Households' Propensity to Meet the Capital Accumulation Ratio over Time: Evidence from the 1992-2007 Surveys of Consumer Finance

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This paper explores the time trends of the capital accumulation ratio and considers whether changes in stock indexes relative to housing indexes have an impact on the percentage of households that meet the 25% CAR threshold. The percentage of households meeting the 25% CAR threshold varies significantly between most of the survey years. In periods when the stock market increased more than housing prices (1992-1995, 1995-1998 and 2004-2007), the percentage of households meeting the 25% CAR threshold increases 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 decreases from previous periods. The difference between the years is significant for every period except 1995-1998.

Introduction

Retirement planning is a scary and complex endeavor for many people. Retirement planning involves a lot of unknown variables and scenarios: 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 aren't interested in learning the details or don't have the patience to do so. Life is hectic, many people are overworked and retirement planning tends to take a backseat.

Research indicates that Americans are not saving enough for their retirement. About half of workers saving for retirement report that the total value of their investments, excluding their home and their defined benefit plan, was less than $25,000 (Helman, VanDerhei, & Copeland 2007). According to the 2007 Retirement Confidence Survey, only 66% of workers report that they have saved for retirement and only 60% report that they are currently saving.

Retirement planning is growing in importance and complexity. Many rule of thumb guidelines have emerged in an effort to make financial decisions easier. One common retirement rule of thumb suggests setting aside 10% of gross income for savings. Many experts agree that this isn't so much a rule as it is a starting point. A major financial news outlet suggests that people save "10% for basics, 15% for comfort, [and] 20% to escape." Authors suggest that an individual's highest priority should be saving for retirement because every dollar forgone could cost $10 or more in retirement income (Weston, 2009). Rules of thumbs exist because people don't have the knowledge, time or interest necessary to sort through all of the details in order to make a sound financial plan. Many people 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, & Achascoso, 1996) and are a quantitative tool useful in financial decision-making (Yao, Hanna, & Montalto, 2002). The capital accumulation ratio (CAR), defined as the proportion of net worth held in investment assets, is intended to identify the share of assets held primarily for future consumption. The CAR has been used to assess household well-being (DeVaney, 1993), retirement adequacy (DeVaney, 1995; Yao, Hanna, & Montalto, 2003), financial strength over time (Garman & Forgue, 2008) and change in wealth over the lifecycle (Harness, Finke, & Chatterjee, 2009).

This paper explores the time trends of the capital accumulation ratio and considers whether changes in stock indexes relative to housing indexes might have an impact on the percentage of households that meet the 25% CAR threshold. A cross sectional review of the CAR is useful in understanding how economic events or trends impact household investments and investment decisions. This paper will look at the capital accumulation ratio over a 15 year range using the Survey of Consumer Finances national dataset for 1992, 1995, 1998, 2001, 2004 and 2007. It will contribute to the existing literature by exploring cross sectional trends associated with the capital accumulation ratio.

Literature Review

Retirement Adequacy

Retirement adequacy is defined as having sufficient resources to meet retirement needs. A household is considered to have adequate retirement coverage if its assets are equal to or greater than its needs at retirement. An analysis of retirement adequacy involves a comprehensive review of all components of retirement income. Once there is a comprehensive measure of retirement resources, retirement adequacy is determined by comparing needs at retirement to retirement resources. Retirement wealth can be considered adequate if total retirement income is equal to or greater than the planned retirement consumption level (Yuh, Montalto, & Hanna, 1998). If households do not have adequate resources, they are considered to be inadequately prepared (Yao et al., 2003).

Based on mean lognormal portfolio projections and current contribution rates in the 1995 Survey of Consumer Finances (SCF), Yuh, Hanna, et al. (1998) found that only 42% - 52% of households are adequately prepared for retirement. Yuh, Montalto, et al. (1998) found that about 52% of the households in 1995 SCF had adequate wealth for retirement given their planned retirement age. Further analysis indicated that households that spent less than income were much more likely to be prepared for retirement. Planned retirement age also had a significant effect on adequacy. Yao et al. (2003) used the capital accumulation ratio to determine 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. Moore & Mitchell (2000) investigated retirement adequacy by comparing the projected savings rates with the optimal savings rates under the life cycle model. They found that for retirement at age 62, only 31% of the sample households were prepared to consume at the pre-retirement level after retirement and did not need additional savings. For retirement at age 65, only 40% of these households had adequate retirement wealth. Their analysis showed that females were less likely to be prepared for retirement because they have a longer life expectancy.

Capital Accumulation Ratio

The capital accumulation ratio (CAR) is an indicator of how well an individual or household is advancing toward financial goals for capital accumulation. The CAR is defined as investment assets-to-net worth and compares the value of investment assets with net worth. Several studies have been conducted assessing the capital accumulation ratio. Most studies of the capital accumulation ratio have sought to identify specific characteristics of households meeting certain, specified guidelines. Other studies have focused on finding the ratio of investment assets to net worth that most accurately predicts retirement adequacy. Another subset of studies analyzes how the CAR predicts different aspects of household financial well-being.

The capital accumulation ratio is calculated from information on investment assets and net worth. As defined in past studies, (Yao et al., 2002; DeVaney, 1997) 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, art work, antiques), and other real estate excluding the home and net business assets. Net worth is the sum of liquid assets, investment assets, and nonfinancial assets minus consumer debt and property debt (Kennickell, 2000).

There is some debate as to what should be considered the optimal CAR. Lytton, Garman, & Porter (1991) suggested that the CAR should be at least 25%. DeVaney (1993) also proposed that the CAR should be at least 25%. Greninger et al. (1996) conducted a Delphi study which resulted in the suggested mean value CAR to be just over 50%. Yao et al. (2003) examined retirement adequacy in relation to the CAR and found less of an error rate with households meeting the 25% guideline. They concluded that the 25% guideline was more appropriate than the 50% guideline. Garman & Forgue (2008) asserted that the CAR should increase as households' progress through the lifecycle. During the initial stages of the life cycle, young people typically have little money to save. The money they do accumulate is often used for large purchases, such as a house or a car rather than investing for retirement. Harness et al. (2009) found that meeting the 25% guideline resulted in a 28.1% increase in net worth over the ten years, but did not report how this compared to households that did not meet the guideline. They also found that among those who met the 25% threshold, an increased CAR percentage came with increased wealth dispersion of over 35%.

For the purposes of this study, we will assess factors related to the likelihood of meeting the CAR guideline of 25%. We are interested in whether the proportion of households meeting the ratio changes over time. The 25% threshold is selected over the 50% threshold because a high CAR threshold of 50% would likely exclude many of the younger households that may be in the initial stages of the lifecycle. 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% CAR 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 CAR threshold of 25%. Given the construction of the CAR, there are factors that could logically affect the ratio. Since the numerator of the CAR is comprised of investment assets, will CAR increase in response to changes in the stock market? The denominator of the CAR is comprised of net worth, which includes both investment assets and non-financial assets, such as housing values. When net worth increases through home values, will the CAR decrease? Will the percentage of households that meet the 25% CAR threshold stay fairly consistent over time? If households do not respond to market changes, the CAR may be affected by these market forces and the percentage of households meeting the threshold may change over time.

Net Worth

Net worth is defined as households' total assets minus liabilities. After falling between 1989 and 1992, median and mean net worth have steadily been on the rise. From 1992 to 1995, mean net worth rose 2.7% while median net worth rose 6.8% (Kennickell, Starr-McCluer, & Sundén, 1997). Continuing the acceleration trend from 1992, both mean and median net worth increased robustly between 1995 and 1998. Mean net worth rose 25.7% and the median rose

17.6%. The levels of both of these measures exceeded the levels observed in 1989, which was toward the end of the last expansion, representing another market expansion. Compared with 1989, both mean and median net worth were approximately 20% higher in 1998 (Kennickell, Starr-McCluer, & Surette, 2000). From 1998 to 2001, median net worth rose 10.4% and mean net worth increased 28.7%. Median net worth, at this point, had increased 40.5% over the period from 1992 to 2001 (Aizcorbe, Kennickell, & Moore, 2003). The pace of net worth growth slowed down, though still increased, from 2001 to 2004. The median rose 1.5% and the mean rose 6.3% (Bucks, Kennickell, & Moore, 2006). From 2004 to 2007, net worth growth once again accelerated. Median net worth rose 17.7%, and the mean rose 13%. Both median and mean net worth have risen consistently since 1998, but overall the mean has gained more (54.7%), compared with the median (31.8%). Unrealized capital gains were an important factor in the increase in net worth over the 2004–2007 period; the share of total assets attributable to unrealized capital gains from real estate, businesses, stocks, or mutual funds rose 5.1%, to 35.8% in 2007 (Bucks, Kennickell, Mach, & Moore, 2009).

Investment and Financial Assets

For the purposes of this thesis, financial assets are classified as either investment assets or liquid assets. Financial assets are considered to be investment assets if they are intended for some longer-term future use. Investment assets are comprised of assets such as stocks, bonds, pension plan assets, certificates of deposit, etc. Liquid assets are not considered investment assets because they are generally held in non-interest bearing accounts and are used in the short-term. Liquid assets are often referred to as transaction accounts because of the nature of the accounts (check writing, ATM withdrawals, etc).

Composition of financial assets has changed over time. There was a considerable shift from 1989 to 1995 where the share of traditional financial assets, such as transaction accounts and certificates of deposit, declined sharply: from 30% in 1989 to only 19% in 1995. At the same time, the share of tax-deferred retirement accounts and equities started to rise almost proportionately, from 38% in 1989 to 56% in 1995 (Kennickell et al., 1997). Continuing with this trend, the share of financial assets in transaction accounts decreased another 15.7% from 1995 to 1998. From 1989 to 1998, growth was concentrated among stocks, mutual funds, tax-deferred retirement accounts, and other managed assets. Combined, these assets accounted for 71.3% of financial assets in 1998, up from 48.4% in 1989 (Kennickell et al., 2000). After the acceleration of financial assets, the share of financial assets in households' total assets only increased by 1.3 percentage points between 1998 and 2001 (Aizcorbe et al., 2003). The peak of financial assets held as a percentage of assets occurred in 2001. Financial assets (as a percentage of total assets) fell 6.3 percentage points from 2001 to 2004 (Bucks et al., 2009).

Stock Market Index

Standard & Poor's 500 stock-market index, the S&P 500, is useful for evaluating the past performance of stock investments because the index is well regarded as a proxy for the large-cap stock market. Companies that are chosen for the index are the foremost companies in leading industries within the U.S economy. The Ibbotson SBBI Data Series for Large Company Stocks is constructed from the S&P 500 Composite, but includes dividends reinvested. The components that make up the index include total return, income return and capital appreciation return

(Ibbotson Associates, 2009, pp. 5). The Ibbotson SBBI Data Series for Large Company Stocks is used in this analysis. The Ibbotson Large Stock Index was initialized in December, 1925 at $1.00 and closed in 2008 at $2,049.45 for a compound annual growth rate of 9.6% (Ibbotson Associates, 2009, pp. 19). Throughout the 1990s, the Ibbotson Large Stock Index experienced significant growth. From 1992 to 1995, the index increased 53.4%. During the period from 1995 to 1998, the index increased 110.9%. This was followed by a brief dip from 1998 to 2001 of -3.06%. The index then rebounded and from 2001 to 2004 and increased 11.2% and again increased during the period of 2004 to 2007 by 28.16% (Ibbotson Associates, 2009).

Housing Values

Housing values are a large part of the CAR because they are excluded from the investment asset component (the numerator) of the ratio. Therefore, as housing values rise CAR is expected to decrease. In order to balance out the CAR, this increase in housing values should be offset by an increase in investment assets. If a household tries to maintain its CAR, it will have to adjust its investment asset levels in response to changes in relative changes in housing and stock prices.

The S&P/Case-Shiller Home Price Indices are the leading measure of United States residential real estate prices. The index includes indices for different metropolitan areas capturing approximately 75% of residential housing stock in the U.S. The methodology measures the movement in the price of single-family homes by collecting data on actual sale prices of single-family homes in their specific regions.

The 10 City Composite Case-Shiller Index indicates that real estate prices dropped slightly each year from 1989 to 1993. After a decline of -4.6% from January of 1989 to January 1990, prices fell less drastically and declined approximately 1-1.5% until 1993. Starting in 1996, real estate prices started to climb, beginning with a 2.05% increase in 1996 and climbing to double digit increases starting in 1999 (11%). This pace continued until 2006, when real estate prices began declining. From 2005 to 2006, prices went down -0.56%. From 2006 to 2007, real estate prices dropped -11.4% and from 2007 to 2008 there was almost a 20% drop (Standard and Poor's [S&P 500], 2010).

Table 1: Stock Price Changes vs. Housing Price Changes

	Percent Change		
Years	**S&P 500 Index[1]**	**Case-Shiller Index[2]**	**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

[1]The figures were calculated based on data obtained from the Ibbotson SBBI Data Series for Large Company Stocks (Ibbotson Associates, 2009, pp. 215).
[2]The figures were calculated based on data obtained from the April 2010 Seasonally Adjusted

Tables (S&P 500, 2010).

Table 1 shows the stock price changes (S&P 500 Index), the housing price changes (Case-Shiller Index) and the relative changes in each time period. 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 is calculated by dividing these ratios, so, for the first period, 1.36/0.93 = 1.46.

Summary of Economic Changes

There have been many economic changes over the periods covered in this research. Beginning in 1989, there was a shift out of traditional financial assets, such as certificates of deposit, and into investment assets as people started saving independently for retirement. During the late 1990s, specifically from 1995-1999 the stock market increased substantially. This is evidenced by both a growth in median net worth of 17.6% as well as triple digit stock market growth (110.9%). During 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 is 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.

These changes and patterns may have an impact on a household's propensity to meet the 25% CAR threshold. If households are passive investors, then they will be more likely to meet the CAR threshold of 25% during periods when stock prices increase more than housing prices, specifically from 1992-1995, 1995-1998 and 2004-2007. In the same token, households will be less likely to meet the CAR threshold of 25% during periods when housing prices increase 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. 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 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 CAR 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 et al, 2009). In line with this, CAR should be lower among younger households, increase as households' age and then decrease after retirement.

Hanna, Fan, & Chang (1995) developed various lifecycle scenarios and applied those scenarios to the life cycle savings model to provide implications for financial planning. For each of the scenarios, the amount to save each year depends on the difference between income and consumption. If income is greater than consumption, then the consumer is a saver. If income is less than consumption, then the consumer is a borrower (or dissaves). One clear implication from this analysis is that anticipated future income is very important in establishing consumption patterns. Consumers who are confident that their future income will increase do not need to save as much as consumers who expect to have either constant or declining income. The authors suggest that saving the same percentage of income each year is not necessarily valid. Households who are sure that their incomes will increase considerably in the future may be rational in not starting to save for retirement until 25 years before retirement. Households with uncertain future incomes and retirement ages may be rational in starting to save early.

Herd Behavior

Many situations exist in which people are influenced by other people's decisions and actions. There are numerous examples where this behavior has been observed. Existing studies have provided some evidence that asset managers follow the decisions of other asset managers (Scharfstein & Stein, 1990). This behavior can also be seen in everyday situations in the form of restaurant decisions (Banerjee, 1992) and voting (Cukierman, 1989). People's decisions are influenced, either because they believe they lack the information necessary to make the decision or they assume if everyone else is doing it, then it must be right. Avery and Zemsky (1998) suggest that herd behavior, along with a certain level of uncertainty, can lead to stock bubbles.

Banerjee (1992) uses a simple model and example to explain the herd effect. In this study, Banerjee offers subjects the choice of two restaurants and provides imperfect information about the quality of the restaurants. The first individual follows his or her own signal, possibly setting the trend for others' decisions. People who follow make their decisions based on their own signal or by following the decision of the people before them. If the first decision is bad, then everyone may end up choosing the poorer restaurant. This creates a bad equilibrium. This bad equilibrium stems from a "herd externality," of imitating others and discarding one's own information (Banerjee, 1992). This effect is a combination of social pressure, imperfect information and information interpretation.

Herd behavior might be able to explain the technology stock bubble in the late nineties. It is possible that people either react passively to changes in the marketplace (i.e. not balancing their portfolios regularly) or respond in line with other people's decisions. Therefore, when stock prices increase more people see investing as lucrative and either invest more or begin investing for the first time. In this case, we may see the value of the capital accumulation ratio increase. In periods when housing values are increasing, more people purchase homes, home values increase and the value of the CAR may decrease.

Research Hypotheses

If households attempt to meet the 25% CAR 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% CAR threshold.

H1: The percentage of households meeting the 25% CAR threshold is not expected to fluctuate significantly between survey years.

H1A: The percentage of households meeting the 25% CAR threshold will increase from 1992 to 1995.

H1B: The percentage of households meeting the 25% CAR threshold will increase from 1995 to 1998.

H1C: The percentage of households meeting the 25% CAR threshold will decrease from 1998 to 2001.

H1D: The percentage of households meeting the 25% CAR threshold will decrease from 2001 to 2004.

H1E: The percentage of households meeting the 25% CAR threshold will increase from 2004 to 2007.

The life cycle model predicts that a typical household will steadily accumulate investments until retirement, so age should have an influence on meeting the CAR threshold. There has been a fair amount of research on the variables that are significant in predicting whether a household will meet the 25% CAR threshold. Yao, et al. (2002) note that for some household characteristics there are not obvious hypotheses related to meeting the CAR guidelines. Being in a racial/ethnic group other than White is expected to have a negative effect on meeting the threshold. This is for various reasons, but generally speaking, Whites may have more information or experience investing. Education should have a positive effect on meeting the threshold because as education increases, information about investments should also increase. Presence of children under 19 is expected to have a negative effect on meeting the threshold. This may be related to the lifecycle or may simply be because households with children may need to spend money, which would otherwise be invested, on their children. Single males and females are expected to be less likely to meet the threshold when compared to married or unmarried couples. Single males and females may not be similarly motivated to save or invest as their married or couples counterparts and are therefore expected to be less likely to meet the threshold. DeVaney (1995) found households are more likely to meet the threshold if they are white, expecting an inheritance, headed by a male, in good health and covered by a pension. Homeownership is expected to have a negative relationship with meeting the threshold because a large portion of their investments are likely in the home, which is not considered an investment asset for the purposes of CAR and retirement investments.

Based upon previous research, the following hypotheses are suggested.

H2: Age will be positively associated with meeting the 25% CAR threshold until retirement.

H3: Racial/ethnic groups other than White will be less likely to meet the 25% CAR threshold.

H4: Education will be positively associated with meeting the 25% CAR threshold.

H5: Households with children under 19 will be less likely to meet the 25% CAR threshold.

H6: Marriage will be positively associated with meeting the 25% CAR threshold.

H7: Homeownership will be negatively associated with meeting the 25% CAR threshold.

Methods

Data and Sample

The data analyzed in this study are from the six most recent datasets (1992, 1995, 1998, 2001, 2004 and 2007) of the Survey of Consumer Finances (SCF). The SCF is sponsored by the Federal Reserve Board in conjunction with the U.S. Department of the Treasury. The SCF is a triennial survey of U.S families and is designed to provide detailed financial information on American households. These data include information on households' assets and liabilities, income, pensions, labor force participation, use of financial services and standard demographic characteristics (Aizcorbe et al., 2003).

Non-response rates in the SCF tend to be sizeable given the sensitive nature of the survey. To deal with the problem of missing responses, the SCF 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 consists of the five complete implicates and thus the number of observations for each survey year is five times the number of respondents (Board of Governors of the Federal Reserve System, 1996). All five implicates are used in this study.

These six years of datasets are combined to test for time trends. The five implicates are 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.

Dependent variables

The Capital Accumulation Ratio (CAR) is defined as the ratio of invested assets to net worth and is intended to reflect the share of assets held primarily for future consumption. The CAR reveals how well an individual or family is progressing toward financial goals other than home ownership because it compares the actual accumulated value of investment assets to total net worth. The value of the ratio for each household will be compared to the criterion of holding invested assets which are at least 25% of net worth. The dependent variable will be coded as one if the household meets the criterion and coded as a zero, if otherwise. If net worth is zero or negative, then the CAR will be defined as equal to the value of investments, in other words, the denominator will be assumed to be equal to 1. This approach is consistent with similar studies (Yao et al., 2002; DeVaney, 1997). If a household has positive investment assets and zero or negative net worth, the CAR will either be undefined (in the case where net worth is zero) or will be very high. DeVaney (1997) suggests 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. This paper focuses on whether households meet the threshold and not on exact values of the ratio. Therefore, the extreme values will not inappropriately influence the results.

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, art work, antiques), other real estate but not the home and net business assets. Net worth is the sum of

liquid assets, investment assets, and nonfinancial assets minus consumer debt and property debt. Nonfinancial assets consist of the value of the residence, vehicles, business assets, land and other property, minus any outstanding debt against these assets.

Total debt includes 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

The multivariate model is testing the effects of household characteristics and time trends on whether the household meets the 25% CAR guideline. Demographic variables include age, education, number of children, marital status and race/ethnicity of the household respondent. Age, education and income are all coded as continuous variables. Age is the age of the household head. Age-squared is used to capture any nonlinear changes in the age effect. Education is the highest year of education completed by the head of the household. The income variable is the annual household pre-tax income. The income variable is transformed using the logarithmic function because of its highly skewed distribution. A variable for the log of income is set to the log of 0.01 if the level is zero or negative. The variable for whether there is at least one child under 19 living at home is based on the number of related children under age 19 living in the home. Marital status is recorded as either married, unmarried couple, single male or single female. Race/ethnicity is coded as White, Black, Hispanic or Asian/Other. Home ownership is coded as 1 if the respondent is a homeowner and zero, if otherwise.

Analysis

To determine whether the percentage of households meeting the 25% threshold changed across the survey years, an RII means test is performed. A logistic regression is used to examine the factors associated with a household's propensity to meet the 25% CAR threshold.

Results

Descriptive Characteristics

The median CAR for all households is 35%, which is above the 25% threshold. The extremely high maximum value of the ratio (over one billion percent) results in the mean of the ratio being very high, about 252%, supporting the approach of analyzing whether households meet the threshold rather than analyzing the actual value of the CAR.

More than half of households (57%) meet the 25% CAR threshold. Of the marriage status categories, married couples meet the threshold at a higher rate than other categories (69%). Households with a child at home have a slightly lower rate (56%) than do households without a child at home (57%). Homeowners meet the threshold at a higher rate (61%) than renters (48%). The rate at which households meet the threshold increases with age, reaching a maximum for the 51 to 60 age group, and then decreases. As expected, the rate at which households meet the threshold increases with level of education attained.

An RII means test is run to determine if there are any significant changes in households meeting the 25% CAR threshold over the SCF survey years (Table 2). The percentage of households meeting the 25% CAR threshold is significantly different across all survey years, except for the years 1995 and 2007 (p=0.073). Percentage of households meeting the 25% CAR threshold is the lowest in 1992 (mean of 52.7%), then gradually increases until the highest point in 1998 (60.24%). The percentage of households meeting the 25% CAR threshold dips in 2004 (54.51%) before climbing slightly to 56.59% in 2007.

Table 2: Percentage of Households that Meet the 25% CAR Threshold

	Survey Year						
	1992	1995	1998	2001	2004	2007	Total
Percentage of households	52.74%	55.73%	60.24%	58.91%	54.51%	56.59%	56.51%

Note. Based on RII means tests, the percentage for each survey year starting in 1995 is significantly different from the previous survey year.
Note. Weighted analysis of a combination of the 1992, 1995, 1998, 2001, 2004, and 2007 SCF datasets. For significance between years, refer to Table 4.

Multivariate Results

The effects of the survey year dummy variables in Table 3 are relative to the reference category, 2004. The coefficient for 2001 indicates that at the mean value of other independent variables, the odds that households in 2001 meet the guideline are 1.283 times as high as the odds in 2004. The odds that households in 2007 meet the threshold are 1.31 times as high as the odds in 2004. Refer to Table 3 for results from the logistic regression.

Table 3: Logistic Regression Analysis of the Households that Meet the CAR 25% Threshold

Variable	Coefficient	Odds Ratio
Age of Household Head	0.0637*	1.066
Age Squared	-0.00048*	1.000
Years of Education (household head)	0.2265*	1.254
Marriage Status (reference category = married)		
Unmarried (couple)	-0.2224*	0.801
Single Male	-0.2362*	0.790
Single Female	-0.5329*	0.587
Have Child < 19 at home	-0.1589*	0.853
Income (Log of household income)	0.3829*	1.467
Race/Ethnicity of respondent (reference category=White)		
Black	-0.4798*	0.619
Hispanic	-0.7239*	0.485
Asian/other	-0.4491*	0.638
Homeowner	-0.0538	0.948
Year of survey: reference category = 2004		
Year 1992	0.1652*	1.180
Year 1995	0.3051*	1.357
Year 1998	0.3969*	1.487
Year 2001	0.2493*	1.283
Year 2007	0.1231*	1.131
Intercept	-8.1062*	
* p < .05		
Concordance Rate: 82.5%		

Note. Based on non-weighted analyses of a combination of the 1992, 1995, 1998, 2001, 2004, and 2007 SCF datasets.

In order to test the other hypotheses related to changes over time, separate logits (not shown) are run with other reference years in order to test whether changes between 1992 and 1995, 1995 and 1998, and 1998 and 2001 were significant. The change between 1992 and 1995 is positive (Table 4). Households in 1992 are only 87% as likely to meet the threshold as households in 1995. The change between 1995 and 1998 is not significantly different from zero (p=0.093). The change between 1998 and 2001 is positive. The odds that households in 1998 meet the threshold are 1.16 times as high as the odds in 2001. Table 4 shows the results from both the logistic regression (comparing survey years) and the RII means test.

Table 4: Logistic Regression and RII Means Test for 3-Year Periods

Years	Logit	RII Means

	P-value	P-value
1992 - 1995	.0110*	<.0001*
1995 - 1998	.0933	<.0001*
1998 - 2001	.0069*	.0045*
2001 - 2004	<.0001*	0.000*
2004 - 2007	.0203*	<.0001*

Note. RII means tests p-values are based on weighted analyses of a combination of the 1992, 1995, 1998, 2001, 2004, and 2007 SCF datasets. Logit p-values are based on unweighted analyses of a combination of the 1992, 1995, 1998, 2001, 2004, and 2007 SCF datasets. The logit p-values for 2001-2004 and 2004-2007 are based on the logit shown in Table 3. Logit p-values for pairs of survey years not including 2004 are based on separate logits not shown.

The logit is also used to test whether the effects of household characteristics on meeting the 25% CAR threshold are significant (Table 3). There is a high consistency between the predictions of whether a household will meet the 25% threshold as evidenced by the 82.5% concordance rate. Age, education, and income are all positively related to meeting the threshold. Unmarried couples, single males and single females are all negatively related to meeting the threshold. The odds of an unmarried couple meeting the 25% CAR threshold is 80% that of a married couple. Similarly, a single male is only 79% as likely and single females are 59% as likely as married couples are to meet the threshold. All three racial/ethnic group variables are negatively related to meeting the threshold. Households where the respondent is Black are 62% as likely to meet the threshold as a household where the respondent is white, and households where the respondent is Hispanic are less than 50% as likely to meet the 25% threshold. Households where the respondent is Asian (or other) are slightly more likely, but still only have a 64% change of meeting the threshold when compared to households where the respondent is White. Having a child under 19 at home is negatively associated with meeting the threshold. Compared to households without children, households with at least one child under 19 are 85% as likely to meet the threshold. Homeownership is not significant. The coefficient estimates for age and age squared are 0.0637and -0.00048, respectively, and since the coefficient for age is positive, based on calculus, we can conclude that the likelihood of meeting the guideline increases with age until age 66.35, then decreases.

Discussion and Conclusion

Based on the analysis, two hypotheses are rejected. The first is the null hypothesis (H1) that the percentage of households meeting the 25% CAR threshold is not expected to change. The expected result of the null hypothesis is that there will not be significant changes between pairs of survey years. The second (alternative) hypothesis is that the percentage of households meeting the 25% CAR threshold will increase from 1995 to 1998 (H1B). It is hypothesized that given the more extreme growth in the stock market as compared to housing values during the

period from 1995 to 1998, that the percentage of households meeting the 25% CAR threshold will increase.

The percentage of households meeting the 25% CAR threshold is significantly different between every pair of survey years based on the bivariate RII means test. When controlling for other factors in the multivariate analysis, such as income and homeownership, the percentage of households meeting the 25% CAR threshold is significantly different between each pair of survey years, except 1995 and 1998. Income is the only variable likely to have an impact between these years. When controlling for all other variables except for income, the difference between 1995 and 1998 becomes significant. While income did not increase considerably between 1995 and 1998, there is some evidence that incomes in 1995 were still recovering from the 1989 recession (Kennickell et al., 1997) and therefore income growth in the 1995-1998 time period may offset the difference. The growth in income during these periods may be why the difference between 1995 and 1998, when controlling for income, is not significant. There was also growth in ownership of stocks from 1995-1998 (up 20.7% from the prior period), which could also help explain the relative differences between these years.

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% CAR 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. Based on these findings, it appears that market and economic climate play some role in households' ability to meet the 25% threshold.

Of the six hypotheses concerning which variables are significant predictors, only one has a different result from what is expected. Homeownership is expected to have a negative effect on a household's propensity to meet the 25% CAR threshold. The rationale is that home owners may have more wealth in their home and have less in investment assets. This hypothesis is not supported. The outcomes for age, racial/ethnic group, education, children in the home, and marriage are all as expected.

Conclusion and Implications

The capital accumulation ratio, which measures the proportion of net worth held in investment assets, is often used to measure financial well-being, retirement adequacy and financial strength. Despite its frequent use, there has been little analysis concerning the consistency of households meeting the ratio over time. This study attempts to look at the CAR over time and assess the consistency of the percentage of households that meet the 25% threshold.

The actual changes in the proportion of households meeting the 25% CAR guideline, and the changes based on the logit analyses, imply that households do not attempt to maintain their CAR levels. Rather the changes in the percentage of households meeting the 25% CAR threshold move along with the relative change 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. The opposite is also true. When housing prices increase more than stock prices the percentage of households meeting the threshold decreases. This could be because households react passively to changes in the economy or that households attempt to chase returns and follow trends. Homeownership increased only slightly from 1992 (64%) to

2007 (69%) so there is little evidence of this in homeownership. Stock ownership, however, increased substantially over this period. In 1992, stock ownership was at 37% and by 1998 it was at 48%. Stock ownership peaked in 2001 at 52% and leveled off just above 50%. While this isn't conclusive evidence, there is some support for either passive behavior or herd behavior (in the form of chasing returns and increased investments in the market).

The fact that the percentage of households meeting the 25% CAR threshold changes over time is an indication for the need of households and financial advisors to monitor asset portfolios more actively. While the 25% CAR threshold is generally only used as a guideline, 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 rebalancing portfolios is common in terms of stocks, bonds and mutual funds, it's less often considered in the context of full asset management. Additionally, it is important to understand where a household is in the lifecycle. Younger households will likely have a lower CAR. The CAR is expected to increase as households' age, until retirement when the ratio will begin to decrease. A meaningful extension of this study would be to study the composition of investment assets and examine how that changes over time. Another possible extension would be to assess what the value of capital accumulation ratios should be across the lifecycle to help households understand how their portfolios should change over time.

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