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Factors Related to Meeting the Capital Accumulation Ratio Guideline

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Abstract

The capital accumulation ratio, investment assets divided by net worth, has been proposed as a useful indicator of financial health. Various experts recommend a minimum value of 25% to 50% for the ratio. When certificates of deposit are not counted as investment assets, 56% of U.S. households meet the 25% guideline and only 40% meet the 50% guideline. In a multivariate logistic regression, education, income, number of years until retirement, overspending, and financial risk tolerance are positively related to meeting the guidelines. © 2002 Academy of Financial Services. All rights reserved.

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1. Introduction

Financial ratios can provide a convenient way to diagnose the financial status of households (Greninger et al., 1996). Financial ratios provide numerical objective yardsticks designed to help simplify the judgmental assessments of current financial strength and changes over time (Garman & Forgue, 2000). Ratios are a type of quantitative tool used in decision-making. Typically, ratios can be quickly calculated and easily interpreted. They can

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help clarify and simplify financial analysis. They should be applicable to most households. The study of financial ratios offers potential for increasing insight into specific strengths and weaknesses of a family's financial situation (Prather, 1990). One household financial ratio that is somewhat related to the issue of retirement adequacy is the capital accumulation ratio (CAR). DeVaney (1995) suggests that if the capital accumulation of a household is at least 25% of household net worth, the household might be on track for being adequately prepared for retirement.

This paper studies the financial health of households in terms of the CAR, because the accumulated capital is an important retirement resource. The CAR is defined as the ratio of investment assets to net worth. It reveals how well a household is achieving its financial goals for wealth accumulation (Garman & Forgue, 2000). The basic idea of this ratio is that a household should have a substantial part of net worth in assets that will grow, in order to provide for future goals such as retirement. Some experts recommend that this ratio be 25% or higher (Lytton, Garman & Porter, 1991; DeVaney, 1993). Based on surveys of financial planners and educators, Greninger et al. (1996) conclude that the median minimum value recommended is 50%. DeVaney (1995) suggests that meeting the CAR guideline is a good indicator of whether a household is on track to achieving an adequate retirement. This study examines both levels of the CAR guideline, and factors related to whether households meet the guidelines.

2. Literature review

Empirical research on household financial ratios has been limited. The few previous studies with a focus on households and the CAR (Lytton et al., 1991; DeVaney, 1993, 1994, 1995) use 25% as the guideline for the CAR. Greninger et al. (1996) suggest the need for a CAR of at least 50%. All of the guidelines suggested in previous studies lack a theoretical basis. They are developed from intuitive rules of thumb rather than theory or empirical findings. In the following paragraphs, general studies of ratios are reviewed and then studies specifically focused on the CAR guidelines are reviewed.

Lytton et al. (1991) use a hypothetical case study and suggest nine financial ratios that could be broadly applied and interpreted by financial counselors and planners as well as individuals and families. They recommend that the investment assets-to-net worth ratio (i.e., the CAR) be at least 25%. The authors suggest that this ratio is usually less than 20% for young people and that as they advance through the life cycle toward retirement, this ratio should increase.

The Lytton et al. (1991) guideline is based on the authors' intuition. Lytton et al. conclude that recommendations provided for households should not be based on only one ratio. They recommend that all nine ratios should be analyzed together to study the combined effects of these financial ratios on households' financial position. Lytton et al. (1991) conclude that all guidelines for ratios should be derived from consensus among and application of ratios by professionals, and empirical research.

2.1. Empirical studies

Using the 1989 SCF data, DeVaney (1995) examines factors related to retirement preparation of the older and younger baby boomers. She asserts that a household is adequately prepared for retirement if the household meets the 25% CAR guideline. Logistic regression is used to identify the factors that can be used to predict whether households meet the guideline. Age and education have positive effects on meeting the 25% guideline for both older and younger boomers. The proportion meeting the guideline is 42.5% for the younger cohort and 55.4% for the older cohort. For the younger cohort, being white and expecting a large inheritance are positively related to meeting the guidelines. For the older cohorts, those households with the head being in good health, being male, and having a defined benefit pension are more likely to meet the 25% guideline.

Greninger et al. (1996) employ a Delphi technique with a survey of financial planners and educators to identify and refine financial ratios. A panel of 156 financial planners and educators had consensus on 20 out of a total of 22 ratios discussed. Greninger et al. conclude based on the survey results that net investment assets, not including equity in a home, should be a little over 50% of net worth. Greninger et al. (1996) define investment assets as all assets that are held for investment purposes, not including liquid (monetary) assets, use assets and equity in one's personal residence. The median value from the survey is 50%, the mean is 56%, and the standard deviation is 22%, so a low proportion of planners and experts suggest a minimum value of 25%. The mean ratio for financial planners is 57% and for educators is 53%. Based on this result from the Delphi study, Greninger et al. (1996) conclude that the ratio should be at least 50%. However, these recommendations for typical individuals and families do not allow for variation in these ratios by demographic characteristics.

In order to investigate whether U.S. financial ratio guidelines are appropriate for Korean households, Moon, Yuh & Hanna (2001) analyze six financial ratios, including the CAR, with the 1996 National Survey of Family Income and Expenditure in Korea. In the paper of Moon et al. (2001), logistic regression is used to identify the factors that have effects on households' meeting each ratio. The factors studied are income, income squared, income cubed, age (categorical, five groups), household size (categorical, five groups), income times household size (categorical, five groups), a dummy variable of whether households have children in school, a dummy variable of whether households have a baby under age six, education (categorical, four groups), occupation (categorical, five groups), a dummy variable of whether households are married couple households, a dummy variable for gender of the householder, a dummy variable of whether households are dual earner households, and a dummy variable of whether households are city residents.

Moon et al. (2001) find that only 14% of the Korean households meet the CAR guideline of investment assets being at least 25% of net worth. All other things being equal, household size has a negative effect on meeting the guidelines. Households headed by a person older than 50 are less likely to meet the guidelines than otherwise similar households headed by a person less than 30 years old. Marital status and gender also have significant effects on meeting the guidelines.

2.2. Theoretical models

Ando & Modigliani (1963) developed the life-cycle model, which assumes that consumers seek utility maximization from consumption over their lifetime. Based on various assumptions, including the decreasing marginal utility of consumption, the optimal consumption pattern over a lifetime should be relatively flat. With a zero real interest rate, investment accumulation for retirement would increase steadily each year until retirement, then decrease. Hanna, Chang & Fan (1995) show that based on a prescriptive life-cycle model, accumulation of investment assets will depend on expected income patterns and real interest rates. In typical scenarios for increasing real income until retirement, the optimal level of investment assets is low or negative until age 30 or 40, and then rapidly increases as retirement approaches. After retirement, the level of investment assets should decrease according to the model.

The life-cycle model has implications for the accumulation of investment assets, but the CAR is defined as investment assets divided by net worth. Households will hold monetary assets for precautionary motives (Chang, Hanna, & Fan, 1997) and households will acquire tangible assets for use, most importantly, a personal residence. In the United States in 1998, 39% of households under the age of 35 own their own home, and the rate increases by age to 82% for those age 65–74, then drops to 77% for those over 74 (Kennickell, Starr–McCluer, & Surette, 2000, p. 17). The percentage of households with home-secured debt is 33% for those under 35, 59% for those age 35 to 54, then drops substantially for higher age brackets (Kennickell et al., 2000, p. 21). Therefore, an important component of the denominator of the CAR, home equity, typically increases with age as households buy homes, pay down their mortgages, and perhaps upgrade to larger homes or make home improvements. If both the numerator (investment assets) and the denominator (net worth) increase with age, the CAR will not necessarily increase with age.

3. Methodology

Life-cycle savings theory can provide some insights into plausible patterns for accumulation of investment assets. However, since the guidelines are based on a ratio, a careful examination of the numerator (investment assets) and the denominator (net worth) is useful before discussing hypotheses. After a discussion of the variables, hypotheses are presented, followed by a description of the statistical methods.

3.1. Data

The data analyzed in this study are from the public use tape of the 1998 Survey of Consumer Finances (SCF). The sample in the ratio analysis includes every household, resulting in a sample size of 4,305.

3.2. Dependent variables

Greninger et al. (1996) define investment assets as all assets other than liquid (monetary) assets that are held for investment purposes, excluding monetary assets, use assets and equity

in one's personal residence. Monetary assets are defined as cash and cash equivalents, checking accounts, savings accounts, money market accounts, money market mutual funds, and certificates of deposit (CDs) with maturities of less than or equal to six months. The definition used by Greninger et al. (1996) is used in this research. However, the 1998 SCF data set does not specify the maturity of CDs, so we present the percentage of households meeting the ratio guidelines including and not including CDs as investment assets. In 1998, the yield on U.S. Treasuries did not vary greatly by maturity, with 1-year Treasuries yielding 5.05%, 2-year Treasuries yielding 5.13%, and 10-year Treasuries yielding 5.26% (U.S. Bureau of the Census, 1999, p. 531). The pattern for CDs is somewhat similar. Therefore, it is not clear that CDs should be regarded as investment assets, since in the survey year both short-term and long-term CDs had low yields compared to other investments such as stocks.

For most assets, it is obvious whether they are monetary assets, use assets (vehicles, homes, etc.) or investment assets. Some categories are debatable, for example, it is not clear whether some collectibles are for enjoyment or investment. We assume that all collectibles are investment assets. Real estate other than a personal residence is counted as an investment asset. We treat a vacation home as a use asset.

The investment assets in this paper include total directly held mutual funds (excluding money market mutual funds), individually held stocks and bonds, retirement accounts, IRAs and thrift accounts, cash value of whole life insurance, other managed assets (e.g., annuities and trusts), selected other financial assets, other residential assets (not including vacation homes), net equity in nonresidential real estate, business interests and selected other nonfinancial assets. This paper uses the definition for net worth provided in the codebook for the SCF (Kennickell, 2000). The SCF net worth variable is total assets less total debt. Total assets include the previously mentioned investment assets plus liquid assets plus use assets. Total debt refers to total outstanding property and consumer debt.

The denominator of the CAR is net worth. When net worth is zero, the ratio is not defined, and if net worth is negative, interpretation of the ratio is a problem. However, DeVaney (1997) and Prather (1990) suggest that when the denominator of a ratio is zero, it is reasonable to define a ratio as equal to the numerator. Therefore, the CAR would equal investment assets divided by 1.0. The rationale is that if a person has zero or negative net worth, and positive investment assets, a large proportion of assets should be growing, and therefore, the person should be considered to have met the guidelines. The focus of this paper will be on whether households have met the guidelines rather than on the exact values of the ratios, so the extreme values of the ratios will not make a difference.

3.3 Independent variables

Following Yuh, Montalto, & Hanna (1998b), independent variables can be categorized into four groups: demographic, financial, saving/investment decisions, and attitude/expectation variables.

Demographic variables include race/ethnicity, education, marital status of the householder, and presence of related children under 18 in the household. Race/ethnicity of the householder is measured with four categorical variables: Non-Hispanic White (reference group), Non-Hispanic Black, Hispanic, and other. Other represents Asian and other races,

including mostly those of Asian and Pacific Islander ancestry, and also including American Indians and other races in this category. DeVaney (1995) uses the number of years of education as one independent variable. However, whether or not education has a linear relationship with meeting the guidelines is not clear. Therefore, in this research, education of the householder is measured with five categorical variables: less than high school (reference group), high school graduation, some college, college graduation, and more than college graduation (including graduate degree and other professional certificate and degree). DeVaney (1995) has two variables to describe householders' marital status and gender: married and male (both are coded 1 if yes, 0 if no). However, for married or partnered households, she does not differentiate households headed by males and those headed by females. For male- or female-headed households, she does not differentiate married/partnered households or not married/partnered households. In this paper, the marital status of the householder is measured with three categorical variables: couple (married or partnered, reference group), single male, and single female households. The number of related children under 18 might not have a linear relationship with meeting the guidelines. Therefore, presence of related children under 18 is measured by a dummy variable—coded 1 if the household has related children under 18, and 0 if not.

Financial variables include total 1997 income, which is divided into five groups:

1. Less than $10,000 (reference group)
2. Between $10,000 and $24,999
3. Between $25,000 and $49,999
4. Between $50,000 and $100,000
5. Greater than $100,000

It is not clear whether income has a linear effect, a nonlinear effect, or has a step function relationship (having no effect over some intervals, and a nonzero effect over other intervals.) Using dummy variables can help ascertain which effect is most appropriate. In the sample, 12.77% of households are in the first income group. Households in the next four income groups represent 24.30%, 29.17%, 25.09%, and 8.68% of total households respectively.

Variables related to saving/investment decisions include number of years until retirement, planned retirement age, overspending, and savings horizon. Years until retirement and planned retirement age are both continuous. Investment assets should accumulate proportionally as years until retirement decrease. Controlling for number of years until retirement, the later households plan to retire the older they are. Current age is not one of the independent variables used in the multivariate analysis in this article. Current age by itself will not necessarily have the strongest effect on accumulation for retirement, because as Montalto, Yuh & Hanna (2000) show, there is a wide range of planned retirement ages. Current age is a linear combination of years until retirement and planned retirement age, so one should not have all three variables in a logistic regression.

Overspending is measured by three dummy variables: overspent during 1997, underspent during 1997, and spent the same amount as income (reference group). Savings horizon is measured by five dummy variables: saving for next few months, for next year (reference group), for next few years, for next 5 to 10 years, and for longer than 10 years. It might seem that years until retirement would be correlated with savings horizon, but in fact the corre-

lation between the two variables is not significantly different from zero. Self-perceived adequacy of defined benefit pension income is measured by five dummy variables: totally inadequate, inadequate, just about enough (reference group), satisfactory, and very satisfactory.

3.4. Statistical methods

χ^2 bivariate analysis is used to examine simple patterns of meeting the guidelines by various demographic and financial variables. Two multivariate logistic models (logistic regressions for meeting the 25% and 50% guidelines) are used to examine which types of American households are more likely to meet the guidelines. The value of the CAR is continuous. The use of a logistic model and treating the ratio as a dichotomous variable has advantages and disadvantages. The major disadvantage is that by using whether households meet the 25% guideline, for example, we cannot actually differentiate households that have a ratio of 0%, 10%, and 24%, or between households having a ratio of 30% and 200%. However, there is a tradeoff between simplicity of interpretation and the ability to differentiate the magnitude of the ratio. If the continuous ratio is used as a dependent variable, the assumption is that a particular increase in an independent variable has the same effect on the ratio whether the value of this variable is going from 1 to 2 or from 20 to 21, which is not necessarily a plausible assumption. Because of the operational definition of the CAR, it has a maximum value of 168,000 and a mean of 381.35 but a median of 0.54, so it is obvious that the distribution of the ratio is very skewed, so an Ordinary Least Squares (OLS) regression with the ratio as a dependent variable would not be appropriate. We did conduct multivariate OLS analyses with the ratio as a dependent variable, with very low significance of the results. Furthermore, experts suggest 25% and 50% as the guidelines. Our major concern here is to find whether households meet the guidelines or not, so logistic regression is appropriate for our multivariate analyses.

3.5. Hypotheses

Table 1 presents the hypotheses related to the analysis of meeting the CAR guidelines. Under the life-cycle model, the number of years until retirement is expected to have a negative effect on the chance of meeting the guidelines. As the number of years until retirement increases, households' need for investment assets decreases. When households are young, they are rational to have very low savings out of income in order to smooth their lifetime consumption, so they may have very low levels of investment assets. Planned retirement age is expected to have a negative effect on the chance of meeting the guidelines, because Social Security and other defined benefit pensions have higher benefits for later retirement ages, so the later the retirement age, the less incentive one will have to accumulate investment assets now. Also, the later the retirement age, the shorter will be the remaining life expectancy, so the amount of investment assets now will not need to be as high.

The savings horizon should be related to meeting the guideline, because households are increasingly likely to use CDs and money market accounts as horizons become shorter and shorter, especially for horizons under five years. Therefore it is plausible that the savings

Table 1
Comparison of expected and actual effects of estimators in the capital accumulation ratio analysis

Variable	Ratio >= 25%		Ratio >= 50%	
	Expected	Actual	Expected	Actual
Demographic characteristics				
Race/ethnicity (reference category: non-Hispanic white)				
Black, non-Hispanic	−	−	−	NS
Hispanic	−	−	−	−
Asian and other races	−	−	−	NS
Education (reference category: less than high school)				
High school graduation	+	NS	+	NS
Some college	+	+	+	+
Bachelor degree	+	+	+	+
Graduate degree or more	+	+	+	+
Marital status (reference category: couples/partners)				
Unmarried female	−	NS	−	+
Unmarried male	−	NS	−	+
Presence of related children under 18	−	NS	−	NS
Financial characteristics				
Total 1997 income (reference category: total 1997 income less than $10,000)				
Between $10,000 and $24,999	+	+	+	+
Between $25,000 and $49,999	+	+	+	+
Between $50,000 and $100,000	+	+	+	+
More than $100,000	+	+	+	+
Saving/investment decision variables				
Number of years until retirement (coded zero if already retired)	−	−	−	−
Planned retirement age	−	NS	−	+
Overspent over 1997 (reference category: spent same amount as income)				
Overspent	−	+	−	+
Underspent	+	+	+	+
Savings horizon (reference category: saving for next year)				
For next few months	−	NS	−	NS
For next few years	+	NS	+	NS
For next 5–10 years	+	+	+	NS
For longer than 10 years	+	NS	+	NS
Attitude/expectation variables				
Expect income increases versus prices (reference category: income increases about same as prices)				
More than prices	−	+	−	+
Less than prices	+	NS	+	NS
Risk tolerance level (reference category: willing to take no financial risks)				
Willing to take substantial financial risks	+	+	+	+
Willing to take above average financial risks	+	+	+	+
Willing to take average financial risks	+	+	+	+
Retirement income from Social Security and pension (reference category: enough to maintain living standard)				
Totally inadequate	+	NS	+	+
Inadequate	+	NS	+	NS
Satisfactory	−	NS	−	NS
Very satisfactory	−	NS	−	+

Note. NS: not significant based on logistic regression results reported in Table 4.

horizon has a positive effect on meeting the ratio guidelines. Income should have a positive effect. As income increases, the replacement rate of Social Security pensions decreases, so households have greater need to accumulate investments.

Expecting income to increase more than prices should have a negative effect. Those who expect income to increase more than prices have less need for investments. Expecting income to increase less than prices should have a positive effect for similar reasons. Investment risk tolerance level should have a positive effect. Households who are willing to take more risks should have more investment assets (as opposed to monetary assets). Perceived adequacy of retirement income from Social Security and defined benefit pensions is expected to have a negative effect. If pensions are adequate, there is less need for households to accumulate investments.

Hypotheses related to some of the households' demographic characteristics do not have a strong theoretical background. Being in a racial/ethnic group other than Non-Hispanic White is expected to be less likely to meet the guidelines. Non-Hispanic White households may have more information about investment. Because of socialization, they might be more inclined to make investments. Education should have a positive effect. As education increases, information about and understanding of investments should increase. Unmarried males and unmarried females may be less motivated than similar married couple households to invest. Presence of related children under 18 is expected to have a negative effect. Households with the burden of raising children may have to accumulate use assets instead of investment assets.

The Survey of Consumer Finances includes a variable on whether the household spends less than income, about the same as income, or more than income. Hypotheses related to overspending lack a strong theoretical basis. It may seem plausible that overspending would have a negative effect on meeting the CAR guidelines. When a household overspends, its net worth decreases because it either must withdraw from its own net worth or borrow. Both behaviors lower its net worth level. The household's investment assets are likely to decrease, too. Retired households may spend more than income because they have accumulated investment assets, and as their investment assets decrease, both the numerator and the denominator of the ratio will decrease. Careful consideration of the ratio components shows that the relationship between overspending and meeting the guidelines may be more complicated, given the different ways that households overspend:

1. When the CAR is less than 0 (0.1% of total households), overspending is unlikely to affect meeting the guideline. The ratio would be less than 0 because of negative investment assets, specifically having a negative value for a business.
2. When the ratio equals = 0 (26.3% of total households), investment assets must be zero. Overspending might decrease net worth and presumably would not increase investment assets, so would have no effect on meeting the guidelines.
3. When the ratio is greater than 0 and less than 1 (63.6% of total households), as overspending increases, net worth decreases and investment assets may decrease proportionally, or less or more than proportionally. The ratio may therefore decrease, remain the same, or even increase.
4. When the ratio is equal to 1.0 (0.6% of total households), as overspending increases, net

Table 2
Median and mean value of the capital accumulation ratio and percent of households meeting guidelines, with and without CDs counted

	With CDs	Without CD's
Median value	40.91%	35.34%
Mean value	35947.50%	35179.54%
% households with ratio <= 0	24.00%	26.36%
% households with ratio between 0 and 1	66.26%	64.16%
% households with ratio >= 1	9.74%	9.48%
Investment assets >= 25% of net worth	59.34%	56.13%
Investment assets>= 50% of net worth	43.22%	40.01%

Source: 1998 Survey of Consumer Finances.

worth decreases and investment assets may decrease proportionally, especially if net worth includes only investment assets. The ratio may therefore remain the same.

5. When the ratio is greater than 1.0 (9.5% of total households), as overspending increases, net worth decreases and investment assets may decrease, but the effect on meeting the ratio guideline will depend on the particular cause of the ratio being greater than 1.0.

   (a) If net worth is greater than 0, the ratio = (a positive number)/(a smaller positive number), so that after overspending, the ratio may increase, for instance, if the overspending is financed by additional debt, the numerator will stay the same and the denominator will decrease.
   (b) If net worth is less than or equal to 0, a value of 1.0 is used in calculating the ratio. If there are any investment assets, the ratio will be greater than 1.0. Therefore, overspending will have no effect on the ratio unless investment assets are sold to finance the deficit.

Because of these complications, it is uncertain what net effect overspending might have. It is included in the logit models, hoping to find whether overspending has an effect and how big of an effect it has on households' retirement adequacy.

4. Results

4.1. Descriptive statistics

When investment assets are calculated without including CDs, 26% of the sample households have a CAR of zero or less (Table 2). The median value of the ratio is 35.3% and the mean ratio is 35,180%. When CDs are included in the value of investment assets, 24% of the sample households have a ratio less than or equal to zero. The median ratio is 40.9% and the mean ratio is 35,948%. The negative values of the ratios are due to the negative values of investment assets. The high values of the means of the ratios are caused by some households having very low or negative net worth, as well as having positive levels of investment assets. This paper will avoid the possible statistical distortions related to the extreme values of the ratios by examining whether or not the ratios meet the guidelines.

Table 3
Percent of households meeting capital accumulation ratio guidelines, by demographic and financial characteristics

Household characteristics	% meeting 25% guideline	% meeting 50% guideline
Demographic characteristics		
Age of head		
Less than 35	48.6	37.8
35–44	65.1	49.4
45–54	64.6	45.3
55 and over	50.4	32.1
Race ethnic group of head		
Non-Hispanic white	60.9	42.4
Black	43.1	35.2
Hispanic	28.0	21.7
Asian and other	50.4	39.9
Highest education of head		
Less than high school degree	29.2	19.1
High school degree	48.6	32.3
Some college	61.3	45.2
Bachelor degree	74.0	54.9
Graduate degree or more	79.6	59.7
Type of household		
Married couple	62.1	43.4
Unmarried female	43.2	32.0
Unmarried male	56.2	41.3
Presence of related children under 18		
Yes	59.8	44.6
No	54.1	37.5
Financial characteristics		
Total 1997 Income		
Less than 10,000	23.0	18.1
10,000–25,000	35.7	25.7
25,000–50,000	59.0	38.6
50,000–100,000	77.6	55.1
Greater than 100,000	90.4	73.6

(continued)

Table 2 shows the percentage of households meeting the two CAR guidelines, with and without CDs being counted as investment assets. With CDs, 59% of the households meet the 25% guideline and 43% meet the 50% guideline. Without CDs, 56% of the households meet the 25% guideline and 40% meet the 50% guideline. For the rest of this paper, results are reported without CDs in the value of investment assets.

4.2. Bivariate results

The percentage of households that meet the CAR guidelines varies by demographic and financial characteristics (Table 3). All differences shown in Table 3 are highly significant, with χ^2 statistics significant at the 0.0001 level except for Presence of Related Children under 18 for meeting the 25% guideline, which is significant at the 0.0003 level. Households with

Table 3 (continued)

Household characteristics	% meeting 25% guideline	% meeting 50% guideline
Saving/investment decision variables		
Whether overspent over past year		
Spending exceeded income	56.0	43.0
Spending equaled income	40.5	28.9
Spending less than income	64.5	45.2
Savings horizon Next few months	41.5	29.8
Next year	46.3	35.1
Next few years	56.4	40.0
Next 5–10 years	65.9	46.1
Longer than 10 years	68.6	48.5
Attitude/expectation variables		
Expectation of income increase against prices		
More than prices	61.3	50.1
Less than prices	50.4	34.5
About same as prices	57.0	38.3
Financial risk tolerance level		
Willing to take substantial risk	73.4	58.0
Willing to take above average risk	80.4	58.7
Willing to take average risk	65.5	47.0
Willing to take no risk	33.3	22.1
Self-perceived adequacy of retirement income from Social Security and pensions		
Totally inadequate	52.5	39.5
Inadequate	55.2	39.5
Just enough to maintain living standard	55.4	37.2
Satisfactory	73.2	51.4
Very Satisfactory	63.7	47.1

Notes: All chi-square statistics for differences within each variable are significant at the 0.001 level or better. Without CD's counted as investment assets. Source: 1998 Survey of Consumer Finances; descriptive statistics and chi-square analysis are appropriately weighted using the SCF final nonresponse adjusted sampling weight (x42001).

a head between age 35 and 44 are the most likely to meet the guidelines compared to other age groups, with 65% meeting the 25% guideline and 49% meeting the 50% guideline. Households headed by someone less than 35 years old are the least likely to meet the 25% guideline. Households headed by someone over 55 are the least likely to meet the 50% guideline.

Households headed by a non-Hispanic White person are more likely to meet the guidelines than those headed by someone in any other race/ethnic group, with 61% meeting the 25% guideline and 42% meeting the 50% guideline. Hispanic households are the least likely to meet the guidelines. Households headed by someone with a graduate degree are the most likely to meet the guidelines, with 80% meeting the 25% guideline and 60% meeting the 50% guideline. The more educated the head of household, the more likely the household meets the guidelines.

Married couple households are the most likely to meet the guidelines, with 62% meeting the 25% guideline and 43% meeting the 50% guideline. Unmarried female households are

the least likely to meet the guidelines. Households with related children under 18 are more likely to meet both guidelines, with 60% meeting the 25% guidelines and 45% meeting the 50% guidelines. Households with total 1997 income greater than $100,000 are the most likely to meet the guidelines, with 90% meeting the 25% guideline and 74% meeting the 50% guideline. The higher the household income level is, the more likely the household meets the guidelines.

Households who reported spending less than income over the past year are the most likely to meet the guidelines, with 65% meeting the 25% guideline and 45% meeting the 50% guideline. Households who reported spending equaled income over the past year are the least likely to meet the guidelines.

Households with savings horizons of more than 10 years are the most likely to meet the guidelines, with 69% meeting the 25% guideline and 49% meeting the 50% guideline. The longer the savings horizon, the more likely a household meets the guidelines.

Households that expected income to increase more than prices are the most likely to meet the guidelines, with 61% meeting the 25% guideline and 50% meeting the 50% guideline. Households that expect income to increase less than prices are the least likely to meet the guidelines. Households that are willing to take above average risk in order to obtain above average returns are the most likely to meet the guidelines, with 80% meeting the 25% guideline and 59% meeting the 50% guideline. Households that are willing to take no risk are the least likely to meet either of the guidelines. Households that expected their retirement income from Social Security and pensions to be satisfactory are the most likely to meet the guidelines, with 73% meeting the 25% guideline and 51% meeting the 50% guideline.

4.3. Multivariate results

The logistic regression (logit) models both are significant in predicting whether households meet the guidelines, with the χ^2 test of each overall model highly significant (Table 4). Table 1 shows the expected direction of effects and significant directions of effects of independent variables from the logistic regressions in Table 4. There is a high consistency between the predictions of whether a household meets the guideline based on the values of the independent variables, as shown by the 85% concordance rate for the 25% guideline and the 81% rate for the 50% guideline. The pseudo R^2 values are relatively high for a cross-sectional analysis, with 0.44 for the 25% guideline and 0.37 for the 50% guideline. There are 18 variables significant at the 0.05 level or better in the logit for the 25% guideline and 19 variables significant at the 0.05 level or better for the 50% guideline.

All three race/ethnic group variables are significant in the 25% guideline logit but only the Hispanic dummy variable is significant in the 50% guideline logit. Non-Hispanic Black households are only 76% as likely as similar non-Hispanic White households to meet the 25% guideline, and Hispanic households are only 51% as likely to meet the 25% guideline as similar non-Hispanic White households. Households in the Asian and other group are 56% as likely as otherwise similar non-Hispanic White households to meet the 25% guideline. Hispanic households are 66% as likely to meet the 50% guideline as similar non-Hispanic White households, but the other two race/ethnic variables did not have significant effects.

Three out of four education group variables are significant in the 25% and the 50%

Table 4
Logistic analysis of the likelihood of meeting the 25% and 50% capital accumulation guidelines

Variable	Ratio >= 25%		Ratio >= 50%	
	RII coef.	Odds ratio	RII coef.	Odds ratio
Intercept	−1.9623***		−2.3750***	
Race/ethnicity (reference category: non-Hispanic white)				
Black, non-Hispanic	−0.2817*	0.755	−0.0896	0.914
Hispanic	−0.6755***	0.510	−0.4231*	0.655
Asian and other races	−0.5771*	0.562	−0.2955	0.745
Education (reference category: less than high school)				
High school graduation	0.2183	1.244	0.1964	1.216
Some college	0.4875**	1.628	0.5154***	1.674
Bachelor degree	0.7547***	2.127	0.6521***	1.918
Graduate degree or more	0.6813***	1.975	0.5793**	1.784
Marital status (reference category: couples/partners)				
Unmarried female	0.0438	1.045	0.2376*	1.269
Unmarried male	0.1107	1.117	0.2925*	1.339
Presence of related children under 18	0.0397	1.041	0.0671	1.069
Total 1997 income (reference category: total 1997 income less than $10,000)				
Between $10,000 and $24,999	0.3569*	1.428	0.2284	1.255
Between $25,000 and $49,999	1.0259***	2.785	0.7235***	2.058
Between $50,000 and $100,000	1.6061***	4.973	1.1424***	3.128
More than $100,000	3.0403***	20.722	2.5014***	12.136
Number of years until retirement (coded zero if already retired)	−0.0143**	0.986	−0.0121**	0.988
Planned retirement age	0.0615	1.064	0.0754*	1.078
Overspent over 1997 (reference category: spent same amount as income)				
Overspent	0.5135***	1.670	0.4440***	1.558
Underspent	0.3980***	1.488	0.2917**	1.339
Savings horizon (reference category: saving for next year)				
For next few months	0.0059	1.006	−0.0551	0.947
For next few years	0.2017	1.224	0.0522	1.055
For next 5–10 years	0.3775**	1.459	0.0861	1.091
For longer than 10 years	0.3611*	1.436	0.0325	1.035
Expect income increases versus prices (reference category: income increases about same as prices)				
More than prices	0.1760	1.193	0.3176**	1.373
Less than prices	−0.1203	0.887	−0.1091	0.896
Risk tolerance level (reference category: willing to take no financial risks)				
Willing to take substantial financial risks	0.9552***	2.600	1.0475***	2.849
Willing to take above average financial risks	1.2261***	3.406	0.8981***	2.453
Willing to take average financial risks	0.6746***	1.963	0.5035***	1.645
Retirement income from Social Security and pension (reference category: enough to maintain living standard)				
Totally inadequate	0.1279	1.137	0.2816**	1.325
Inadequate	0.0347	1.035	0.1430	1.153
Satisfactory	0.3542	1.424	0.3151	1.369
Very satisfactory	0.2237	1.251	0.3457*	1.412
Concordance	85.1%		80.9%	
Pseudo R-square	0.4410		0.3697	
Chi square test of the likelihood ratio	1430.637	<.0001	1174.934	<.0001

*Significant at 0.05 level. **Significant at 0.01 level. ***Significant at <0.001 level.
Analysis of 1998 Survey of Consumer Finance; multivariate analyses are unweighted.

guideline logits. The reference group is households that are headed by a person who did not finish high school. Households headed by a person with some college education are 1.6 times as likely to meet the 25% guideline as the reference group. Households headed by a Bachelor's degree holder are 2.1 times as likely and households headed by a graduate degree holder, other types of certificates holder, and person with professional training are almost twice as likely to meet the 25% guideline as the reference group. Households headed by a person with some college education are 1.7 times as likely to meet the 50% guideline as the reference group. Households headed by a bachelor degree holder are 1.9 times as likely and households headed by a graduate degree holder are 1.8 times as likely to meet the 50% guideline as the reference group. Households headed by a high school graduate are as likely as the reference group to meet either one of the guidelines.

For the household composition variables, the unmarried female and unmarried male group variables are significant in the 50% guideline logit. Households headed by an unmarried female are 1.3 times as likely as similar married couple households to meet the 50% guideline. And households headed by an unmarried male are 1.4 times as likely as similar married couple households to meet the 50% guideline. Whether a household has related children under 18 did not have a significant effect on whether the household meets the guidelines.

All four income group variables are significant in the 25% guideline logit and three of these variables are significant in the 50% guideline logit. The reference group is households with total 1997 income less than $10,000. Households with total 1997 income between $10,000 and $25,000 are 1.4 times as likely to meet the 25% guideline as the reference group. Households with total 1997 income between $25,000 and $50,000 are 2.8 times as likely to meet the 25% guideline and 2.1 times as likely to meet the 50% guideline as the reference group. Households with total 1997 income between $50,000 and $100,000 are 5 times as likely to meet the 25% guideline and 3.1 times as likely to meet the 50% guideline as the reference group. Households with total 1997 income more than $100,000 are 20.7 times as likely to meet the 25% guideline and 12.1 times as likely to meet the 50% guideline as the reference group.

Number of years until retirement has a significant negative effect on meeting the guidelines as expected. The more years until retirement, the less likely the household is to meet the guidelines. Retirement age has a significant positive effect on meeting the 50% guideline. This result is not consistent with the related hypothesis.

Both of the variables for whether a household overspent or underspent during 1997 are significant in the 25% and the 50% guideline logits. Compared with households that neither overspent nor underspent, those who overspent are 1.7 times as likely to meet the 25% guideline and 1.6 times as likely to meet the 50% guideline. Households that underspent are 1.5 times as likely to meet the 25% guideline and 1.3 times as likely to meet the 50% guideline as the reference group.

Only two out of four savings horizon group variables are significant in the 25% guideline logit. Households with a 5 to 10 years horizon are 1.5 times as likely, and households with a horizon longer than 10 years are 1.4 times as likely, to meet the 25% guideline as households that save for the next year. Of the income expectation variables, only the variable for households that expect income to go up more than prices is significant in the 50%

guideline logit. Households that expect income to go up more than prices are 1.4 times as likely to meet the 50% guideline as households that expect income to go up about the same as prices.

5. Conclusions and implications

This paper has provided the first analysis of factors related to meeting two different CAR guidelines among a sample of U.S. households of all ages. Not counting CDs, 56% of households meet the 25% guideline, but only 40% meet the 50% guideline. It may be appropriate to use the 25% guideline as a minimum suggested guideline, similar to the Greninger et al. (1996) discussion of "danger point" guidelines, and the 50% guideline as the "reasonable" guideline.

About 90% of households in the highest income category meet the 25% guideline and only 23% of households in the lowest income category meet the 25% guideline. Results from the logit are more extreme, with households in the highest income category being 21 times as likely to meet the 25% guideline as similar households in the lowest income category. This may be due to the possibility that the effects of other independent variables tend to offset each other when they are not controlled for. The fact that income is strongly related to meeting the guidelines may be due not only to higher income households being able to "afford" to have investment assets, but because the higher replacement rates under Social Security might make it rational for lower income households to acquire relatively lower levels of investment assets.

Lytton et al. (1991) suggest that 'young people often have an investment assets-to-net worth ratio of less than 20%.' Table 3 shows that 49% of households with a householder younger than 35 meet the 25% guideline and 38% of them meet the 50% guideline. Of the households with a householder older than 55, 50% meet the 25% guideline and 32% meet the 50% guideline. Therefore, younger households are not significantly lower than older households in terms of meeting the ratio guidelines. Younger households typically have lower levels of investment assets than older households, but they also have lower levels of other assets, and also have high debt levels.

When the effects of income and other variables are controlled in the logit, households headed by someone with some college education or more are more likely to meet the guidelines than those headed by someone who have not finished high school, but there is not a consistent increase with education. In the future, even households who have not tried to achieve a comfortable retirement and other goals with investments will need to think more about investing, so a focus on these ratio guidelines may be appropriate.

Everything else being equal, planned retirement age did not have a significant effect on meeting the 25% guideline. If households plan to retire early, they should think more about investing because they are likely to have longer years in retirement and therefore need more retirement resources.

Underspending has a positive effect on meeting the guideline, which is expected, as saving can contribute to accumulation of investment assets. Overspending has a positive effect on meeting the guidelines. This could be caused by different types of overspending. Overspend-

ing can lower households' net worth, and this is a possible reason for its positive effect: if a household overspends, both investment assets and net worth may be lower, but if net worth decreases more than investment assets, the ratio may increase. Another plausible explanation would be, since overspending is self-reported, it is possible that some households did not consider contributions to investment accounts, such as 401(k) plans, as saving. Therefore, they might actually have underspent rather than overspent.

In the multivariate logit model for meeting the 25% guideline, only two of the four groups of savings horizon are significant at the 0.05 level or less. Meeting the 50% guideline is totally independent of the savings horizon. This is contrary to the bivariate results, which showed that the longer the horizon, the more likely the households meet the ratio guidelines. This could be the result of the offsetting effects of other variables that are controlled in the logit model. For example, the Pearson correlation test showed that savings horizon is significantly positively related to overspending. The longer the savings horizon, the more likely households overspent.

Having related children under 18 or not did not affect households' status of meeting the guidelines when all other variables are controlled in the logit. Households that do not have dependent children may be able to invest more for the future since they do not bear the burden of raising children.

Retirement age has a positive effect on meeting the 50% guideline. This is not consistent with the hypothesis. Rather than following the life-cycle model, perhaps households tend to accumulate investment assets based on certain events that are not strongly related to retirement age, for instance, when they are first offered a chance to sign up for a 401(k) plan. Controlling for years to retirement, the later the retirement age is, the older the householder is, and therefore the more likely the household is to meet the ratio guidelines. Households that expected their retirement income from Social Security and other defined benefit pensions to be inadequate are as likely to meet the 50% guideline as those expected such income to be just about enough to cover expenses. Households that expect adequate retirement income may not need to worry about retirement, because they expect the resources to be more than or equal to the needs. However, households should try to invest more for the future if they expect inadequate retirement income.

Although experts have implied that the guidelines are appropriate in most cases, the CAR should be adjusted for households' needs and situations. For instance, a prescriptive life-cycle model would imply that a young college graduate who just entered the work force might be rational to save nothing, or even borrow, because of expectations of a substantial income increase in the future. Therefore, the 25% and 50% guidelines might not be realistic for that person.

The "one fits all" type of guidelines need to be updated. Future research should be done to develop appropriate CARs for households in different situations. Having a CAR guideline is helpful because it helps households to be more aware of their financial healthiness and encourages households to invest for their goals. However, the CAR should be used together with other ratios in terms of assessing households' financial health. In the sample, households with zero or negative net worth were included. If they have positive investment assets, the CAR suggests that they are more financially healthy than households with a positive net worth and positive investment assets even if the latter has much higher levels of investment

assets. This suggestion is not necessarily true. The interest gained from investing may not be more than the interest paid on debts. Therefore, households may be financially healthier if their debts do not exceed some proportion of their assets.

More than 90% of the households in the highest income category (over $100,000) meet the 25% guideline but only about 74% in that category meet the 50% guideline. Therefore, the 50% guideline may not be a realistic guideline. Also, the 25% ratio guideline may be more reasonable for general U.S. households because income is more strongly related to the 25% guideline than the 50% guideline, and the pseudo R^2 for the 25% guideline is higher than the pseudo R^2 for the 50% guideline (Table 4). There is no direct evidence that meeting the 50% guideline increases a household's chance to be prepared for retirement or other goals. The 50% guideline might be recommended by some financial planners based on their experience working with upper-income households.

The CAR seems to be more complicated than previous research has assumed. There are many types of fluctuations in net worth, the denominator, as well as in investment assets, the numerator. Because of the complexity of the nature of ratios, the CAR needs to be studied more thoroughly, perhaps with some normative theoretical analyses such as done by Chang et al. (1997) with the liquidity ratio guideline.

Part of the problem with the CAR guideline is that net worth is in the denominator, because some households have zero or negative values of net worth. However, when the analyses are performed excluding households with zero or negative net worth, there are few changes in the patterns reported. It is plausible that the ratio of investment assets to total assets may be a reasonable alternative in assessing households' capital accumulation towards their financial goals. However, this alternate ratio ignores debt. Some households could have a very high level of debt. For instance, if two households have investment assets of $100,000 and total assets of $400,000, but one has no debt and the other has debt of $300,000, are both in the same position in terms of making progress toward achieving goals? Nevertheless, it would be useful to explore alternatives to the CAR.

Future research needs to be done to compare meeting the guidelines to retirement adequacy as defined in more complete, complex ways such as done by Yuh, Hanna & Montalto (1998a). It might also be useful to conduct more complex statistical analyses of the determinants of the CAR, perhaps using Tobit on the truncated ratio or nonlinear regression approaches.

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