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Financial Ratios and Perceived Household Financial Satisfaction

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This paper tests the relative association of three objective measures of financial health (using the solvency, liquidity, and investment asset ratio) against a household's subjective feeling of current financial satisfaction. Utilizing a financial satisfaction framework developed by Joo and Grable and a sample of 6,923 respondents in the 2008 Health and Retirement Study, this paper presents evidence of two main findings: (a) the solvency ratio is most strongly associated with financial satisfaction levels based on a cross-sectional design and (b) changes in the investment asset ratio are most strongly associated with changes in financial satisfaction over time.

Keywords: HR; financial satisfaction; ratios; financial therapy; financial planning; financial counseling

INTRODUCTION

Financial therapy is the integration of cognitive, emotional, behavioral, relational, and economic aspects of financial health (Financial Therapy Association, 2013). Therefore, financial therapy encompasses the intersection of both finances and emotions (Lauderdale & Huston, 2012). This study explores this connection by using financial ratios as objective measures of financial health and compares it to the level of satisfaction a person feels about their financial situation. Financial satisfaction includes being content with one's material (objective) and non-material (subjective) financial situation (Joo & Grable, 2004). How a person manages his or her personal finances has been shown to be a major influence contributing to satisfaction or dissatisfaction with a person's financial situation (Porter & Garman, 1993).

Why should we care about financial satisfaction? Hansen (2009) showed that higher financial satisfaction is related to positive emotional outcomes. Positive emotions can

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broaden an individual's attention and thinking. When experiencing positive emotions, consumers are more likely to be creative, flexible, and open-minded. Also, positive emotions can alleviate or eliminate negative emotions and strain experienced at a physiological level (Hansen, 2009). Thus, it is important to gain knowledge about the factors that can impact financial satisfaction for a household. In addition to these ancillary benefits, financial satisfaction is often itself a core goal for financial therapy clients. Therapists who ignore clients' subjective feelings of financial dissatisfaction may be less successful at addressing the core needs of their clients.

Utilizing a financial satisfaction framework developed by Joo and Grable (2004) and data from the 2008 psychosocial leave-behind questionnaire of the Health and Retirement Study (HRS), the main purpose of this study was to compare three financial ratios (the solvency, liquidity, and investment asset ratios) to determine which ratio has an association when a respondent believes he or she is financially satisfied. Therefore, the following research question was investigated: "What household financial ratio (solvency, liquidity, or investment asset) is associated with a person's level of financial satisfaction?" Previous studies on subjective financial satisfaction have been conducted with small samples, making it difficult to generalize the findings to the population as a whole (Fitzsimmons & Leach, 1994; Parrotta & Johnson, 1998; Titus, Fanslow, & Hira, 1989). One benefit of the current study is that it used a larger sample size than had been available in prior studies of financial satisfaction. However, one potential limitation, as discussed later, is that the financial satisfaction measure is comprised of a single-item.

LITERATURE REVIEW

Financial Ratios as a Measurement of Financial Strain

Prior research has identified several financial ratio guidelines that are useful in identifying household financial health issues, such as liquidity problems and insolvency (Baek & DeVaney, 2004; Chang, Hanna, & Fan, 1997; DeVaney, 1994; DeVaney & Lytton, 1995; Lyons & Yilmazer, 2005). Since each ratio could capture a different aspect of the financial circumstances of the household, a single ratio may not be comprehensive enough to accurately capture the magnitude to which households are having financial problems (Baek & DeVaney, 2004; Lyons & Yilmazer, 2005). Financial ratios could be used to assess a household's ability to avoid major debt (solvency ratio), maintain adequate cash reserves for emergencies (liquidity ratio), and show the accumulation of assets towards financial goals (investment assets ratio).

The current study followed Kim and Lyons (2008) in constructing three financial ratios that measure financial strain: (a) a solvency ratio (total assets/total debts), (b) a liquidity ratio (liquid assets/monthly income), and (c) an investment assets ratio (investment assets/net worth). It should also be noted that the calculation of other ratios for this study was not permitted due to data limitations in the HRS. Similar to Kim and Lyons (2008), financial strain as proxied by the three aforementioned ratios were defined as an objective measurement of financial status for this study.

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A solvency ratio of less than 1.0 has previously been used to identify respondents who were financially strained (Kim & Lyons, 2008). This ratio identifies respondents who are highly leveraged and are close to being insolvent. These households could face an array of financial issues since their liabilities exceed their assets. As consumers move through the life cycle, the solvency ratio should typically be lower in early adulthood because borrowing may take place to fund current consumption. Later, the ratio would typically increase with time, as income and assets increase while households save for retirement when assets are then drawn down to fund consumption (Ando & Modigliani, 1963).

A liquidity ratio of less than 2.5 has previously been used to identify respondents who are financially strained (Kim & Lyons, 2008). This level indicates that a household has sufficient liquid assets to cover about 2.5 months of living expenses after a total loss of income, as might result from illness, disability, or unemployment. Financial planners often recommend that individuals set aside an emergency fund with liquid savings worth about two to six months of living expenses (DeVaney, 1997). The amount varies due to individual household characteristics like the number of earners in the family, the availability of credit, and the stability of employment among family members in their current job (Prather, 1990). Adequate liquidity allows households to pay their bills on time and protects households in case an emergency arises. Greninger et al. (1996) suggested that a 2.5 month buffer was an appropriate amount to set aside in the event of job loss.

The investment assets ratio of less than 0.25 has previously been used to identify respondents who are financially strained (Kim & Lyons, 2008). This level identifies individuals who have less than 25 percent of their net worth in investment assets. According to Baek and DeVaney (2004), individuals in the earlier stages of the life cycle often have an investment asset ratio of less than 20 percent. However, as individuals advance through the life cycle, it is recommended that they maintain an investment asset ratio of at least 25 percent (DeVaney, 1997; Lytton, Garman, & Porter, 1991). The investment asset ratio may be an indicator of how well an older individual has met his or her accumulated savings goals (Baek & DeVaney, 2004).

History of Ratios

Greninger et al. (1996) reported that financial ratios have been used in the business world for the last 50 years. For example, ratios are commonly employed by financial lenders to manage risk exposure through the use of debt ratios in credit scoring models (DeVaney & Lytton, 1995). The use of ratios to assess the economic situation of families has been studied in the academic literature since at least 1985, with the solvency, liquidity, and investment asset ratios being among the most commonly used, as outlined below.

Griffith (1985) published a model highlighting 16 ratios that could be used to evaluate a household's current financial situation. Prather (1990) attempted to establish norms for the 16 ratios and concluded that five ratios (liquidity ratio, current ratio, debt coverage ratio, debt service ratio, and the inflationary hedge ratio) were the most useful. Iwuagwu (1989) further tested the five best ratios and found that the liquidity ratio was

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one of two ratios (the other being liquid assets/consumer debt) positively correlated with financial security. Financial security was a subjective measure based on a question that asked how secure a household perceived themselves to be financially. Lytton, Garman, and Porter (1991) proposed nine ratios including the liquidity, solvency, and investment asset ratios for financial planners and counselors to use. DeVaney (1993) used the nine ratios proposed by Lytton et al. (1991) to examine which ratio best predicted household insolvency, using the 1983 and 1986 waves of the Survey of Consumer Finances (SCF). The liquidity ratio was the best predictor of insolvency using logistic regression, and the solvency ratio was the best predictor using a classification tree. The solvency and liquidity ratios were both significant predictors of insolvency in the logistic regression. Not meeting the liquidity and solvency ratio guidelines increased the odds of being insolvent by five and three times, respectively, using the 1983 levels to predict insolvency in the 1986 survey.

Socio-Economic Variables

Researchers have also reported that a number of socio-economic characteristics appear to influence financial satisfaction. Several studies noted a positive direct relationship between income and financial satisfaction (Campbell, Converse, & Rogers, 1976; Hira & Mugenda, 1998; Lown & Ju, 1992; Parrotta & Johnson, 1998; Titus et al., 1989; Sumarwan & Hira, 1993; Zurlo, 2009). Others have also found a positive direct relationship between net worth and financial satisfaction (Mugenda, Hira, & Fanslow, 1990; Sumarwan & Hira, 1993).

Being older had a positive direct effect on financial satisfaction (Hira & Mugenda, 1998; Lown & Ju, 1992; Sumarwan & Hira, 1993; Titus et al., 1989). Having more education also produced a positive direct result on financial satisfaction (Hira & Mugenda, 1998; Lown & Ju, 1992; Zurlo, 2009). Although living with a partner or being married produced a positive effect on financial satisfaction in some studies (Campbell et al., 1976; Hira & Mugenda, 1998; Mugenda et al., 1990; Zurlo, 2009), Lown and Ju (1992) nor Joo and Grable (2004) found a significant relationship between marital status and financial satisfaction.

Mugenda et al. (1990) found that being female had a positive relationship with financial satisfaction but several studies (Joo & Grable, 2004; Lown & Ju, 1992; Sumarwan & Hira, 1993) found no significant effect for gender. Zurlo (2009) identified a positive relationship between being White and financial satisfaction, but Joo and Grable (2004) found no association with race. The presence of children in the household was negatively related to financial satisfaction (Joo & Grable, 2004). Zurlo (2009) illustrated that better self-reported health had a positive relationship with financial satisfaction. In different studies, current employment had either a positive (Campbell et al., 1976; Zurlo, 2009) or negative (Sumarwan & Hira, 1993) relationship with financial satisfaction.

Regarding the relationship between socio-economic variables and financial ratios, Joo and Grable (2004) found that higher levels of household income and homeownership led to a higher solvency ratio, while households with children were less likely to be financially solvent. DeVaney and Hanna (1994) found that age and income had a negative

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relationship with insolvency, but being married had a positive impact. Education and race were not significant predictors of insolvency.

In a test of the liquidity and investment assets ratios, Baek and DeVaney (2004) found that having more education increased the likelihood of a household meeting the liquidity threshold (i.e., those with a liquidity ratio of 2.5 or higher), but earning more decreased the odds. Having more education, being employed, and earning more money increased the odds of meeting the investment assets ratio. Using a sample size of 365 in testing the liquidity ratio from the Wisconsin Basic Needs Survey, Iwuagwu (1989) found that income and homeownership had a positive effect on financial security. Lyons and Yilmazer (2005) used the solvency (total assets/total debts) and liquidity ratio (liquid assets/income) as measures of financial strain (i.e., those with a solvency ratio below 1.0 and a liquidity ratio less than .25). They found that financially strained households were more likely to be younger, female, Black, and single, have children, report lower levels of income and net worth, and have poor health.

Kim and Lyons (2008) used the solvency, liquidity, and investment assets ratio as objective measurements of financial strain (i.e., those with a solvency ratio below 1.0, a liquidity ratio less than 2.5, and an investment asset ratio below .25). For the entire sample, 5% of respondents reported a solvency ratio of below 1.0, 50% reported a liquidity ratio of less than 2.5, and 52% had an investment asset ratio of less than .25. Respondents who were financially strained were more likely to report lower levels of income and net worth, more likely to be Black or Hispanic, and to have less education, and less likely to be married, and own a home.

Bieker (2011) examined differences in financial status between Black and White households with data from the 2001 SCF, using ratios as a proxy for financial status with respect to liquidity, debt burden, solvency, and capital accumulation. The study found that for the liquidity ratio (liquid assets/monthly income), solvency ratio (total liabilities/total assets) and the investment asset ratio (investment assets/net worth) there was a statistically significant difference between Black and White households for each ratio, with more White households meeting the prescribed benchmarks as set forth above by Kim and Lyons (2008).

Financial Satisfaction

Two studies of financial satisfaction in the psychology literature included different measures of assets and liabilities. Hansen, Slagsvold, and Moum (2008) used income, property assets, financial assets, and debt in their regression. Income alone explained 14% and 7%, respectively, of the variance in financial satisfaction among men and women using the same measure of financial satisfaction in the current study. By adding the two asset measures and debt, the amount of explained variance in financial satisfaction increased from 14% to 25% among men and 7% to 29% among women. This study also found that property and financial assets had a positive association with financial satisfaction, but debt had a negative impact on financial satisfaction. Plagnol (2011) also showed that income

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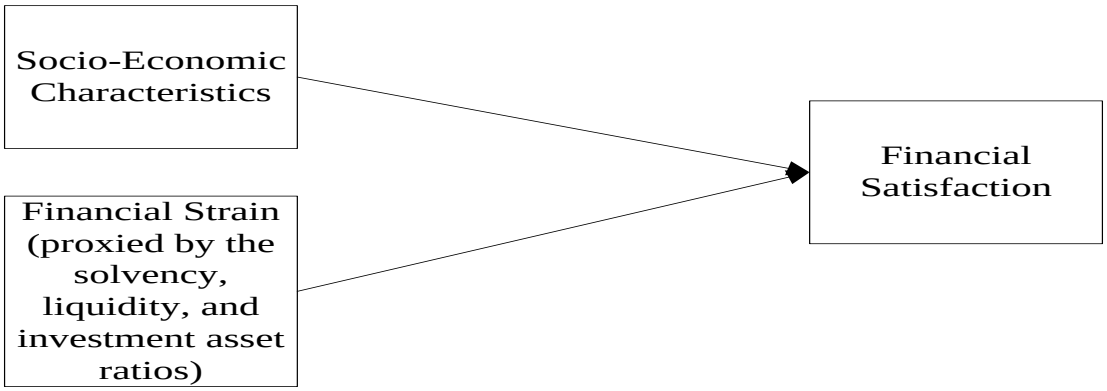
and assets had a positive impact on financial satisfaction, while carrying debt led to a decline in financial satisfaction. In Plagnol's (2011) fixed effects model, higher income, financial assets, and tangible assets were associated with increases in financial satisfaction and consumers with credit card, mortgage, and other types of debt had a negative impact.

THEORY

A condensed version of Joo and Grable's (2004) Framework for Financial Satisfaction will serve as the main theoretical model for the current study. The previous literature on financial satisfaction has shown that socioeconomic variables, and objective measures (ratios) may have an impact on one's financial satisfaction. The Joo and Grable framework shows that socio-economic characteristics such as age, education, income, race, homeownership, number of children, marital status, and gender directly affect financial satisfaction. Financial strain, as measured using ratios, has also been shown to have direct effects on financial satisfaction. Therefore, it seems reasonable to hypothesize that both socio-economic characteristics and financial strain may have a direct impact on financial satisfaction. Based on these hypothesized relationships, the determinants of financial satisfaction can be more fully identified in the framework presented below in Figure 1.

Figure 1. Determinants of financial satisfaction



In this framework, it is predicted that one's overall financial satisfaction level can be impacted by current financial situation (Joo and Grable, 2004). Specifically, individuals who have acceptable financial ratios tend to be less strained with their financial situation. This lowered level of strain should have a positive impact on the financial satisfaction level of the person (Joo & Grable, 2004). Alternatively, individuals that do not have acceptable financial ratios tend to be more strained with their current financial situation. The increased strain can negatively impact financial satisfaction level.

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METHODS

Data

The analysis of the research question uses the HRS, a nationally representative panel study of Americans age 50 and older. The HRS provides in-depth information on the financial position of older households, allowing for the construction of a series of financial ratios. In the HRS, questions on demographics, income and wealth, family structure, health, and employment were included in each core interview section. Beginning in 2004, the HRS added a new feature in the form of a self-administered questionnaire, which was left with respondents upon the completion of an in-person core interview. The Psychosocial Leave-Behind Participant Lifestyle Questionnaire measures psychosocial issues, such as social support, sense of control, and financial strain. The questionnaires from the 2004 and 2008 surveys were used in the current study.

The 2008 wave of the HRS consists of 17,217 respondents. The sample is comprised of respondents who answered a question concerning how satisfied they were with their current financial situation. This question was part of the leave-behind questionnaire of which only 6,923 people answered. Answers to the 2008 financial satisfaction question were compared against the respondents' answer from 2004, in which the same financial satisfaction question was asked. The total number of respondents answering both questions produced a total sample size of 839, as seen in Table 4 and discussed in detail later.

In the HRS, the person most knowledgeable about financial matters within the household (financial respondent) stated the value of all assets, debts, and total income for the entire household. The financial respondent variables included: (a) all three ratios, (b) household income, and (c) total household wealth. Individual respondent variables included: (a) the respondent's age, (b) gender, (c) race, (d) marital status, (e) educational level, (f) homeowner status, (g) whether or not they have children (i.e., "Do you have any children?"), (h) employment status, and (i) health status. It is important to note that a spouse or partner of the individual respondent could have a different gender, race, educational level, working status, not have children, and have better or worse health. The financial respondent and the individual respondent could be the same person, but this was not always the case. For the financial satisfaction question in the leave-behind questionnaire, 78 of the 6,923 total responses were answered by someone other than the assigned respondent in the household.

Dependent Variable

Financial satisfaction was the dependent variable in this study and was measured with a 5-point Likert-type item found in the leave-behind questionnaire: "How satisfied are you with your family's current financial situation?" The responses were: 5=*completely satisfied*, 4=*very satisfied*, 3=*somewhat satisfied*, 2=*not very satisfied*, 1=*not at all satisfied*.

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Independent Variables

Financial ratios. Whereas previous research focused on proposed "ideal" ratio levels within each proposed measurement, the current analysis attempted to compare different ratio measurements. One challenge with such comparisons was that different ratios are likely to be on different scales and have different distributions across any sample. These differing distributions of ratio numbers within the sample could skew results from traditional measurements of the quality of the ratio as a predictor of an outcome, regardless of the importance of the underlying factors measured by each ratio. As such, it is important to develop a commonly-shared, universal measurement for each ratio that allows a clean comparison of the underlying factors.

This study created a universal scale for each ratio by ranking respondent scores on each ratio by decile. Thus, each ratio, regardless of its distribution of underlying ratio numbers, was flattened into identical ten unit segments. For purposes of the regression analysis, each ratio was broken out into deciles so that a proper comparison between ratios could be made. This approach converted the ratios into decile scores to form a 1-10 score on each one, with the top 10% of the sample getting a 10, the next highest 10% getting a 9, and so forth. Table 1 shows the full decile distribution for each of the ten deciles for each of the ratios used. For example, a household with a solvency ratio of 1.40 would be in the second decile and be assigned a score of two.

Table 1
Ranges for each decile

Decile	*Solvency Ratio (Ranges)*	*Liquidity Ratio (Ranges)*	*Investment Asset Ratio (Ranges)*
1st	Less than 1.39	Zero	Zero
2nd	1.39 to 02.77	.000 to .119	Zero
3rd	2.77 to 05.72	.119 to .389	Zero
4th	5.72 to 15	.389 to .822	.0000 to .0707
5th	15 to 117	.822 to 1.504	.0707 to .2208
6th	117 to 15,000	1.504 to 2.603	.2208 to .3984
7th	15,000 to 140,000	2.603 to 4.403	.3984 to .5392
8th	140,000 to 360,700	4.403 to 8.315	.5392 to .6756
9th	360,700 to 765,000	8.315 to 18.630	.6756 to .8139
10th	Greater than 765,000	> 18.630	> .8139

A value of one was added to any zero values for monthly income, total debts, and net worth to enable the calculation of a ratio. Total assets were defined as the sum of financial assets (checking accounts, savings accounts, money market funds, certificates of deposit, mutual funds, stocks, bonds, and individual retirement accounts) and nonfinancial assets (real property). Total debts were all debts including mortgage debt. Liquid assets include checking accounts, savings accounts, and money market funds. For the purpose of this study, investment assets included stocks, bonds, certificates of deposit, individual retirement accounts, real estate, and business or farm equity, but not the primary residence or vehicles. This definition followed the one used by Baek and DeVaney (2004). Net worth was defined as total assets minus total debts.

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When testing financial ratios, it is also important to control for income and wealth. For example, Harness, Finke, and Chatterjee (2009) controlled for wealth and income when testing the hypothesis that gains in the investment asset ratio resulted in greater wealth accumulation. They found that the log of wealth had a negative relationship with the change in net worth, but the log of income had a positive impact on the change in wealth. DeVaney and Hanna (1994) found that income had a negative relationship when testing the solvency ratio.

Baek and DeVaney (2004) showed that when using the liquidity ratio guideline of greater than 2.5, households in the highest income quartile were 55% less likely to meet the 2.5 month guideline when compared to the lowest quartile. For the investment asset ratio, those households in the highest income quartile were seven times more likely to meet the investment asset ratio guideline of .25 when compared to the lowest quartile. Yao et al. (2003) also tested the investment asset ratio, but instead of breaking out income into quartiles, they used five categories with income less than $10,000 as the reference group. They found that having an income between $50,000 and $100,000 increased the odds by more than five times of at least meeting the .25 investment asset ratio guideline, compared to households that made $10,000 or less. Similarly, earning more than $100,000 increased the odds by over twenty times.

Kim and Lyons (2008) also controlled for income and wealth when using the solvency, liquidity, and investment asset ratio and noted that not meeting the investment guidelines used in the study was associated with lower levels of income and wealth for all three ratios. Moon, Yuh, and Hanna (2002) were able to calculate the inflection point on income when each ratio changed from positive to negative. Using a liquidity guideline of three months, they found that income had a positive effect on the liquidity ratio up to $50,966, but above this amount until $87,616, it had a negative effect. With the investment asset ratio guideline of .25, income had a positive effect until household income reached $87,016 and thereafter, it had a negative effect. For the solvency ratio guideline of 1.0, income up to $18,646 had a positive effect, but income of $18,647 to $74,585 caused the association to turn negative. Once household income was greater than $74,585, the relationship with the solvency ratio became positive again.

As noted above, the effects of income and wealth on each ratio are quite different and not controlling for them can introduce unobserved bias into the regression results. By including both wealth and income as independent variables, these variables are held constant to determine if a relationship exists between the ratios and financial satisfaction. Using the same ratios as the current study, Bieker (2011) tried to answer the following question using the 2001 SCF: *"Are financial ratios and a subjective measure of financial satisfaction independent of household wealth and income?"* Bieker's results suggested that the financial ratios and the subjective measure of financial satisfaction measured aspects of household satisfaction that were different from and independent of the level of household income and wealth. Therefore, they measured different aspects of financial satisfaction that were not captured in household wealth or income.

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While other research presented above has examined the separate components of the solvency ratio (i.e., total assets or total debts), Plagnol (2011) and Hansen et al. (2008) noted that assets had a positive effect on financial satisfaction, but debt had a negative impact. Wealth (total assets minus total debt) has been shown to have a positive impact on financial satisfaction (Mugenda, Hira, & Fanslow, 1990; Sumarwan & Hira, 1993). Including a separate control variable for net worth helps to prevent the possibility that a solvency ratio association with financial satisfaction might be simply reflecting an association of greater solvency with greater net worth and greater net worth with financial satisfaction. Without controlling for wealth, it would not be possible to determine whether or not this was driving an association between the solvency ratio and financial satisfaction.

Demographics. The following demographic characteristics were included as controls in the model and were consistently used in previous studies of financial satisfaction (see, Campbell, Converse, & Rogers, 1976; Hira & Mugenda, 1998; Joo & Grable, 2004; Lown & Ju, 1992; Mugenda, Hira, & Fanslow, 1990; Parrotta & Johnson, 1998; Sumarwan & Hira, 1993; Titus et al., 1989; Zurlo, 2009): age, gender, race/ethnicity, marital status, education, having children, current employment, health status, and homeownership.

Age was coded as a categorical variable with five groups: (a) respondents younger than 55 years old, (b) 55 to 64, (c) 65 to 74, (d) 75 to 84, and (e) 85 and older. Male respondents were coded as one female respondents were coded as zero. Race was separated into three categories: (a) White, (b) Black, and (c) Other. Respondents who were married or lived with a partner were compared against single respondents. Education was coded as a categorical variable with four groups: (a) less than a high school education, (b) high school graduate, (c) attended some college, and (d) college graduate. Having children was coded as one and not having any children was a zero. Respondents who were currently working were coded as one and respondents not working were a zero. Health status was ascertained at the individual level with the question: "*Would you say your health is excellent, very good, good, fair, or poor*?" Respondents who owned their home were compared against renters.

Analysis

Descriptive statistics were given for each level of financial satisfaction. Ordinary least squares (OLS) regression was used to see which financial ratio had the strongest association with financial satisfaction based on testing data from one survey year. Because OLS regression is not always appropriate for ordered categorical dependent variables, cumulative logistic regression was used as a robustness check. As in this study, Sanderson, Heckert, and Dubrow (2005) found that it was common to compare results under both methods but report the results from the OLS regression because both methods frequently found the same patterns of results, yet the OLS results were easier to interpret. Two additional robustness checks (i.e., Akaike Information Criteria (AIC) and F-Test) were also used to see which ratio had the best overall model fit with financial satisfaction.

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A fixed effects model was used to see which ratio was the best predictor of financial satisfaction based on testing data from two points in time. The change in the variables of interest (i.e., solvency ratio, liquidity ratio, investment assets ratio, health status, education, homeowner status, marital status, income, wealth, and work status) between 2004 and 2008 were compared against the change in financial satisfaction over this same time period. Age, race, and gender were not included as change variables because respondents would age similarly between the two waves and it was assumed that race and gender would not vary. The change variables were created by subtracting the 2004 value from the 2008 value.

RESULTS

Description of Sample

Table 2 presents sample statistics related to the two key variables—objective financial strain and subjective financial satisfaction. For the entire sample, 7% of respondents reported having a solvency ratio of less than one in 2008, 59% reported having a liquidity ratio of less than 2.5, and 52% reported having investment assets less than .25. At each higher level of financial satisfaction, each group exhibited a drop in the percentage of households that were financially strained in all ratios. Moving from the least satisfied to the most satisfied groups, the solvency ratio decreased from a high of 24% to a low of 3%, the liquidity ratio decreased from 85% to 44%, and the investment asset ratio decreased from 79% to 36%.

There was an increase in household income and net worth from those reporting the lowest level of financial satisfaction to those reporting the highest level of financial satisfaction. Median household income doubled from a low of around $22,000 for those reporting that they were not at all satisfied with their present financial situation, to almost $50,000 for those completely satisfied. Median household net worth increased by a factor of over 12 from $33,750 at the low end of financial satisfaction to almost $460,000 at the highest level of financial satisfaction.

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Table 2
Description of households

		Present Financial Satisfaction				
Variable	*All Responses Measurement*	*Not At All Satisfied Measurement*	*Not Very Satisfied Measurement*	*Somewhat Satisfied Measurement*	*Very Satisfied Measurement*	*Completely Satisfied Measurement*
	Mean (Median)	Mean (Median)	Mean (Median)	Mean (Median)	Mean (Median)	Mean (Median)
Household Income	$ 63,202.56	$ 36,237.29	$ 49,350.99	$ 56,750.66	$ 71,557.44	$ 79,216.25
	$ (39,523.00)	$ (22,200.00)	$ (28,838.00)	$ (35,362.00)	$ (47,248.00)	$ (49,480.00)
Household Net Worth	$ 520,939.02	$ 112,330.80	$ 211,104.94	$ 328,984.15	$ 704,294.43	$ 897,922.42
	$(204,000.00)	$ (33,750.00)	$ (80,950.00)	$(141,000.00)	$(347,000.00)	$(459,000.00)
	Percent	Percent	Percent	Percent	Percent	Percent
Age						
Less than 55	06.37%	10.28%	12.11%	07.03%	04.63%	02.91%
55-64	26.60%	42.06%	35.54%	28.88%	23.94%	16.37%
65-74	37.25%	33.56%	34.08%	37.27%	39.37%	37.60%
75-84	22.06%	10.74%	14.57%	20.18%	22.85%	31.87%
85 and older	07.72%	03.36%	03.70%	06.64%	09.21%	11.25%
Gender						
Male	40.09%	33.11%	35.54%	40.53%	42.97%	40.70%
Female	59.91%	66.89%	64.46%	59.47%	57.03%	59.30%
Race						
White	84.00%	74.94%	76.57%	79.60%	90.13%	90.36%
Black	12.87%	20.36%	20.52%	16.84%	07.36%	06.74%
Other	03.13%	04.70%	02.91%	03.56%	02.51%	02.90%
Married or Living with Partner	65.00%	47.43%	59.75%	63.56%	70.12%	69.34%
Education						
Less than high school	22.99%	30.64%	29.04%	25.63%	18.32%	18.80%
High school diploma	33.99%	34.68%	31.39%	34.59%	33.48%	35.04%
Some college	21.51%	21.03%	25.22%	21.27%	21.37%	19.95%
College degree	21.51%	13.65%	14.35%	18.51%	26.83%	26.21%
*Health Status**						
Poor health	07.99%	24.16%	11.77%	07.96%	04.80%	04.85%
Fair health	20.77%	33.11%	30.38%	22.77%	16.30%	13.75%
Good health	32.41%	22.37%	34.53%	34.99%	32.61%	29.99%
Very good health	29.36%	14.54%	18.27%	27.91%	34.19%	36.73%
Excellent health	09.39%	05.82%	04.93%	06.29%	12.05%	14.62%
Have children	87.49%	86.13%	88.12%	87.82%	87.30%	87.26%
Currently working	30.29%	33.33%	36.21%	34.20%	29.50%	20.82%
Homeowner	72.27%	53.69%	64.01%	69.89%	78.57%	78.71%
Solvency Ratio < 1	06.94%	24.16%	10.43%	07.87%	02.84%	03.30%
Liquidity Ratio < 2.5	59.42%	85.01%	79.82%	65.32%	48.64%	43.73%
Investment Ratio < .25	52.29%	78.52%	71.41%	59.87%	40.19%	36.25%
	N = 6,932	N = 447	N = 892	N = 2,275	N = 1,834	N = 1,484

*Variable is missing observations

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People under age 65 represented 52% of those with the lowest level of financial satisfaction, but only 19% of those with the highest financial satisfaction. The percentage of respondents who were male increased from 33% for not at all financially satisfied to 41% for those who were completely financially satisfied. The percentage of respondents who were White increased from 75% for not at all financially satisfied to 91% for those who were completely satisfied. Blacks constituted 20% of respondents who were not at all financially satisfied, but only 7% of those who were completely satisfied. The percentage of respondents in the Other race category stayed consistent across all categories of financial satisfaction. Homeownership levels increased by 25 percentage points from the lowest level to the highest level of financial satisfaction.

Respondents who were currently married or live with a partner comprised 48% of those with the lowest level of financial satisfaction, but almost 70% of those with the highest level of financial satisfaction. The percentage of respondents having a high school diploma or attending some college stayed consistent across all categories of financial satisfaction. Respondents who did not graduate from high school represented 31% of those with low financial satisfaction, but only 19% of those with high financial satisfaction. The share of respondents with a college degree was twice as large for those reporting high satisfaction as compared with those with low satisfaction. The percentage of households having children stayed consistent across all categories of financial satisfaction. Respondents with poor health constituted 24% of those not at all financially satisfied, but only 5% of those who were completely financially satisfied. Conversely, those reporting excellent health comprised only 6% of those with low satisfaction, but were 15% of those with high financial satisfaction.

Regression Results

Table 3 presents OLS linear regression results from the 2008 HRS. Table 3 helps to present which financial ratio had the strongest association with financial satisfaction based on testing data from one survey year. In the first specification, all three ratios converted into decile scores were regressed on financial satisfaction with all the ratios being highly significant. Again, for purposes of the regression analysis, each ratio was broken out into deciles so that a proper comparison between ratios could be made because each ratio was on a different scale of measurement. The approach used in this study converted the ratios into decile scores to form a 1-10 score on each one. This put each ratio on the same scale and negated the need to compare specific values of each individual ratio.

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Table 3
Results of linear regression

Variable	Coefficient (Standard Error) [R^2] (1) *N=5,719*	Coefficient (Standard Error) [R^2] (2) *N=6,424*
Ratios		
Solvency Ratio	.08411 (.00581)***	.09038 (.00579) [23.49%]***
Liquidity Ratio	.04484 (.00577)***	.05959 (.00547) [20.83%]***
Investments Ratio	.02884 (.00525)***	.02998 (.00509) [19.80%]***
Independent Variables		
Age		
Less than 55	-.58295 (.06401)***	
55 to 64	-.46466 (.04030)***	
65 to 74	-.20878 (.03285)***	
Gender (Male)	-.03540 (.02756)	
Race (White)	.02919 (.03962)	
Married	.04250 (.03241)	
Education (Less than high school)	.04925 (.03479)	
Have Children	-.04716 (.04006)	
Homeowner	.07736 (.03844)*	
Income (Log)	.16404 (.01788)***	
Net Worth (Log)	.04521 (.01275)***	
Currently working	-.07167 (.03388)*	
Health Status (Poor)	-.38071 (.05285)***	
Ratios with full controls	[24.69%]	
Only Independent Variables	[19.37%]	

*p<.05; **p<.01; ***p<.001.
(1) All ratios with full controls.
(2) Results from regressions with only one ratio, controls not reported but includes full controls.

The first model factored in the total effect that all three ratios had on financial satisfaction because they were all included in the same regression, along with all the independent control variables. However, a change in the decile for the solvency ratio was associated with a larger magnitude of effect on financial satisfaction because it had a higher coefficient compared to the liquidity and investment assets ratio. As all three ratios had been converted to deciles, the coefficients indicated that increasing the solvency ratio by one decile was associated with a .08 increase in subjective financial satisfaction. This association was twice that of the impact of increasing the liquidity ratio by one decile, which yielded a coefficient of .04, and four times greater than increasing the investment asset ratio by one decile, with a coefficient of .02.

In the second specification, each ratio converted into a decile score was separately regressed on financial satisfaction with all the ratios being significant, but with the solvency ratio again producing the highest coefficient. This specification was included to examine the separate effect that each ratio had on financial satisfaction using all the independent control variables. The solvency ratio also explained the most variance in financial satisfaction with an $R^2 = .23$. A higher variance explained reflects a better accuracy

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of the prediction. In comparison, the liquidity ratio model explained .21 of the variance in financial satisfaction whereas the investment asset ratio model explained .20.

The purpose of Table 4 was to see which ratio was the best predictor of financial satisfaction based on testing data from two points. In Table 4, the change in the variables of interest between 2004 and 2008 were compared against the change in financial satisfaction over this same time. A fixed effects model comparing two years was used in the current study. The longitudinal fixed effects design controls for all time-invariant personal characteristics of respondents, as it compared respondents to themselves at different times. Comparing three survey years was not possible because only two respondents answered the financial satisfaction question in all three waves and only twenty answered the same question between the 2006 and 2008 waves. Therefore, the current study compares the difference in 2008 results to 2004.

Table 4
Results of the change in financial satisfaction

Variable	Coefficient (Standard Error) [R^2] (1) *N=839*	Coefficient (Standard Error) [R^2] (2) *N=839*
Ratios		
Change in Solvency Ratio from 2004 to 2008	.02443 (.01460)	.03031 (.01452) [16.30%]*
Change in Liquidity Ratio from 2004 to 2008	.00168 (.01167)	-.00399 (.01153) [15.87%]
Change in Investments Ratio from 2004 to 2008	.04217 (.01274)***	.04430 (.01243) [17.13%]***
Independent Variable Change from 2004 to 2008		
Change in health status from 2004 to 2008	-.08717 (.03333)**	
Change in education status from 2004 to 2008	.01146 (.01064)	
Change in homeowner status from 2004 to 2008	.03244 (.03672)	
Change in marital status from 2004 to 2008	-.03837 (.03354)	
Change in income status from 2004 to 2008	4.50749E-8 (4.207373E-7)	
Change in wealth status from 2004 to 2008	1.65856E-7 (6.856777E-8)*	
Change in work status from 2004 to 2008	-.03653 (.01947)	

*p<.05; **p<.01; ***p<.001.
(1) All ratios with full controls – Comparing 2004 to 2008 with 2004 results as the base year.
(2) Each individual ratio with full controls not reported – Comparing 2004 to 2008 with 2004 results as the base year.

Model one compared the change in all three ratios from 2004 to 2008 against the change in financial satisfaction during the same period of time. The first and second specification also included the change in seven independent variables (i.e., health status, education, homeowner status, marital status, income, wealth, and work status) from 2004 to 2008. The first measure included changes in the control variables and the change in all three ratios. The first model factored in the total effect that the change in each of the three ratios had on the change in financial satisfaction. The results indicated that the change in

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the investment asset ratio was significant. In the second specification, the change in each ratio was separately regressed on the change in financial satisfaction with the solvency ratio and the investment asset ratio being significant. This specification was included to examine the separate effect that the change in each ratio had on the change in financial satisfaction, while controlling for changes in the control variables listed above. In order to make the amount of change consistent across ratios, each ratio was broken out into deciles. A one decile increase in the investment asset ratio between 2004 and 2008 was associated with a .04 increase in financial satisfaction whereas a one decile increase in the solvency ratio between 2004 and 2008 was one-half this amount at .02. This result was different from Table 3, where on a cross-sectional basis the solvency ratio described the most variance in financial satisfaction. The change in health status and wealth were the only significant independent variables in models one and two.

Because ordinary least squares regression is not always appropriate for ordered categorical dependent variables, cumulative logistic regression was used as a robustness check. The dependent variable used in this study was not actually numerical, which means that no assumption can be made regarding the scalar interval between rankings. This means that the categories of the dependent variable were not equidistant; therefore, moving from level 1 to 2 was not necessarily the same as going from level 4 to 5. Since the categories were not equidistant, this violated the assumption of parallel lines (Wang & Hanna, 2007). Cumulative logistic regression assumes that the logistic function is the same for all values of the independent variable and does not violate the assumption of parallel lines.

Each odds ratio can be interpreted as the effect of that variable on the odds of being in a higher rather than lower level of financial satisfaction. The results showed that a one decile increase in the solvency ratio increased the odds by 17% of increasing financial satisfaction, which was double the effect of that observed for a one decile increase for the liquidity ratio (8%) and the investment assets ratio (5%). Table 5 clearly showed that the solvency ratio had the strongest association with financial satisfaction.

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Table 5
Results of cumulative logistic regression

Variable	Parameter estimate	P-Value	Odds Ratio
Ratios			
Solvency Ratio	0.1568	<.0001***	1.170
Liquidity Ratio	0.0787	<.0001***	1.082
Investments Ratio	0.0510	<.0001***	1.052
Independent Variables			
Age			
Less than 55	-1.0698	<.0001***	0.343
55 to 64	-0.8472	<.0001***	0.429
65 to 74	-0.4004	<.0001***	0.670
Gender (Male)	-0.0720	0.1642	
Race (White)	0.0781	0.2902	
Married	0.0543	0.3722	
Education (Less than high school)	0.0769	0.2374	
Have Children	-0.0955	0.2040	
Homeowner	0.1174	0.1034	
Income (Log)	0.3231	<.0001***	1.381
Net Worth (Log)	0.0958	<.0001***	1.101
Currently working	-0.1364	0.0313*	0.872
Health Status (Poor)	-0.6932	<.0001***	0.500

*p<.05; **p<.01; ***p<.001. N=6,424

Table 6 presents the results of two more robustness checks to test overall model fit. The primary approach used to test model fit was the AIC. This method is useful for comparing different models that contain different parameters to identify the best model given the data. AIC scores are based on information theory and rest on the assumption that the model with the smallest value is the best fit for the data (Gergel et al., 2004). Burnham and Anderson (1998) further assert that the bigger the difference in AIC scores between the best model and other competing models, the less likely the other models are to being acceptable. The results indicated that the solvency ratio model had the lowest AIC score and the gap between the other ratio models was not small. This confirms that the solvency ratio had the best overall model fit.

Table 6
Test of model fit

Model	AIC	R^2	F-test	p
Solvency Ratio with full controls	-108.5319	0.2260	413.35	<.0001
Liquidity Ratio with full controls	51.4352	0.2041	113.07	<.0001
Investment Asset Ratio with full controls	118.0690	0.1947	183.62	<.0001

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A second robustness check presented in Table 6 was an F-Test. The F-Ratio tests the overall fit of a regression model to a set of observed data. The predicted main effect of the solvency ratio was significant, $F(1, 6224) = 413.35$, $p = <.0001$. The liquidity ratio was also significant, $F(1, 6224) = 113.07$, $p = <.0001$. Finally, the investment asset ratio was also significant, $F(1, 6224) = 183.62$, $p = <.0001$. The solvency ratio produced the largest F-Value. This test also showed that the solvency ratio had the best model fit for the data.

DISCUSSION

The results from this study present evidence of two main findings: (a) the solvency ratio is most strongly associated with financial satisfaction levels based on a cross-sectional design and (b) changes in the investment asset ratio are most strongly associated with changes in financial satisfaction over time. As the Joo and Grable (2004) framework would predict, financial strain as proxied by financial ratios, has a direct impact on financial satisfaction. The first finding also confirms past academic studies, where on a cross-sectional basis, debt was found to have a negative impact on financial satisfaction. This impact of debt is separate from the simple benefit of changes in net worth, as net worth was explicitly controlled for in several of the models. In addition, the current findings extend the earlier work by showing that, in the context of a ratio, a debt-related solvency ratio is most strongly associated with financial satisfaction on a cross-sectional basis. Past research, based only on a cross-sectional analysis, may be flawed in that it may overstate the impact of debt changes. While debt can still have a negative association with changes in financial satisfaction in the longitudinal analysis, it does not have the same strength of association as does the investment asset ratio.

While the first finding gives evidence that reducing debt is useful, it is possible that reducing debt is not as effective as focusing on the investment asset ratio. The strength of the investment asset ratio association is particularly notable given that more than 20% of the sample had no investment assets and were thus all labeled as belonging to the first decile. Despite this complete lack of variation for a substantial share of the sample, the decile distribution of the investment asset ratio still has the strongest association with changes in financial satisfaction. What could cause this? A difference between cross-sectional and longitudinal results may reflect an association without causation. The defining feature of a cross-sectional study is that it provides a snapshot of a population at a single point in time. The main benefit of a cross-sectional design is that it allows researchers to compare many different variables at the same time, but the main drawback is that researchers cannot view the same snapshot before or after that single point in time. However, in a longitudinal study, researchers can conduct several observations of the same respondents over a period of time. Also, in a longitudinal analysis, a fixed effects model can be employed. This allows for the control of all the stable characteristics of a person, thereby eliminating potentially large sources of bias.

The results from the cross-sectional design in Table 3 show that people in more debt are less financially satisfied. But changes in the debt ratio did not have a relatively large impact when viewed through the prism of a longitudinal study as seen in Table 4. It may be possible that some unobserved underlying stable personality characteristic causes people

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to both be financially unhappy and to get into debt. If such a time-invariant third factor is causing both outcomes, then the association would be evident in a cross-sectional study, but not with a longitudinal design. The longitudinal fixed effects design controls for all time-invariant personal characteristics of respondents as it compares respondents to themselves at different times. Thus, these results are consistent with the idea that some time-invariant characteristics, such as a personality trait, results in both financial dissatisfaction and the increased use of debt. To the extent this is the case, then reducing debt would not be as effective at improving financial satisfaction as it would appear to be in a cross sectional analysis.

There is also empirical support that other factors in the Joo and Grable (2004) framework play a role in perceived financial satisfaction. In the current results, age is significantly negatively associated with financial satisfaction, and homeownership is positively associated with financial satisfaction. This result differs from Joo and Grable (2004) where no significant result was found for age or homeownership. A common observation is that financial satisfaction tends to improve with age (Hira & Mugenda, 1998; Lown & Ju, 1992; Sumarwan & Hira, 1993; Titus et al., 1989). The descriptive results in this study also show that as the financial satisfaction levels increase, both median household income and net worth increase as well. However, this relationship does not exist once controlling for other financial characteristics. Hansen et al. (2008) attributed the age-related association with financial satisfaction to greater assets and less debt among the aged. The current results, given the inclusion of controls for assets and debt, as well as other financial characteristics, support the conclusion of Hansen et al. (2008) in that the age associated difference relate to tangible financial differences rather than age itself. In addition, the negative association with currently working confirms the results of Sumarwan and Hira (1993).

The log of income and net worth had a significant positive association with financial satisfaction, while current employment had a negative association. This finding confirms the positive association that income and net worth have with financial satisfaction found in a variety of studies (see, e.g., Mugenda, Hira, & Fanslow, 1990; Sumarwan & Hira, 1993). The finding that income has a significant relationship with financial satisfaction was not found in the Joo and Grable (2004) model. However, where there are similar variables in the current dataset, the other components of the Joo and Grable model (2004) were affirmed as significant.

Limitations

One major limitation of this study is that the HRS and some other secondary datasets do not allow for the calculation of many different ratios. For instance, most datasets collect balance sheet or expenditure data, but not both types of measures at the same time. The use of and the availability of distinct types of ratios could lead to different results than those presented in this paper. Another limitation has to do with how financial satisfaction is measured. As previously mentioned, both single-item and multiple-item measures of financial satisfaction have been used in previous studies. Since only a single-item measure is used in this study, the use of multiple-items to measure financial

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satisfaction may lead to a more accurate measure of financial satisfaction. However, Joo and Grable (2004) found that research conducted to date suggests that both single-item and multiple-item measures offer researchers an acceptable level of validity and reliability when used in the correct manner and that both methods produce similar predicted outcomes.

IMPLICATIONS

One of the key implications is that prior research, based only on a cross-sectional design, may be flawed in that it may overstate the impact of debt changes. By using the fixed-effect approach, the investment asset ratio produces the largest coefficient in models one and two of Table 4 and also explains the most variance in the change in financial satisfaction in model two at .17. The solvency ratio is also significant in model two, yet when all three ratios are included together in the first model, it does not become significant. This means that when the change in financial satisfaction is examined over the course of four years using full controls, the best predictor is the investment asset ratio. However, Table 4 should be interpreted with caution because the sample size is much smaller than in Table 3.

While debt is still an important factor in the cross-sectional results, this does not tell the whole story. For a planner to have the greatest effect on their client's financial satisfaction, it appears that the accumulation of financial assets is the best way to improve client financial satisfaction. This has to be welcome news for financial planners who concentrate on wealth management and are paid based on assets under management (AUM). The planners who are successful at helping clients attain a higher investment asset ratio should experience a double benefit: happier clients overall, leading to higher retention rates and more fee income for the planner if they are paid based on an AUM model.

Another way for planners to take advantage of the results of this study is to emphasize the benefit of personal savings toward major life goals such as retirement. With the continued switch from defined benefit to defined contribution plans, more employees are assuming personal responsibility for saving money towards retirement. This shift imposes more accountability on workers to sensibly save and if planners can help their clients to see the benefit of longer-term savings, at the expense of present consumption, they should be more satisfied in the long-run.

For financial therapists, the results suggest that clients may be more satisfied in the long-term if the counseling process proceeds from remedial to preventative financial counseling techniques. Remedial financial counseling is helpful when clients have reached a state of financial strain (Pulvino, Lee, & Pulvino, 2002). This financial strain can be manifested in things like not being able to service outstanding debt or having to use credit cards to fund current consumption. One way to view financial stability is by being solvent. Being insolvent (as reflected in the solvency ratio) can add strain, which has a negative impact on financial satisfaction. As Joo & Grable (2004) posed, one's overall financial strain level can be impacted by their current financial situation, which in turn affects their

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financial satisfaction level. Because a financial therapist can help a client address the immediate concern, the mitigation of the pressing issue can have a positive impact on overall financial satisfaction.

As the strain-causing event dissipates, the client may be ready to continue on to more preventative measures, like helping a client discuss and understand their goals and objectives and helping clients develop a course of action before it is needed. Preventative approaches are appropriate when clients are financially stable, but desirous of finding better ways to use their resources more wisely (Pulvino et al., 2002). If a client can pay all their bills in the short-term and is solvent, they are more than likely ready to discuss longer-term goals, such as retirement savings. As noted in this study, when viewed longitudinally, clients are more financially satisfied when accumulating assets for some future use. Hence, by helping clients transition from remedial to preventative counseling, a therapist is also likely increasing financial satisfaction by addressing the short-term strain event and also decreasing strain, thereby increasing financial satisfaction by helping the client to focus on longer-term goals.

CONCLUSION

In conclusion, this research provides information to financial planners and financial therapists on the use of common financial ratios as targets in helping clients to achieve greater financial satisfaction. Although debt reduction is often a positive goal, a solvency ratio goal constitutes a more balanced approach. Improvements in the solvency ratio appeared strongly positive in the cross-sectional analysis and weakly positive in the longitudinal analysis. Finally, the investment asset ratio may be a surprisingly useful target ratio which, although not as strong in the cross-sectional analysis, was the most important ratio in the longitudinal analysis. The only ratio that does not have an impact on a cross-sectional or longitudinal basis was the liquidity ratio.

For future research, it would be interesting to replicate this study among households that are in different stages of the life cycle. Specifically, since the HRS samples older households, examining a younger cohort with different consumption and savings needs may produce different results. Another idea is to examine the effects of ratios on financial satisfaction during changing economic times. Since this study covered the years of 2004-2008, it would be interesting to see if the results change during an extended growth phase, instead of during an economic recession.

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