

# Saving Behavior of U.S. Households in the 1980s: Results from the 1983 and 1986 Survey of Consumer Finance

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*An analysis of the 1983 and 1986 Survey of Consumer Finance shows that 40% of U.S. households had a decrease in real net non-housing assets between the two survey periods. This study uses t-test, bivariate and multivariate analyses to investigate household saving behavior and identify factors related to it. Multivariate regression results show that the household's initial net non-housing asset level is the most important factor related to increases in net non-housing assets (saving.) The initial net non-housing asset level in 1983 was negatively related to saving between the two periods. Households with higher income levels had higher predicted saving than those with lower income levels. Households with a high level of risk tolerance saved more than their counterparts. Households that received windfalls between 1983 and 1986 saved a large fraction (87%) and only consumed a small fraction of the windfalls received.*

KEY WORDS: *Saving, Risk Tolerance, Net Worth*

A household's saving represents a decision to either increase asset accumulation or to consume less of current income in order to meet household financial goals. Several motives for such a decision can be distinguished: 1) saving for retirement, 2) precautionary saving, and 3) saving for bequests (Sturm, 1983). Other saving motives reported by consumers include savings for children's education, living expenses, purchase or travel plans, and for better life (Xiao & Olson, 1992). Households at different life cycle stages, with different demographic and economic characteristics, should be motivated to save or dissave in accordance with their practical needs and long term financial plans.

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Using data from the 1983 and 1986 Survey of Consumer Finance (SCF), this paper investigates American households' saving behavior and identifies factors related to it.

### The Literature

#### *General Household Saving Patterns in the 1980s*

Macro-economic data show that the United States national saving rate fell at an alarming rate during the 1980s (Skinner, 1990, pp. 247; Bosworth, Burtless & Sabelhaus, 1991, pp. 183). The economy was moving from recession to recovery in the 1980s. Between 1978 and 1991 the percent change in median family income from the previous year ranged from a low -3.5% (1980) to a high 4.3% (1986), with an average of 0.3%. The optimism about future economy created a rapid change in attitudes to favor buying which might have discouraged the precautionary incentive for saving. This resulted in an overall saving slowdown in the 1980s (Chang & Lindamood, 1993).

Such macro-economic information, however, does not reveal much about various saving behavior of individual households with different characteristics. A review of micro-economic analysis and an examination of household survey data could provide more insight in understanding household saving behavior.

#### *The Life-Cycle Saving Hypothesis*

The life-cycle saving hypothesis (Modigliani & Brumberg, 1954) suggests that the build-up of assets in individuals' working lives is mainly for financing consumption after retirement when earned income is reduced. Households dissave in retirement after accumulating wealth by saving during their working years (Modigliani & Brumberg, 1954). Shorrocks's (1975) study provided empirical support for the life-cycle saving hypothesis. Several empirical studies, however, found that the level of saving among the elderly did not move downward as expected (Mirer, 1979, 1980; Juster, 1982; Avery & Kennickell, 1991). Longer life expectancy, bequest motives, and unexpected medical expenses were plausible explanations for the phenomena.

#### *Factors Related to Household Saving*

*Wealth.* Household wealth has been found to have both positive and negative effects on household saving. Hefferan (1982), using data

from the 1972-1973 Consumer Expenditure Survey (CES), found that wealth had a positive effect on the decision to save as well as the level of saving (Hefferan, 1982). On the other hand, one implication of the life-cycle saving and permanent income hypotheses is that, all else equal, increases in wealth should lead to declines in personal saving (Modigliani & Brumberg, 1954; Friedman, 1957).

*Income.* A positive relationship between saving and income has been tested with theoretical and empirical evidence (Hefferan, 1982; Foster, 1981). Hefferan (1982) found that saving was positively influenced by income. Foster (1981) used the female cohort (ages 30-44) from the National Longitudinal Survey to examine the relationship between wife's earnings and net worth accumulation. Using the change in net worth as a dependent variable, Foster found that the absolute amount of family income, rather than the sources of income, was the important factor in determining the extent of net worth accumulation.

*Number of Earners.* Mullis (1984) tested the effect of number of earners and change in number of earners on household saving. The number of earners was negatively related to change in net assets between 1966 and 1971.

*Household Size.* Using the mature male cohort of the National Longitudinal Survey (NLS), Mason (1975) found that, holding income and other demographic variables constant, larger family size was associated with smaller saving.

*Ethnicity.* Using an elderly sample, Short (1984) found that white households saved more than black or other ethnic households in every wealth category identified in his study. Avery and Kennickell (1991) also found that non-hispanic white saved more than hispanic and non-white households.

*Household Composition.* Using data from the Survey of Consumer Finances (SCF) and Consumer Expenditure Survey (CES), Bosworth, Burtless, & Sabelhaus (1991) found that saving varied widely by marital status and the presence or absence of dependent children. Results from both data sets suggested that single-head households with children had the lowest saving rates in the population.

*Education.* Results from Solmon's (1975) study showed that, all other things being equal, both average and marginal propensities to save tended to rise with schooling attainment of the family head.

*Social Security and Pension.* Micro-economic evidence has generally been favorable to the proposition that social security and pension has reduced individual saving (Hubbard, 1986). There are conflicting results, however, about the effect of social security payments on private saving. Feldstein (1974) found that introduction of the social security system in the United States has reduced personal saving by about 50%, whereas a study by Leimer and Lesnog (1982) implied that some post-war evidence shows that social security may have increased saving.

#### *Purpose of This Study*

A review of empirical studies on household saving suggests that although the overall saving patterns in the nation declined during the 1980s, individuals with different demographic and financial characteristics behaved differently in asset accumulation. Previous studies on household saving behavior mainly focused on effects of static household demographic characteristics and economic variables. This study aims to incorporate all possible variables that influence household saving decisions to help explain and understand household saving behavior in the 1980s. Factors affecting household saving identified in this study include static household demographic and economic variables, dynamic variables between two periods of time, expectational variables, and attitudinal variables. Results from this study will provide additional information in understanding household saving behavior as well as insight for financial planning.

### Methodology

#### *Data and Sample*

Data were drawn from the 1983 and 1986 Survey of Consumer Finance (SCF) -- the most recent and usable panel data available for investigating saving behavior at micro level<sup>1</sup>. The survey instruments were designed to gather exhaustive details on all household assets and debts, providing family financial information at the two points of time (Avery & Elliehausen, 1987; Avery & Kennickell, 1988). This study used weighted sample and cleaned, imputed data file<sup>2</sup>. A sample with

a total of 2,116 households were used for the empirical analysis, with the special non-probability high income sample excluded.

*Measurement of Saving*

This study adopts a balance-sheet perspective and defines effective saving as the net increase in the amount of wealth between the two survey dates. The net worth variables in both 1983 and 1986 were measured by gross assets, excluding pension, plus total net present value of pensions, minus total debt. Home equity was also excluded from the measure of net worth variables in 1983 and 1986 because an increase in home equity, which accounts for a large portion of wealth, often results from the factors in local housing market unrelated to decisions made by a household. The measure of saving in this study therefore, excludes changes in net home equity and, therefore, is the non-housing asset accumulation between 1983 and 1986.

Note that Consumer Price Index (CPI) from the 1983 respondent-interview month to the 1986 respondent-interview month increased 11.25% (Avery & Kennickell, 1988). All dollar values reported in 1983 were converted to constant 1986 dollar amounts. The saving measure in this study therefore, is real saving and does not account for inflation.

*Methods of Analysis*

*T-Test.* A preliminary analysis of characteristic differences between Savers and Dissavers was conducted using a two sample t-test<sup>3</sup>. Respondents were defined as Savers if their non-housing asset accumulation between 1983 and 1986 were positive; and Dissavers otherwise. Multivariate and bivariate analysis were used to investigate factors related to household saving.

*Multivariate and Bivariate Analysis*<sup>4</sup>. Multiple regression can be used to analyze the effects of a number of variables, while controlling for the effects of the other independent variables in the regression. For instance, a regression of saving on net worth and age would provide results that could be interpreted as the effect of net worth on saving, controlling for age. A long list of independent variables that were suspected to have some effect on the dependent variable were identified and entered the regression model. However, inclusion of irrelevant variables or omission of relevant variables in the model would affect the variances and introduce bias of the estimators (Maddala, 1992, pp. 161-165). In order to obtain a parsimonious yet efficient set of predicting variables, the regression analysis with stepwise search procedure was used. With the stepwise regression, it

is possible to test the potential effects of a large number of independent variables in an equation by dropping the insignificant variables from the regression run. From this, the "best" subset of independent variables can be obtained (Neter, Wasserman, & Kutner, 1989). Furthermore, with a reduction in the variable list, the model can be kept simple and problem of multicollinearity can be reduced (Sen & Srivastava, 1990. pp.233). A list of variables included for possible entry into the saving equation is listed in the appendix.

For comparison, separate bivariate regressions were run for each set of independent variables that was significant in the complete stepwise regression, so that the effect from income variables only, age variables only, etc. could be found.

## Results

*Description of Household Saving Patterns and Sample Characteristics*  
Between 1983 and 1986, 63% of the sample had a real increase in net worth and 60% of the sample had a real increase in net non-housing assets. The mean value of real non-housing asset accumulation between the two periods was \$9,658, and the median value was \$2,455. There is a wide variation in real non-housing assets accumulation among households. Between 1983 and 1986, the non-housing assets ranges from a decrease of \$3,576 or more for the bottom 25% to an increase of \$16,389 or more for the top 25%.

The majority of the sample were white (86.6%); the mean age of the respondents was 46; and more than three-fourths (75.7%) of the respondents had high school completed education or higher. The average years of education of the respondents was 12.5 years. Most of the households were married couple households (63.5%) and were home owners (69%). About 18% of the respondents identified themselves as risk-taking persons. In 1983, 15% of the respondents expected to receive inheritance in three years. The average amount of windfall received between 1983 and 1986 was \$2,278 and the average 1982-1983 income of the respondents was \$29,221.

### *Factors Related to Saving*

A comparison of households with positive non-housing asset accumulation (Savers, n=1,276) between 1983 and 1986 to those with

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negative non-housing asset accumulation (Dissavers, n=840) is summarized in Table 1 below. The results show:

- Savers had mean income level 13% higher than Dissavers (\$31,386 vs. \$27,796).
- Savers had less than half the mean net non-housing assets of Dissavers (\$52,014 compared to \$124,818).
- Savers were younger than Dissavers (43.6 vs. 48.8 years).
- Savers had more years of schooling than Dissavers (12.7 vs. 11.8 years).
- Savers had higher percentage of white households than Dissavers (87.5% vs. 80.9%); savers' percentage of black households was about half that of Dissavers' (8.6% compared to 16%).
- Savers had more white collar, blue collar, and sales worker than Dissavers (28.4%, 35%, 11.5% vs. 18.3%, 31%, 8.7%) but had fewer farmer and self-employed workers (0.9%, 3.1% vs. 3.7%, 4.6%).
- More Savers worked in both 1983 and 1986 than Dissavers (69.4% vs. 55.2%).
- Savers had lower percentage of retired households than Dissavers (11.4% compared to 18%).
- More Savers stayed married between 1983 and 1986 than Dissavers (61% vs. 52.9%).
- More Savers got married between 1983 and 1986 than Dissavers (6.9% vs. 3.9%).
- Fewer savers became non-married or stayed single between 1983 and 1986 than Dissavers (2.1%, 29.5% compared to 4.5%, 38.3%).

### *Results of Multivariate and Bivariate Analysis*

Multivariate stepwise regression was the primary method used in this study to investigate factors related to level of household saving. The final step of regression had 10 independent variables, which explained 62% of saving. The regression results are presented in Table 2.

Table 1.  
Comparison of Mean Levels of Saving For Savers and Dissavers by Selected Household Characteristics (t-tests).

Variable	Savers (n=1276)	Dissavers (n=840)	Significance
Average annual income in '82 and '83	\$31,386	\$27,796	0.01
Initial net non-housing assets in '83	\$52,014	\$124,818	0.00
Age as of '83	43.6	48.8	0.00
Years of schooling as of '83	12.7	11.8	0.00
Race: White	87.5%	80.9%	0.00
Black	8.6%	16.0%	0.00
Owned home in '83	67.6%	64.4%	0.13
Occupation			
white collar (professional & manager)	28.4%	18.3%	0.00
blue collar (craftsman, laborer)	35.0%	31.0%	0.05
sales	11.5%	8.7%	0.03
farmer	0.9%	3.7%	0.02
self-employed	3.1%	4.6%	0.08
Change in job status during '83 & '86			
worked in '83 & '86	69.4%	55.2%	0.00
worked in '83, did not work in '86	8.4%	8.9%	0.69
did not work in '83, worked in '86	5.5%	5.3%	0.83
retired in '83 & '86	11.4%	18.0%	0.00
Change in marital status during '83 & '86			
married in '83 & '86	61.0%	52.9%	0.00
not married in '83, married in '86	6.9%	3.9%	0.00
married in '86, not married in '86	2.1%	4.5%	0.00
never married in '83 & '86	29.5%	38.3%	0.00

Figures reported are weighted, n=2116

*Effects of Income.* Both income and income squared entered the regression. The positive coefficient of income and the negative coefficient of income squared indicate a curvilinear relationship between income and predicted saving. In Figure 1, the horizontal axis is shown as the average annual income of 1982 and 1983, and the vertical axis is predicted saving, based on the assumption that all independent variables were at the mean levels for the sample. The solid line in Figure 1 shows that within the scope of the analysis (i.e., average annual income up to \$50,000), predicted saving increases as income increases. Holding other variables at their mean values, the predicted saving is negative even for average annual income of \$50,000. The income threshold for positive predicted saving is \$56,057.



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Table 2.  
Stepwise Regression Results

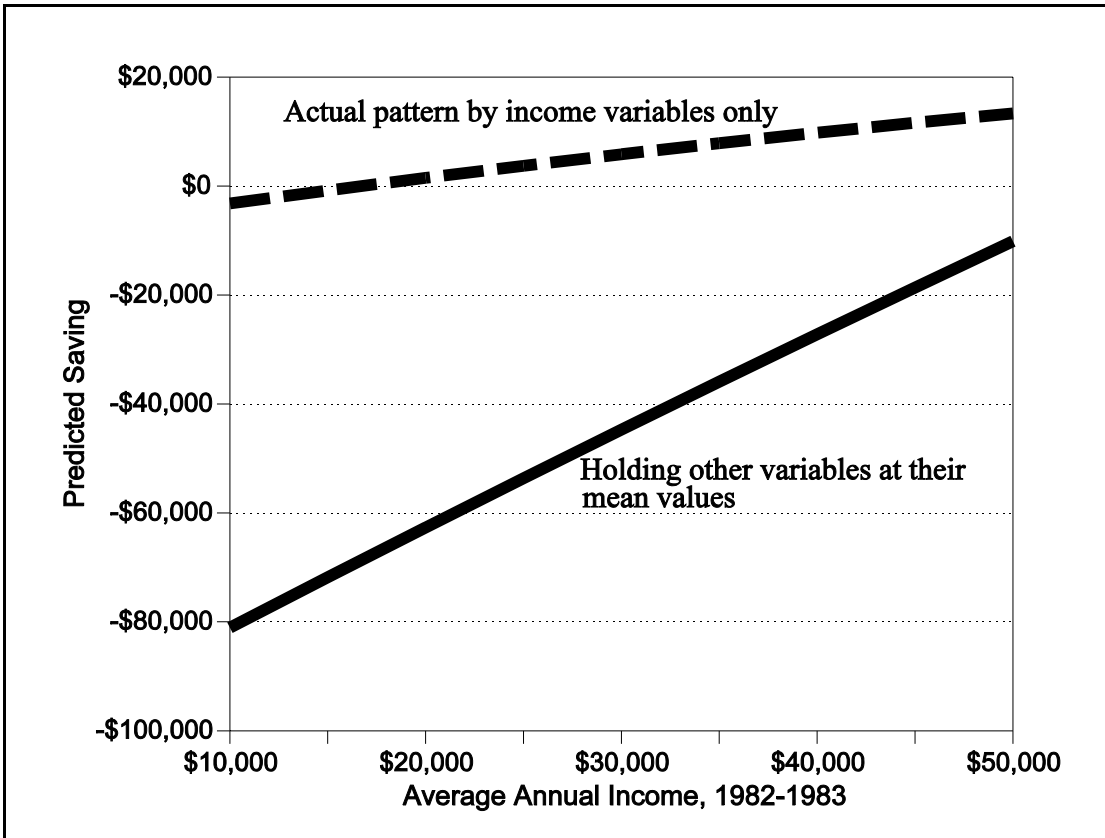
Variables	Coefficient	F-value
Net Non-Housing Assets in '83	-1.136	459.76
Net Non-Housing Assets in '83 x Age	0.014	169.52
Income (thousands)	1907.029	197.87
Income (thousands) Squared	-2.221	72.97
Number of earners in '83	-35974.884	32.73
Risk Taking	33326.706	10.33
Respondent's employment status in '83 was laid off	158610.312	29.99
Respondents changed from working to non-working between '83 and '86	68412.918	4.61
Expected to receive an inheritance	31251.847	7.52
Amount of windfalls received	0.871	21.15
Intercept	-36537.169	20.51
R <sup>2</sup>	0.62	

All variables are significant at .05 level or higher; all figures reported are weighted;  
n=2,116

For comparison, a simple regression of savings as a function only of income and income squared was run. The result (dashed line in Figure 1) shows a higher level of predicted saving by income, not controlling for other variables. The predicted saving increases as income increases, but more slowly than when other variables are held at their mean values. The predicted saving in this case is positive for average annual income about \$17,000 and over.

*Net Non-Housing Assets and Age.* Holding other variables constant, net non-housing assets had a negative effect on saving, but the interaction term for net non-housing assets and age, was positively related to saving. The relationships between predicted saving and initial net non-housing assets for selected ages (and at the mean values of other variables) are presented as solid lines in Figure 2. The effect of net non-housing assets on saving was dependent on the age of the respondent. In general, net non-housing assets had a negative effect on saving, while age was positively related to saving. Younger respondents and those with larger net non-housing assets saved less than their counterparts.

Figure 1.  
Effect of Income on Saving, Other Variables at Their Mean Values  
(Based on Table 2) and as Function of Income Variables Only.



For comparison, Figure 2 also shows the relationship between predicted saving and net non-housing assets without controlling for other variables (dashed line). Contrary to the multivariate result, the bivariate relationship shows that the predicted saving *increases* as net non-housing assets increase. There was no significant bivariate relationship between saving and age variables.

Figure 2.

Effect of Net Non-Housing Assets and Age on Saving, Other Variables at Their Mean Values (Based on Table 2) and as Function of Net Non-Housing Assets in 1983 Variables Only.

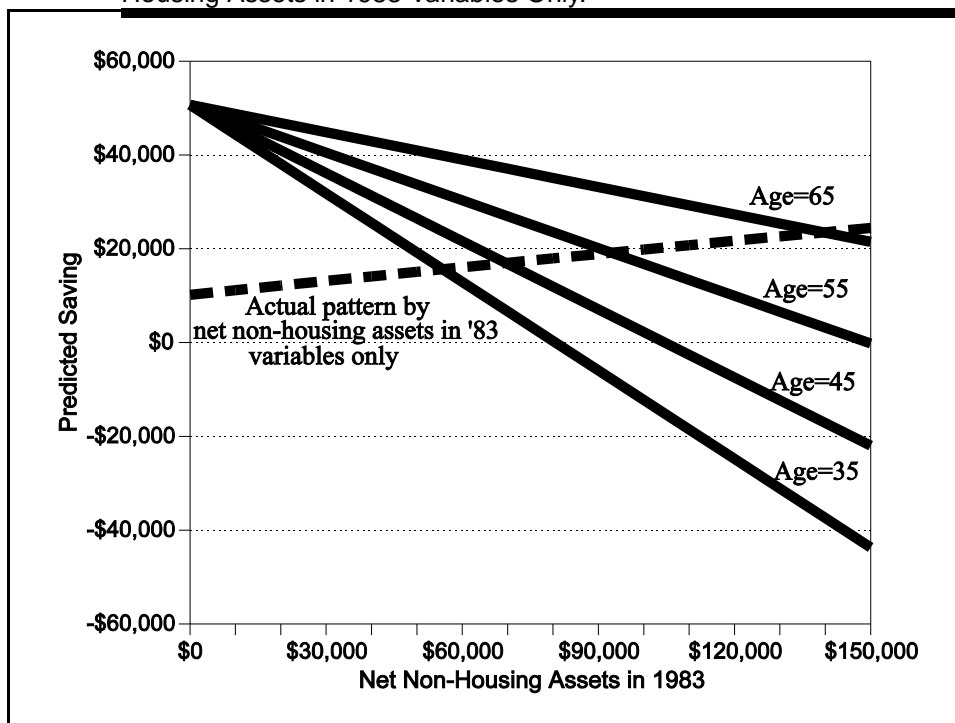
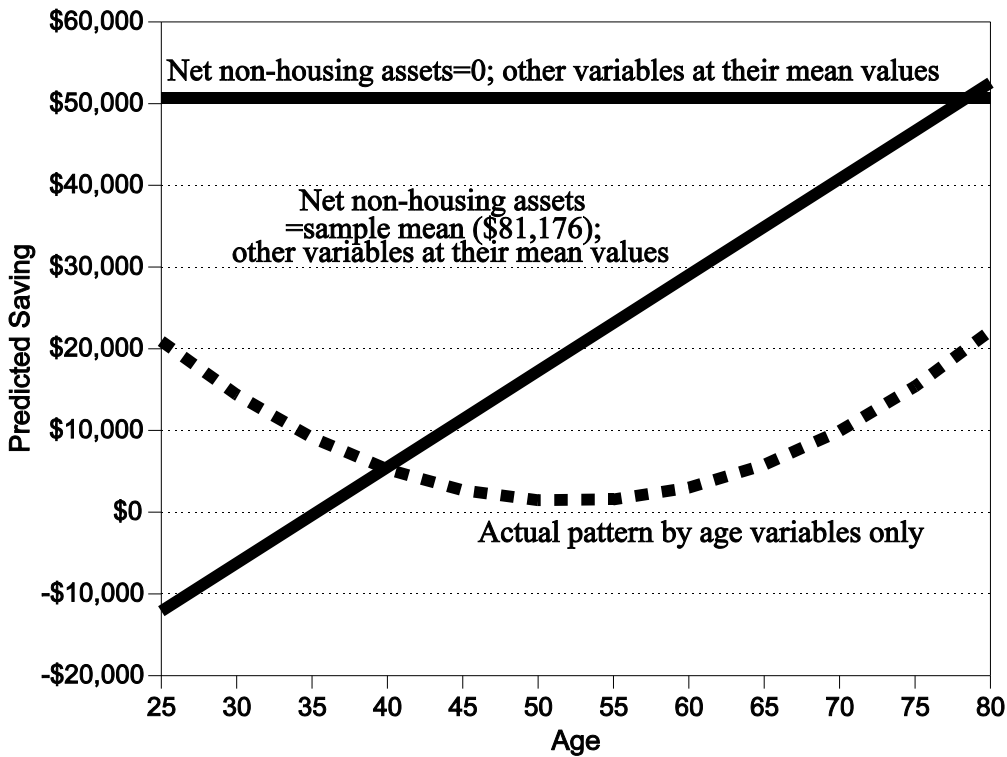


Figure 3 further presents the relationship between age and saving. Holding other variables at their mean values (solid lines), except where the net initial non-housing assets are zero, predicted saving increases as age increases. For the case when the non-housing assets are set to zero, age shows no effect on the level of predicted saving. The relationship between predicted saving by age and age squared without controlling other variables is also shown in Figure 3 as the dashed line. Contrary to what is predicted by the life cycle saving hypothesis, the graph shows a curvilinear, U-shape, relationship between age and predicted saving. The bivariate relationship between age and saving is not significant.

Figure 3.  
 Effect of Age on Saving for Initial Net Non-Housing Assets=0 or =Mean of Sample (\$81,176), Other Variables at Their Mean Values (Based on Table 2) and as Function of Age Variables Only.



*Effects of Other Variables.* Holding other variables constant, those expected to receive an inheritance between the two survey years accumulated \$31,251 more than their counterparts; while having additional earner in the household in 1983 reduced saving by \$35,975. All other things equal, respondents who said in 1983 that they were willing to take above average or substantial risks to obtain a higher return on investments accumulated \$33,326 more between 1983 and

1986 than those who were only willing to take average or no risks in investments. Households with a respondent who was laid off in 1983 accumulated more non-housing assets during the two survey years. Bivariate relationships between saving and each of these variables were significant and of similar patterns as in multivariate analysis.

Holding other variables constant, the amount of windfalls received between the two survey periods had a positive effect on household saving. For every dollar of windfalls received, household saving was increased by \$0.87. Households with a respondent who changed from working to non-working between 1983 and 1986 also accumulated more than respondents with other types of employment status change. There were no significant bivariate relationships between saving and each of the two variables.

*Variables that Did Not Enter Regression.* Among the variables that did not enter the regression were household size, education, amount of social security coverage, gross value of pensions (as estimated by the Federal Reserve), and whether the respondent owned a home in 1983. Variables related to ethnicity and marital status also did not enter into the regression.

#### Discussions of Results

The economy was moving from recession to recovery during 1983 and 1986. Yet 40% of U.S. households experienced a decrease in real net non-housing assets between the two periods. The optimism about future economy created a rapid improvement in attitudes toward buying. Since more money was spent on consumption, less money was saved during the time of economic recovery. It is possible that overspending was a contributory factor in the decrease in wealth (Bae, Hanna & Lindamood, 1993).

#### *Discussion of Multivariate Results*

*Income.* Holding other variables at their mean values, income is positively related to non-housing asset accumulation. This result is consistent with a negative relationship between income and probability of overspending found in Bae, Hanna and Lindamood's (1993) study. As Bae, Hanna and Lindamood suggested, households have needs and wants that tend to be covered even if they do not have sufficient incomes. Overspending may be even more common at a time of

economic expansion. Lower-income households may expect their income to increase in the future, so they overspend, become debt-extended before their "expected income increases" are realized.

Households with higher income have more resources to put aside and may be more likely to be successful in investing and managing their money. Consequently, they are more likely to have positive non-housing asset accumulation.

*Initial Net Non-Housing Assets.* In general, initial net non-housing assets is negatively related to non-housing assets accumulation. This finding is consistent with one implication of the life-cycle saving and permanent income hypotheses. The hypotheses state that, all else being equal, increases in wealth should lead to declines in personal saving (Modigliani & Brumberg, 1954; Friedman, 1957). Empirical evidence also suggests that for every dollar increase in the household's net worth, the household increases its consumption roughly by \$0.05 (Wilcox, 1991). Households with higher net non-housing assets therefore, may have less incentives to save.

*Age.* Holding other variables at their mean values, predicted saving increases with age. Consistent with several empirical studies (Mirerm 1979, 1980; Juster, 1982), this finding suggests that the level of saving among the elderly did not move downward as predicted by the life-cycle saving hypothesis.

Booming stock and real estate market during the 1980s were the major reasons for the elderly to accumulate large amount of wealth during that period (Dortch, 1994). Dortch's study indicated that many elderly householders sold their homes in the 1980s at a tremendous gain because of high inflation in home value. During the 1980s, householders aged 75 and older had the greatest net worth in stock and mutual fund shares of any age group. Younger households, on the other hand, were likely to borrow against the equity in their homes in order to generate income (Dortch, 1994).

This study excluded housing wealth in the measure of saving but still found a positive effect of age on saving. It is possible that the elderly are reluctant to borrow out of their "home equity" account, even during retirement. Bequest motives, longer life expectancy, coupled with concern about unexpected medical expenses may also explain saving behavior of these older households.

*Windfalls and Inheritance.* Holding other variables constant, for every dollar of windfalls received, household saving was increased by \$0.87. This finding suggests that between 1983 and 1986, instead of consuming out of this transitory income, the household saved a large fraction and only consumed a small fraction of the windfalls received. This result is consistent with the rational expectation permanent income hypothesis which suggests that a consumer's propensity to consume out of regular income is higher than that of transitory income (Friedman, 1957). In other words, transitory components of income have smaller effect on consumption than that of permanent components of income (Friedman, 1968). Therefore, most windfalls (a typical source of transitory income) will not be consumed but saved.

An alternative explanation for the effect of windfalls found in this study could be based on mental accounting. According to behavioral life-cycle hypothesis (Shefrin & Thaler, 1988), people tend to consume from income and leave the perceived "wealth" alone. The larger is a windfall, the more wealth-like it becomes, and the more likely it will be saved. Since \$0.87 out of one dollar windfall income was saved by the consumers, it is plausible that the majority of households who received windfalls between 1983 and 1986 considered the windfall as an asset income and thus saved a large portion of it.

All other things being equal, respondents who expected to receive inheritance accumulated \$31,251 more than those who did not. No information is available regarding whether these respondents actually received the inheritance or not. The result may suggest that those who expected to receive inheritance and actually receive it saved most of that inheritance. The effect of inheritance receipts on household saving behavior may, therefore, be similar to that of windfalls.

### Implications

*Implications for Financial Planners, Counselors, and Educators*  
*Effective Financial Planning.* Asset accumulation (saving) is a major mechanism for a household to achieve its financial goals. Dissaving may be rational at some point in the life cycle. Most consumers, however, are unable to meet their goals because of continued dissaving or overspending. One household can increase its non-housing assets by spending less of current income, paying off debts, or investing successfully in portfolio. Financial planners and counselors

should take each client's income pattern, household composition, along with information on the balance sheet into account to help their clients plan for saving through the most effective practice.

Forty percent of U.S. households had a decrease in non-housing wealth during 1983 and 1986. This study found that younger and lower income households were more likely to experience such wealth decreases during the period than the older and higher income ones. Indeed overspending is common for the young households who may temporarily have lower income and expect a substantial income increase in the future. Although borrowing may be a rational means for these households to maximize utility from consumption (Fan, Chang, & Hanna, 1992), most households are unable to meet their financial goals because of this continued dissaving. Furthermore, families should be aware that even in times of increasing prosperity, a substantial decrease in income is possible even for the young and highly educated individuals (Chang & Lindamood, 1993). Financial planners and counselors should advise the young and lower income households to build emergency reserves and to help them plan for life-cycle saving and optimal asset allocation.

*Risk Tolerance.* The results showed that those with a high level of risk tolerance accumulated more non-housing wealth than those with low risk tolerance. It is possible that those who state that they have a high risk tolerance focus on the short-term fluctuations of the stock market and similar investments with a high average real rate of return. Those who state that they have a low risk tolerance may tend to invest in lower-return, long-term investments. Whether a financial planner or counselor should simply accept a client's statement of risk tolerance or try to educate the client on the consequences of caution is open to debate, but the results of this study provide additional evidence that low risk tolerance results in lower accumulation of assets.

*Prime Candidates for Financial Planning and Financial Service Industry.* Older households, high-income households, and households who received windfall income or anticipated to receive inheritance saved significantly more than their counterparts. Because of their high saving levels, such households would be prime candidates for financial planning services. Financial services industry can also target its marketing and service efforts on these groups of households.

*Implications for Future Research*



## SAVING BEHAVIOR OF U.S. HOUSEHOLDS

The 1989 wave of SCF consists of 1,803 overlapping panel sample and 2,000 new independent cross-section sample (Kennickell, 1991). Additional insights on household saving behavior over time could be obtained by extending this analysis with the 1989 SCF panel sample. Future research should investigate effects of income uncertainty and expectation of future income on household saving behavior. It would be also useful to examine changes in asset/liability allocation over time as they link to changes in household demographic and economic characteristics as well as external market performance.

### Endnotes

1. The SCF surveyed households in 1983, then reinterviewed the households in 1986 and 1989. However, adjustment made for missing values for the 1989 wave of survey involves the use of multiple imputed values for financial items to allow for nonresponse. The SCF used five imputed variables for each of the missing variables, so five complete data sets were created. Special problems of imputations were further induced by the mixture of panel and cross-section data. The complexity of the analysis has delayed presentation of the 1989 panel data in research publications (Kennickell, 1991).
2. The actual responses given by respondents may contain missing or inconsistent information due to respondents' misunderstanding, lack of knowledge, or unwillingness to answer certain questions. These problems make analysis of raw data difficult and may bias conclusion. A series of consistency checks and imputation procedures was developed at the Federal Reserve Board to clean the raw data and to estimate values for the missing data (Avery & Elliehausen, 1987). The cleaned and imputed data file has been checked for coding and other errors and will provide more usable observations than the raw data file. Therefore, this study uses the cleaned and imputed data file in the empirical analysis.

For the sample to be representative for national population, a full sample 1983 composite weight is used. This weight is equal to the non-reponse adjustment factor weight times the 1983 post-stratification weight and is the recommended weight to use with the full area probability sample (Avery & Elliehausen, 1987). All of the analysis reported in this study using the entire 1983 area probability sample is done using this weight.

The 1986 SCF had constructed a pair of weights for the 1986 sample, one to represent the 1983 population of which the 1986 sample is a sub-sample, and one weight to represent the 1986 population. For the purpose of this study which involves individual-household changes in wealth, the SRC cross-section composite weight post-stratified by 1983 population counts is used in the analysis.

3. Since numbers of observations in savers and dissavers groups are unequal, a SAS PROC GLM with LSMEANS statement was used. An example of statistical procedures is listed as follows.  
PROC GLM; CLASS saver; MODEL income=saver; LSMEANS saver /TDIFF;

WEIGHT wt8386;  
 where saver=1 if non-housing asset accumulation between 1983 and 1986 was positive, and =0 otherwise; the weight variable, wt8386, is c1007 in the 1986 SCF.

4. Statistical procedures for multivariate analysis are listed as follows.  
 PROC REG; MODEL saving=age education income network ...;  
 /SELECTION=STEPWISE SLENTRY=0.15 SLSTAY=0.05; WEIGHT wt8386;  
 where saving is a continuous variable.

#### APPENDIX

##### Variables that could have entered the stepwise regression

Variables	Definition
Age in '83 and Age squared	continuous
Net non-housing assets in '83	continuous
Net non-housing assets in '83 x Age	continuous
Net non-housing assets in '83 <sup>2</sup> x Age	continuous
Net non-housing assets in '83 x Age <sup>2</sup>	continuous
Household size in '83	continuous
Change in household size b/w '83 & '86	continuous
Education of	6 dummy variables indicating different levels schooling
Ethnicity	4 dummy variables indicating white, black, Hispanic, or other races
Poor health	dummy variable, 1=yes, 0=no
Occupation	9 dummy variables indicating professional, manager, self-employed, sales, craftsman, laborers, farmer, arm force, or no occupation.
Had private health insurance	dummy variable, 1=yes, 0=no
Risk taking	1=respondent take substantial or above average risk to earn substantial or above average returns, 0=else.
Number of earners in '83	continuous
Change in number of earners b/w '83 & '86	continuous
Pension Coverage (continuous)	gross value of pension coverage
Social Security Coverage (continuous)	amount of social security coverage
Job Status in '83	6 dummy variables indicating working full time, working part time, being laid off, unemployed, retired, or not working at all.
Expect to retire in 3 years (asked in '83)	dummy variable, 1=yes, 0=no
Expect to receive inheritance in 3 years (83)	dummy variable, 1=yes, 0=no
Expect to return to work if not worked full time (asked in '83)	dummy variable, 1=yes, 0=no
Owned home in 1983	dummy variable, 1=yes, 0=no
Amount of windfall received during '83 and '86 and windfall squared	continuous
Marital Status in 1983 respondent's	6 dummy variables indicating the marital status in 1983 was married, divorced, separated male, separated female, widowed, never married
or	

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Marital Status Change between '83 & '86 in	5 dummy variables indicating had a spouse '83 but no spouse in '86, stayed married in both periods, had different spouses in both periods, no spouse in '83 but had a spouse '86, or stayed single in both periods.
Income and Income squared its	Total 1982 & 1983 Household Income and squared term (continuous)

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### References

- Avery, R. B. & Elliehausen, G. E. (1987). *1983 Survey of Consumer Finance: Technical Manual and Codebook*. Board of Governors of the Federal Reserve System.
- Avery, R. B. & Kennickell, A. B. (1988). *1986 Survey of Consumer Finance: Technical Manual and Codebook*. Board of Governors of the Federal Reserve System.
- Avery, R. B. & Kennickell, A. B. (1991). Household saving in the U.S. *Review of Income and Wealth*, 37(4), 409-30.
- Bae, M., Hanna, S. & Lindamood, S. (1993). Patterns of overspending in U.S. households. *Financial Counseling and Planning*, 4, 11-30.
- Bosworth, B., Burtless, G., & Sabelhaus, J. (1991). The decline in saving: evidence from household surveys. In William C. Brainard & George L. Perry (eds.) *Brookings Papers on Economic Activity*, 183-241. Washington, D.C.: Brookings Institution.
- Campbell, J. Y. (1987, November). Does saving anticipate declining labor income? An alternative test of the permanent income hypothesis. *Econometrica*, 55(6), 1249-1273.
- Chang, Y. R., & Lindamood, S. (1993). Factors related to risk of household income variability. *Financial Planning and Counseling*, 4, 47-66.
- Chang, Y.R. & Hanna, S. (1994). Factors related to household expected real income growth. *Proceedings of the Eastern Regional Family Economics Resource Management Association*, 118-130.
- Dortch, S. (1994, April). The gold in grandma's house. *American Demographics*, 9-10.
- Fan, X.J., Chang, Y.R. & Hanna, S. (1992). "Optimal Credit Use With Uncertain Income," *Financial Counseling and Planning*, 3, 125-132.
- Feldstein, M. (1974). Social security, induced retirement, and aggregate capital accumulation. *Journal of Political Economy*, 82(5). 905-926.
- Fisher, M. R. (1956). Exploration in savings behaviour. *Bulletin of Oxford University Institute of Statistics*, 18(3), 201-277.

- Foster, A.C. (1981). Wives earnings as a factor in family net worth accumulation. *Monthly Labor Review*, 104(1), 53-57.
- Friedman, M. (1957). *A Theory of Consumption Function*, London: Oxford University Press.
- Friedman, M. (1968). Theory and analysis of consumption and saving function, in Arnold Zellner (ed.) *Readings in Economic Statistics and Econometrics*, 236-253. Boston, MA: Little, Brown and Company.
- Hefferan, C. (1982). Determinants and patterns of family saving. *Home Economics Research Journal*, 11(1), 47-55.
- Hubbard, R. G. (1986). Pension wealth and individual saving. *Money, Credit, and Banking*, 18(2), 167-178.
- Kennickell, A. B. (1991). Imputation of the 1989 Survey of Consumer Finances: stochastic relaxation and multiple imputation. *Proceedings of the Section on Survey Research Methods*. American Statistical Association, 1-9.
- Leimer, D. R. & Lesnog, S. D. (1982). Social security and private saving: new time-series evidence. *Journal of Political Economy*, 90, 606-629.
- Maddala, G. S. (1992). *Introduction to Econometrics*. New York, NY: MacMillan Publishing Company.
- Mason, A.W. (1975). *An Empirical Analysis of Life Cycle Saving, Income and Household Size*. Unpublished doctoral dissertation, University of Michigan, Ann Arbor.
- Mirer, T. W. (1979). The wealth-age relation among the aged. *American Economic Review*, 69, 435-443.
- Modigliani, F. & Brumberg R.E. (1954). Utility analysis and the consumption function. In K. Kurihara (ed.), *Post-Keynesian Economics*, New Brunswick: Rutgers University Press.
- Mullis, R. J. (1984). *The Dynamics of Household Saving Behavior*, Unpublished doctoral dissertation, University of Missouri-Columbia.
- Neter, J., Wasserman, W. & Kutner, M. H. (1989). *Applied Linear Regression Models*, Homewood, IL: Richard D. Irwin, Inc.
- Sen, A. & Srivastava, M. (1990). *Regression Analysis: Theory, Methods and Applications*. New York: Springer-Verlag.
- Shefrin, H. M. & Thaler, R. H (1988). The behavioral life-cycle hypothesis, *Economic Inquiry*, 26, 609-643.
- Shorrocks, A.F. (1975). The wealth-age relationship: a cross-section and cohort analysis. *Review of Economics and Statistics*, 155-163.
- Short, Kathleen Strunck (1984). *The Life Cycle Theory, Uncertainty, and the Saving Behavior of the Elderly*. Unpublished doctoral dissertation, The University of Michigan.

## SAVING BEHAVIOR OF U.S. HOUSEHOLDS

- Solmon, L. C. (1975). The relation between schooling and savings behavior: an example of the indirect effects of education. In F. Thoman Juster (ed.), *Education, Income, and Human Behavior*. New York: McGraw-Hill Book Company, 253-293.
- Skinner, J. (1990). Precautionary saving, wealth accumulation, and the saving downturn of the 1980s. *National Tax Journal*, 43, 247-57.
- Sturm, P. H. (1983). Determinants of saving: theory and evidence. *OECD Economic Studies*, 1, 147-196.
- Wilcox, D. W. (1991, January). Household spending and saving: measurement, trends, and analysis, *Federal Reserve Bulletin*, 77(1), 1-17.
- Xiao, J. J. & Olson, (1992). Mental accounting and saving behavior, in (ed.) *Proceedings of the 38th Annual Conference of American Council on Consumer Interests*, 139-142. Columbia, MO: ACCI.