash value of life insurance, other managed assets, other nonresidential assets such as loans owed to the household, artwork, antiques, net business assets, and real estate other than the personal residence. Monetary (liquid) assets included checking, savings, money market, and call accounts, and were not counted as part of investment assets, although certificates of deposit were included as investment assets. Net worth was the sum of monetary assets, investment assets, and nonfinancial assets minus consumer debt and property debt.

Total debt included housing debt (including mortgages and home equity loans), credit card debt, installment loans including student loan debt and vehicle loans, outstanding line of credit loans, home improvement debt, amounts borrowed from life insurance, pension loans, and other consumer debt. In the SCF, net worth is inflation-adjusted and represents the difference between households' gross assets and their liabilities.

Independent Variables

Demographic variables included age, education, marital status of the household head, and racial/ethnic status of the respondent. Age was the age of the household head. Age-squared was used to capture any nonlinear changes in the age effect. Education was the highest year of education completed by the head of the household. The income variable was the annual household pre-tax income. The income variable was transformed using the logarithmic function because of its highly skewed distribution. A variable for the log of income was set to the log of 0.01 if the level is zero or negative. The variable for whether there was at least one child under 19 living at home was based on the number of related children under age 19 living in

the home. Marital status was recorded as either married, unmarried couple, single male, or single female. Race/ ethnicity was coded as White, Black, Hispanic or Asian/ Other. Home ownership was coded as 1 if the respondent was a homeowner and 0 if otherwise. The planning horizon (X3008) was coded as the number of years, based on the choice each respondent made, for instance, "next few months" is coded as 0.3 years, "next year" was coded as 1 year, and "longer than 10 years" was coded as 15 years.

Analysis

The percentage of households meeting the 25% capital accumulation ratio threshold was compared for each year of the survey. To determine whether the percentage of households meeting the 25% threshold changed significantly from one survey year to the next, a repeated-imputation inference (RII) means test was performed. In a repeatedimputation inference means test the point estimate of the mean was the average value of five implicates and the point estimate of variance was the sum of "between" implicate variance and "within" implicate variance. Compared to non-repeated-imputation inference methods, the repeated-imputation inference method had a larger standard error; thus, had smaller *t*-statistics (Montalto & Sung, 1996). The reduction of t-statistics reduced the likelihood of rejecting null hypothesis. T-statistics and p-values were used to test for significance.

A multivariate model was used to control for the effects of household characteristics on whether the household meets the 25% capital accumulation ratio guideline over time. In the logistic regression results reported in this article, the reference year was 2001, so the significance levels for the dummy variables representing other survey years show only whether households in those years were significantly different in likelihood than households in 2001. Separate analyses were performed with different survey years serving as the reference category. This method enables a comparison of each survey year to the previous survey year to determine whether any change in the percentage of households meeting the 25% capital accumulation ratio threshold was significant when the other independent variables were controlled. A repeated-imputation inference (RII) method was used to combine the implicates for the logistic regressions, because using only one implicate may underestimate the variances of the estimates of coefficients (Montalto & Sung, 1996) and averaging the effects of the five implicates in the SCF datasets may also underestimate the variances (Lindamood, Hanna, & Bi, 2007).

Results

The median capital accumulation ratio for all households in the combined 1992-2007 sample was 35%, which is above the 25% threshold. Because of some of the extreme values of investment assets, the maximum value of the ratio was over one billion percent, (e.g., if the value of investments was \$10,000,000, but net worth was negative, the ratio would be defined as 10,000,000, or one billion percent). The mean of the ratio is about 252%, supporting the Yao et al. (2002) approach of analyzing whether households meet the threshold rather than analyzing the actual value of the ratio. The median value of the capital accumulation ratio has fluctuated over time (see Table 2). In 1992, the median capital accumulation ratio was 29%, the ratio increased to 34% in 1995 and to 42% in 1998, then decreased to 39% in 2001 and again in 2004 to 33%. The median of the ratio increased in 2007 to 35%.

The pattern of the percentage of households meeting the 25% capital accumulation ratio threshold was similar to the pattern of the median of the capital accumulation ratio, increasing from 53% in 1992 to 56% in 1995 to 60% in 1998, then decreasing to 59% in 2001 and 55% in 2004, and increasing to 57% in 2007. The percentage of households meeting the 25% capital accumulation ratio threshold changed significantly for each successive survey year (see Table 3).

The results from the logistic regression, assessing whether households met the 25% capital accumulation ratio threshold, are shown in Table 4. The coefficients for the survey year dummy variables showed a pattern similar to the pattern of the actual percentage each survey year. The actual percentages for each survey year is shown in Figure 1, and the calculated likelihood of meeting the 25%

Table 2. Median Level of Capital Accumulation Ratio (CAR) and Percent of Households With CAR of 25% or More by Survey Year

	1992	1995	1998	2001	2004	2007	Combined
Median	0.290	0.340	0.424	0.391	0.327	0.351	0.352
Percent with CAR $\ge 25\%$	52.74	55.73	60.24	58.91	54.51	56.59	56.51
Ν	3,906	4,299	4,305	4,442	4,519	4,418	25,889

Table 3. Hypotheses and Percentage Point Changes in Likelihood of Meeting CAR Guidelines, Actual andCalculated Based on Logistic Regression Results

Years	Hypothesis	Actual change	Calculated change
1992-1995	H1A +	+2.99% **	+3.39% *
1995-1998	H1B +	+4.51% **	+2.30% *
1998-2001	H1C –	-1.33% *	-3.87% *
2001-2004	H1D -	-4.40% **	-5.69% **
2004-2007	H1E +	+2.08% **	+3.01% *

*p < .05. **p < .001.

Note. Significance levels for changes in actual likelihoods are based on RII means tests. Significance levels of changes in calculated likelihoods are based on RII logistic regression results. As hypotheses are directional, one-tail tests are used.

Note. Changes in calculated percentages are based on logistic regression results shown in Table 4. Calculated levels are based on mean levels of other variables. The significance levels for year dummy variables in the logistic regression are with 2001 as the reference category, but separate calculations were performed to obtain significance tests for other pairs of survey years.

Table 4. Logistic Regression of Likelihood of Meeting 25% CAR Guideline

Variable	b	SE	Odds ratio
Year of survey: reference category = 2001			
1992	-0.074	0.055	0.929
1995	0.064	0.054	1.066
1998	0.160*	0.055	1.174
2004	-0.230**	0.053	0.795
2007	-0.109*	0.054	0.897
Household income (Log)	0.357**	0.016	1.429
Racial ethnic status of respondent			
Black	-0.447**	0.050	0.639
Hispanic	-0.689**	0.064	0.502
Asian/other	-0.439**	0.080	0.644
Age of head	0.058**	0.006	1.060
Age squared/10000	-4.161**	0.001	0.953
Years of education of head	0.222**	0.007	1.248
Own home	-0.108*	0.040	0.898
Household composition			
Unmarried couple	-0.229**	0.067	0.795
Single male	-0.245**	0.050	0.783
Single female	-0.534**	0.043	0.586
Have child < 19 at home	-0.147**	0.037	0.863
Planning horizon	0.045**	0.004	1.046
Intercept	-7.620**	0.204	
Concordance (averaged for 5 implicates)	82.6%		

p < .05. p < .001.

Note. Logistic regression based on RII method using five implicates of combined 1992, 1995, 1998, 2001, 2004, and 2007 SCF datasets, unweighted. Significance levels shown are based on two-tail tests.



Figure 1. Percent of Households Meeting 25% Capital Accumulation Guideline, 1992-2007, Actual and Calculated, Assuming Household Characteristics Remained Constant

Note. Calculated percentages are based on logistic regression results shown in Table 4, assuming all variables other than survey year are the mean of combined samples.

capital accumulation ratio threshold was calculated at the mean values of other variables. Both the actual and calculated patterns were similar, although the calculated pattern showed a steeper decrease between 1998 and 2004 than the actual pattern.

Many household characteristics affected the likelihood of meeting the 25% capital accumulation ratio threshold (see Table 4). Age and age-squared had strong effects, and based on the combined effects, we calculated that the likelihood of meeting the threshold increases with age until age 70 and then decreases slightly. Household income and years of education had strong, positive effects on the likelihood of meeting the threshold. Households with White respondents were much more likely than otherwise similar households with Black, Hispanic or Asian/Other respondents to meet the threshold. Planning horizon had a significant, positive effect on meeting the ratio. Households with a related child under 19 were less likely to meet the threshold than those without a related child under 19. Homeownership did not have a significant effect on the likelihood.

Conclusion

Based on the analysis, the hypothesis that there was no change in the capital accumulation ratio over time is not accepted. The expected result of the null hypothesis was that there would not be significant changes between pairs of survey years. The hypotheses and the actual and calculated changes between survey years are shown in Table 3. Hypothesis 1A (1992-1995) is accepted for both the actual and calculated changes, as the substantial increases in the actual and calculated likelihoods (2.99 and 3.47 percentage points) were significantly different from zero. Hypothesis 1B (1995-1998) is accepted for the actual increase of 4.51 percentage points and for the calculated change of 2.23 percentage points. Hypothesis 1C (1998-2001) is accepted for both the actual and calculated decreases, 1.33 and 3.53 percentage points respectively. Hypothesis 1D (2001-2004) is accepted for both the actual and calculated changes, as the substantial decreases in actual and calculated likelihoods were significantly different from zero. Hypothesis 1E (2004-2007) is accepted for both the actual and calculated changes, as the increases in actual and calculated likelihoods were significantly different from zero.

In periods when the stock market increased more than housing prices (1992-1995, 1995-1998 and again from 2004-2007), the percentage of households meeting the 25% capital accumulation ratio threshold increased from the previous year. In periods when housing prices increased more than the stock market (1998-2001 and 2001-2004), the percentage of households meeting the threshold decreased from previous periods. Rather than adjusting investments to maintain recommended levels of the capital accumulation ratio, households appear to be passive, with adjustments to their ratios coming from relative changes in housing and stock returns.

Discussion and Implications

The changes in the proportion of households meeting the 25% capital accumulation ratio guideline suggest that household portfolios move along with the relative changes in housing and stock prices. In periods when the stock market increases at a greater rate than housing prices, the percentage of households meeting the threshold increases. In periods when housing prices increase more than stock prices, the percentage of households meeting the threshold meeting the threshold decreases.

The proportion of households meeting the ratio guideline is not constant over time and changes as with economic conditions in a way consistent with passive reactions to changes in returns on stock prices relative to housing prices. It is possible that the guideline is not used by households because of inertia, lack of awareness of the ratio, or the illiquid nature of the housing market. Regardless, given the tumultuous housing market in the United States that started in 2007, where households took on more debt than they could reasonably afford, this might be a useful tool to employ when deciding how expensive a home to buy or where to allocate any additional resources.

Research has shown several economic benefits of meeting the 25% threshold of the capital accumulation ratio, including increased retirement adequacy and greater net worth growth. No personal financial planning textbooks other than Garman and Forgue (2000) mention the capital accumulation ratio. Few financial planners or counselors are exposed to the ratio guideline in their educational preparation and few consumers are made aware of the ratio as a planning tool. Rules of thumb are embraced by consumers because of their simplicity. The capital accumulation ratio could be a powerful, yet simple tool for most consumers when considering how to allocate their resources when purchasing a home or deciding on retirement savings. Practitioners should consider tracking this ratio for their clients and using it when making recommendations about asset portfolio allocations. Educators could consider teaching it as an additional planning guideline.

A balanced portfolio is an important risk diversification method that could include larger assets like retirement accounts and housing. The strength of the guideline is the ability for a household to understand where they may be investing too heavily (such as a house) or too little (such as a retirement plan). While the capital accumulation ratio does not seem to be used as an investment decisionmaking tool, it could be a guideline to consider as families and financial planners contemplate allocating scarce resources in a market where housing prices and the stock market are not stable.

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