Factors Related to the Risk of Household Income Variability

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Patterns of household income instability were analyzed using panel data from the 1983 and 1986 Surveys of Consumer Finance. The dataset included annual incomes for households for the years 1983 through 1985. Almost two-thirds (64.8%) of households had increases in real income between the first two years and the second two years, but households with heads who were poorly educated, older, self-employed, or who changed from being married to unmarried were at high risk of a substantial drop in real income. Young households had a 25% chance of an income increase of 50% or more.

KEY WORDS: income variability, financial planning, risk

Financial planning advice is often based on the implicit assumption that household income is either constant or increasing at a modest real growth rate until retirement¹. A steady income is not certain, however. Although many people may assume that job skills and training will prevent a loss of income, unemployment is no longer limited to marginal workers (Coffee, 1992; Butterfield, 1990). Americans are more vulnerable to cuts than in the past (**The Wall Street Journal**, 1993). "Even if you have been with a company for 15 or 20 years, and even if you are in a senior or professional position, there is no guarantee that you are going to have a job. Your income is not secure, and you have to be prepared to deal with that." (Asinof 1991).

A salient feature of the United States market economy is that many households are at risk of income fluctuations. Many factors can contribute to income reduction, including a voluntary decision to leave the labor force, illness and changes in the economy. These causes can be classified as either internal to the household, such as loss of work caused by illness or accident, or external, such as a layoff due to a downturn (Kinnucan, 1981). Fluctuations are also related to household

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demographic and financial characteristics (Fisher, 1956; Mirer 1974; Dardanoni, 1991).

As income is not constant, common financial advice, such as saving a constant percent of income or having a set amount of financial reserves, should be reconsidered. Such advice may cause some households to save too little, forcing a drastic change in lifestyle when faced with a lower income, while others may save too much, at the cost of present quality of life. The problem in tailoring advice regarding optimal level of saving is identifying which households are at risk of a downturn in income. While information is available about the risk of death for people of different ages, and the risks of theft, fire, and auto accidents, very little is available about the risk of household income decreases, except as measured by unemployment rates.

Knowledge of income patterns and reasons for variability in income are important for financial planners and counselors, as well as for policymakers and researchers trying to evaluate the financial welfare of households. When, for example, a state law establishes that alimony and child support awards be based on the previous year's income, the amount of the award may not accurately reflect ability to pay in the future if there is substantial income variability. Generally, the amount of an alimony or child support award is fixed unless the court or administrative agency accepts a petition to reconsider the amount and agrees to modify the award due to a change of circumstances. It can be costly and time consuming to petition a court or agency, so if income changes are common, perhaps changes in procedures should be considered.

Despite the importance of understanding the risk of income variability for a variety of financial planning and public policy issues, few empirical studies have addressed the variability of household income. Without information on the factors related to income variability, it is not possible to develop the type of risk information that could be the basis for better advice.

The purpose of this study is to determine the risk of a decrease in income for different types of households by analyzing actual patterns of variability in incomes. The study examines the variability of household income by measuring the change in real income between two periods -- 1982-83 and 1984-85 -- for a national sample of 2,116 households. There is little research related to the variability of household income, and much of the research that has been published focuses on the employment status of

the husband in married couple households. This study investigates the relationship of household composition, demographic and economic characteristics and employment status to changes in income. The findings can help determine which types of households have the highest risk of income loss. The information will enable planners and counselors to better help households plan for potential financial hardships.

Review of Literature

Factors Related to Income Variability

Mirer (1974) lists three causes of income variability:

- 1) fluctuations in the economy and inflation;
- 2) real growth in family income-earning capacity; and
- 3) a host of economic phenomena of a chance or short-term nature -illness, unusual overtime, lay off or job shifting.

Research has shown a relationship between income growth and life cycle stage, human capital investment, socioeconomic factors and demographic characteristics. Poor families have low incomes and a high level of income variability (Mirer, 1974; Bensus, 1974). Self-employed people have a higher degree of income variability than those in other types of occupations (Fisher, 1956; Friedman, 1957; Klein & Liviatan, 1957; Bensus, 1974; Kinnucan, 1981). Managers and professionals have the most stable incomes. Income variability is high in both very young and very old households (Bensus 1974, Kinnucan 1981). Education level, ethnic background, and gender have little impact on income variability (Bensus, 1974).

Measures of Income Variability

There is no consistent or universal definition or measurement of income variability. Juster and Taylor (1975) used the unemployment rate to indicate income variability, with a higher unemployment rate indicating a higher degree of income variability. This method has a logical basis, as, in general, households have a greater chance of a reduction in income when unemployment is high. Other measures of income variability include variance of labor income (Dardanoni, 1991), standard deviation of the estimated permanent income (Mirer, 1974), and a coefficient of variation derived by dividing the standard deviation of transitory income by the average of permanent income (Friedman, 1957; Kinnucan, 1981).

Most measures of income variability do not give a complete picture of income variability, due to the influence of unobservable variables such as permanent and transitory income. Furthermore, most previous empirical

studies have focused on aggregate data or changes in the mean levels of samples drawn from household data. Although analysis of aggregate patterns and trends is convenient, it does not allow for conclusions about the impact of factors on specific households.

The Business Cycle and Income Variability

A major source of income variability is external, due to fluctuations in the economy. A historical review of income changes related to the business cycle, using the unemployment rate as an indicator of the business cycle, illustrates the relationship between household income and the economy. Figure 1 presents civilian unemployment rates and real median family income for the years 1978 to 1991. There is a negative correlation between the unemployment rate and real income (-0.87) for these years. The unemployment rate increased from 1979 to 1982 and from 1989 to 1992, but decreased from 1983 until 1989 (**Economic Report of the President**, 1993, p. 391). Median family income (in 1991 dollars) was only \$35,052 in 1982, but increased each year after that until 1989 (**Economic Report of the President**, 1993, p. 380). Between 1978 and 1991 the percent change in median family income from the previous year ranged from a low of -3.6% (1980) to a high of 3.8% (1986), with an average of 0.2%.

Macro-economic information such as shown in Figure 1 is useful in presenting overall trends associated with the business cycle. However, such information does not reveal much about income variability of households with different characteristics. Even in a year of increasing unemployment and decreasing real income, some households experience substantial income increases. In times of prosperity, some households experience substantial income decreases. Consideration of the percentage changes in real family income might lead one to conclude that families only have to prepare for income drops of 5% or so. Such a small income decrease could be accommodated by many households just by reducing flexible spending on clothing and durable goods. An examination of the distribution of different households' real income growth rate patterns between the two periods could provide more insight into the likelihood that households of various types would experience substantial increases or decreases in income.

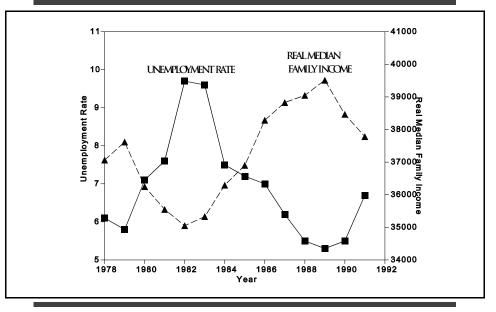
The Importance of This Study

Information about income growth rate patterns of various household groups would be useful for financial practitioners in giving financial advice to different types of families. For instance, the optimal amount of

emergency savings depends on the probability of a substantial income decrease (Hanna, Chang, Fan & Bae, 1993). It would be of interest to know which demographic groups of households tend to experience greater uncertainty of household income. However, factors of changing characteristics of households associated with income variability have been ignored by most empirical studies. In addition to demographic and economic variables identified by previous empirical research, this paper will examine the effect of changing employment status and household composition on household income changes. It is the purpose of this study to bring together new evidence relating to the phenomenon of household income variability.

Figure 1.

Civilian Unemployment Rate and Median Money Income of Families (in 1991 dollars), 1978-1991



Graph constructed by authors using data from Economic Report of the President (1993)

Methodology

Data

Data used in this study were drawn from a public use tape of financial data collected for the 1983 and 1986 Survey of Consumer Finances (SCF). Four years of income information were available -- 1982 through 1985. The surveys were conducted as a panel, so that the same households were interviewed in 1983 and 1986. The re-interview feature of the SCF allows for changes in each household's income patterns to be related to changes in that household's demographic and financial characteristics.

A unique aspect of the research presented in this article is the use of the household as the unit of analysis, rather than using aggregate analysis. Averaging together of data in aggregate analysis can obscure changes in individual households. Another advantage of this research is the use of panel data, which is superior to cross-sectional data, especially for research on changes in households over time.

Measurement and Definition of Variables

The Reference Person. Within each survey household the "economically dominant" (primary) family member was interviewed. This was the person who owned or rented the house, or provided the most income and was also the "most knowledgeable about family finances." Age, education, occupation and marital status changes reported are for the reference person.

Sample Selection. The sample used in this paper includes the national probability sample of households who were interviewed in both years. (A supplemental non-probability sample of high income households was not included for this analysis.) A sample of 2,116 households remained after deleting those who had incomplete or missing information. A subsample was also created excluding households who changed from being employed to retired (see discussion on page 54), resulting in a subsample of 2,008 households for the final analyses.

Income. The primary income concept used in this research is pre-tax total money income reported by the respondent². A unique feature of this study is the use of total household income. Previous studies have focused on the head's labor income only (e.g., Bensus, 1974; Grosse & Morgan, 1981; Dardanoni 1991). With the increasing importance of dual

earner households, income from sources other than the head's labor income may affect the degree of variability of total household income.

Adjustments to the Income Data. To adjust the reported income to constant dollar amounts, the income for each year was multiplied by the ratio of the 1986 Consumer Price Index (CPI) to that year's CPI. All growth rates reported are thus the real growth rates, and do not include the effect of inflation.

The distributions of year-to-year growth rates are reported in the preliminary results. However, one year may be too short of a time to reliably measure income for some households, as the timing of some income receipts may be arbitrary. To reduce the effect of year-to-year fluctuations, two new income variables were created which were based on the income from the first two years and the last two years. The incomes of 1982 and 1983 were added to represent total income for the first period (T_1) , and the incomes from 1984 and 1985 were added to represent total income for the second period (T_2) . The two income measures are:

 T_1 income = 1982 income + 1983 income T_2 income = 1984 income + 1985 income.

Real Income Growth Rate. Income variability was measured by the growth rate of income -- the percent of increase or decrease in income from one period to the next. The distribution of income growth rates for all households gives a simple measure of income variability. For instance, if 10% of the sample has an income drop of at least 49%, there is a fairly large income variability. Analysis of the distribution of income growth rates of households sharing a characteristic can provide more accurate estimates of income variability.

Real income growth rate was calculated for each year of income data and for the two periods, T_1 and T_2 . The growth rate between 1982 and 1983 is computed as follows:

The same formula is used to calculate the real income growth rate between 1983 and 1984 and between 1984 and 1985.

The two-period real income growth rate is computed as follows:

$$\frac{T_2 \& T_1}{T_1}$$

This measure of real income growth rate between 1982-1983 (T_1) and 1984-1985 (T_2) is used to compare income variability for different demographic groups.

To better represent national households, all figures reported in this study were weighted with appropriate weights³.

Results

Exclusion of Those Who Retired

This study focused on the *risk* of income variability. As retirement generally means a planned drop in income, those who were initially employed and then retired were excluded from the sample. Most of the households who changed from employed to retired had a decrease in real income between T_1 (1982-83) and T_2 (1984-85), while most households who either stayed employed or who stayed retired had increases in real income⁴. The final sample used for analysis consists of 2,008 households.

Year to Year Growth Rates

The median growth rate was relatively low for each year to year comparison, with -3% for 1982 to 1983, 5% for 1983 to 1984, and 7% for 1984 to 1985 (Table 1). There was, however, a wide variation in real income growth rates among households. Between 1982 and 1983, 25% of households had real increases of 18% or more, while 25% of the households had decreases in real income amounting to 23% or more. The top 10% of the households had real income decreases of 55% or more, while the lowest 10% had real income decreases of 49% or more.

Patterns for 1983 through 1985 were similar, although with higher real growth rates. It is likely some households were hurt by the recession in 1982, even though the unemployment rate had just started to decrease. Even though the period between 1983 and 1985 was one of increasing prosperity (Figure 1), almost 25% of the households had income decreases between 1983 and 1984 and almost 25% had decreases between 1985.

Period 1 to Period 2 Growth Rates

In order to reduce the effects of unusual income patterns in one year, and arbitrary timing of income receipts, all of the results below are for two periods: T_1 and T_2 . The median increase from T_1 to T_2 was 10% (Table 1). However, 25% of American households experienced real income decreases of 7% or more, and 10% of households had real income decreases of 30% or more. Even during times of prosperity, there is a risk of substantial income decrease, and there is also the possibility of substantial income increase. There was a 25% chance of an increase of 28% or more between T_1 and T_2 .

Table 1.

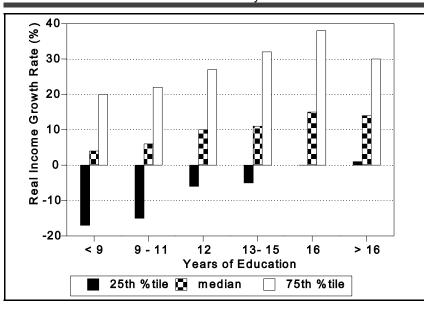
Percentile Distribution of Real Income Growth Rate for Time Period

Growth Rate at Percentile								
Real Income Growth Rates								
Between:	10th	25th <u>(media</u>	50th n)	75th	90th			
1982 & 1983	-49%	-23%	-3%	18%	55%			
1983 & 1984	-13%	0%	5%	17%	40%			
1984 & 1985	-13%	0%	7%	21%	54%			
T ₁ (1982-1983)								
& T ₂ (1984-1985)	-30%	-7%	10%	28%	63%			

Growth Rates by Education. Figure 2 presents the percentile distribution of income growth by years of education. The graph shows that 75% of those with 16 years of education had positive income growth, and over 75% of those with more than 16 years of education had positive income growth. Median real growth rate increased as years of education increased indicating that households with higher education tended to have higher real income increase than households with lower education levels.

The median growth rate of real income between T_1 and T_2 tended to increase with education, with a growth rate of only 4% for those with less than nine years of education, 6% for those with some high school, 10% for high school graduates, and 15% for college graduates (Table 2). The risk of any income drop was less than 25% for college educated reference persons but greater for less educated. The top 10% of households had income increases of 37% or more. However, the lowest 10% of

households for each educational level had income decreases of 16% or more.



Percentile Distribution of Income Growth by Years of Education

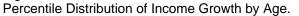
Growth Rates by Age. The percentile distribution of growth rates by age is shown in Figure 3 and Table 2. Over 75% of households aged 35 years or younger had income increases. Except for those aged 45 years and younger, 25% of households had income decreases of 11% or more. Households aged between 65 and 69 had the lowest real income growth rate among all age subgroups. However, only 25% of these households had more than an 18% decrease in real income.

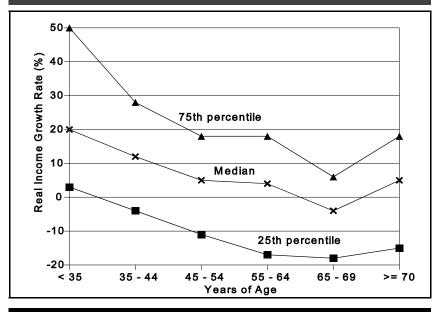
Detailed information on real income growth rates was also examined for combined education and age categories. The results suggest that young households (age < 35) with post college education had the highest income increase. Households aged 65 to 69 with some high school

Figure 2.

education experienced the greatest decline $^{\scriptscriptstyle 5}$ of real income between $\rm T_1$ and $\rm T_2.$

Figure 3.





Growth Rates by Income. Over half of the households had a positive income growth rate in each income level (Figure 4 and Table 2). Median real income growth rates did not vary much for households with different income levels. The range was between 8% and 11%. However, for the top 25% of households in each income category, an inverse relationship between the real income growth rate and average income level in T₁ was found except for the highest average income level. The growth rate decreased from 46% at an income level less than \$10,000 to 20% at an income level between \$75,000 and \$99,999, but increased to 25% of the households had negative real income growth of 4% or more.

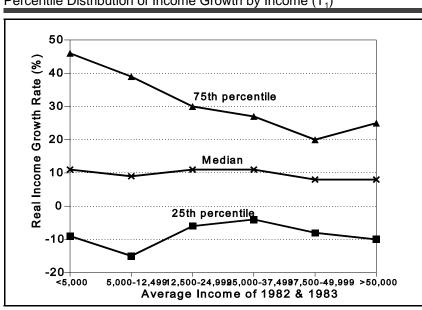
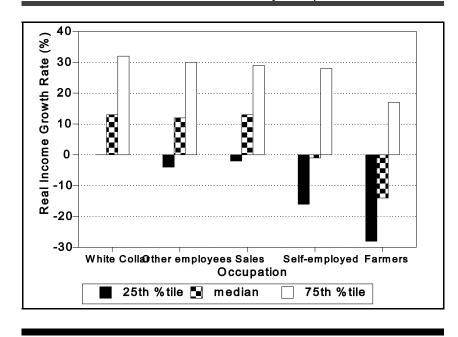


Figure 4.

Percentile Distribution of Income Growth by Income (T_1)

Growth Rates by Occupation. The occupation group "Professional/Manager" (listed as "White Collar" in Figure 5) had the highest growth rate in household income while farmers had the lowest income growth rate among five occupation groups (Figure 5 and Table 2). The magnitude of the growth rates is similar for white collar and blue collar ("other employee") workers. More than half of farmers and self-employed households had income decreases of 2% or more. However, in each occupation group, the top 10% of the households had income increases of 62% or more in all occupational groups during the same period.

Figure 5. Percentile Distribution of Income Growth by Occupation.



Growth Rates by Marital Status Change. Respondents who changed from no spouse to having a spouse during the survey periods had a median increase in income of 63% (Figure 6 and Table 3). Respondents who lost a spouse(through divorce or death) during the survey periods experienced the greatest income decline, with a median of -11%. The size of income growth rates was similar for those who stayed married (either same spouse or different spouses) or single during the survey periods. The top 25% of each marital status category had positive income growth.

59

Table 2.

	Growth Rate at Percentile 10th 25th 50th 75th (median)								
Education									
< 9	-43%	-17%	4%	20%	37%				
			.,.						
9 - 11	-37%	-15%	6%	22%	52%				
5 11	01 /0	1070	070	2270	0270				
12	-26%	-6%	10%	27%	60%				
12	-2070	-078	1070	21 /0	00 /8				
13 - 15	-27%	-5%	11%	32%	80%				
16	-27 %	-3%	15%	38%	63%				
> 16	-24%	1%	14%	30%	70%				
Age									
< 35	-19%	3%	20%	50%	92%				
35 - 44	-24%	-4%	12%	28%	73%				
45 - 54	-32%	-11%	5%	18%	41%				
				18%					
55 - 64	-42%	-17%	4%	10%	40%				
CE CO	270/	4 0 0 /	40/	C 0/	070/				
65 - 69	-37%	-18%	-4%	6%	27%				
70 040/	4 5 0/	F 0/	4.00/	0.40/					
>= 70 -31%	-15%	5%	18%	34%					
Average Annual Income	in 1982-	1983 (T ₁)							
< 10,000	-41%	-9%	11%	46%	157%				
10,000 - 24,999	-35%	-15%	9%	39%	94%				
25,000 - 49,999	-26%	-6%	11%	30%	67%				
50,000 - 74,999	-21%	-4%	11%	27%	47%				
75,000 - 99,999	-31%	-8%	8%	20%	35%				
> 100,000	-36%	-10%	8%	25%	45%				
> 100,000	-30%	-10%	070	25%	45%				
Selected Occupations									
Professional & Manager	-19%	0%	13%	32%	62%				
Sales	-22%	-2%	13%	29%	75%				
Other employees(Crafts		-4%	12%	31%	61%				
Service, Laborer)	, 20/0	170	12/0	0170	0170				

Real Income Growth Rate between $T_1 \& T_2$ by Education, Age, Occupation, and Average Annual Income in T_1

Self-employed	-33%16%		-1%	28%	72%
Farmers	-50%	-28%	-14%	17%	76%

Table 3.				
Real Income Growth Rate between	$T_1 \& T_2 b$	y Marital	Status	Change

	Growth Rate at Percentile 10th 25th 50th 75th 90th (median)
Marital Status	
Spouse in 83, no spouse in 86	-55%-35%-11% 14% 36%
No spouse in 83, spouse in 86	-11% 19% 63%108%218%
Same spouse in 83 and 86	-26% -6% 10% 26% 50%
Different spouse in 83 and 86	-28% -4% 19% 38% 74%
Never married in 83 and 86	-31% -7% 10% 25% 62%



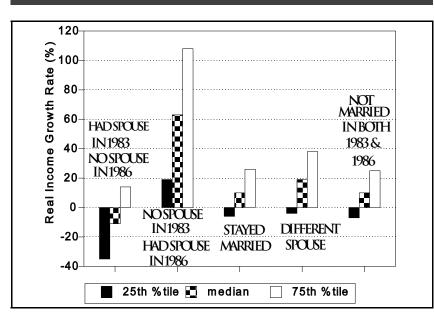


Figure 6. Percentile Distribution of Income Growth by Change in Marital Status

An analysis of the impact of marital status change on males compared to females showed that females who changed from being married to not married had a more severe decline in income than their male counterparts (Table 4). females who changed from being unmarried to married had greater gains in income than their male counterparts. There were relatively small differences between male and female households for those who did not change their marital status between the survey years. The results suggest that women had greater financial difficulties than men from divorce or death of spouse.

Table 4.

Distribution of Real Income Growth Rate between 1982-1983 and 1984-1985 by Change of Marital Status for Male and Female Respondents.

Growth Rate at Percentile

	Male			Female		
Marital Status	25th	50th	75th	25th	50th	75th
Spouse in 83, no spouse in 80	6-20%	5%	17%	-44%	-21%	9%
No spouse in 83, spouse in 86	615%	41%	74%	35%	78%	137%
Married in both 83 & 86	-6%	10%	25%	-6%	10%	28%
Different spouses in 83 & 86	10%	16%	28%	-27%	27%	69%
Not married in 83 & 86	-2%	11%	34%	-10%	8%	24%

Conclusions and Implications

Summary

This study shows that between 1982-1983 and 1984-1985, when the economy was expanding and the unemployment rate was decreasing, about 25% of U.S. households had real decrease in income across all demographic, occupational, and income groups except for households under 35 years old and those with a college degree. Over half of the households between age 65 and 69, and over half of the self-employed households and farm households had decreases in real income during the survey period. Groups with the greatest risk of reductions in real income included households over the age of 44, those with less than a 12th grade education, those who were farmers or otherwise self-employed, and those who lost their spouses because of divorce or death. In every group analyzed, there was at least a 10% chance of a decrease in real income. For almost all of the groups analyzed, there was a 10% chance of an income decrease of over 20%.

Groups with the highest increases in real income included households under the age of 35, households with a college degree, households with professional/manager jobs, respondents who had no spouse in 1983 and had a spouse in 1986. Twenty-five percent of those under 35 had an income increase of 50% or more. Of those who had an average annual income less than \$10,000 in 1983-84, 25% had an increase of 46% or more.

Being married had a greater positive financial impact on women than on men. Households with a female as the economically dominant member suffered more financially from losing their spouse than households with male as economically dominant member. Likewise, female households had higher real income increases than their male counterparts if they changed from being unmarried to married.

Implications for Financial Counselors

Families should be aware that even in times of increasing prosperity, a substantial decrease in income is possible. There may be a tendency for a family to assume that a short-term income increase will continue in the future, especially if there is overall economic optimism in the media. Financial counselors should help families understand that there is a risk of a substantial drop in income. Awareness of the risk of income decreases may help motivate families to build emergency funds or create some other plan for dealing with an income decrease.

The type of plan developed for a family to deal with a drop in income should reflect the risk of income loss, the goals and priorities of the family, and the number of alternatives that would be available to the family. Some families may be able and willing to rely upon home equity loans, gifts or loans from relatives, or increasing the hours worked by family members.

Building an emergency fund to cover six months of spending will make sense for some families at high risk of income decreases. However, an emergency fund typically has the cost of earning a zero or negative rate of return after inflation and taxes. One alternative to building a large emergency fund is keeping fixed expenses low, for instance, by not taking on large loan payments for cars or a house. Counselors and consumer educators should stress the importance of careful planning, as consumers may not be able to rely on lenders to keep their mortgage payments and other committments at manageable levels (Martin, 1993). Families currently renting should take the risk of income decrease into account in deciding whether to buy a home. A major benefit of renting is the ability to easily adjust housing costs to income.

Implications for Future Research

Researchers attempting to explain financial management behavior should consider the differences in risks faced by different types of households. Some households, especially younger ones, have the possibility of substantial increase in income. For such households, the temptation to use credit and to not build an emergency fund is understandable, even though there may also be a risk of an income decrease.

This study provides a starting point in the investigation of household income variability as applied to family financial management. Future research should include multivariate analyses of income changes. Further research should also investigate the effects of real income growth

rates on household financial practices, such as saving and borrowing decisions.

This study is based on an analysis of household income data from the first half of the longest peacetime expansion in U.S. history (**Economic Report of the President**, 1993, p. 57). It may therefore give a somewhat optimistic picture of the risks of income decreases. Future investigation using more recent data will be necessary to determine how different the patterns of income changes are when the economy is going into a recession.

Endnotes

- 1. The review of literature in this article is also used in the first author's dissertation (Chang, 1993).
- 2. Three cases in 1982, 10 cases in 1983, 4 cases in 1984, and 5 cases in 1985 had total household income less than zero. These cases were deleted in the analysis.
- 3. For the sample to be representative for national population, a full sample 1983 composite weight is used. This weight is equal to the non-response adjustment factor weight times the 1983 post-stratification weight and is the recommended weight to use with the full area probability sample (Avery and Elliehausan, 1987). All of the analysis reported in this study using the entire 1983 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 1986 cross-section composite weight post-stratified by 1983 population counts is used in the analysis.

4. Three categories of employment status were identified -- stayed employed, changed from employed to retired, and had retired during the survey periods. Table 1 presents the percentile distribution of real income growth rates by the three employment categories. The results show that over half of the households who changed from employed to retired between the survey periods had real income decreases of 6% or more. These households also had lowest income growth among the three employment status categories. On the other hand, over half of the households who either stayed employed or had retired during the survey periods had positive income growth. Households who stayed employed had the highest income growth among the three employment status categories.

Real Income Growth Rate between T₁ and T₂ by Job Status Percentile Distribution of Growth Rates for each Job Status

Job Status	10th 2	25th	50th	75th	90tł	n
Stayed Employed during Survey Periods	s -36%	6 -2	% 13	3% 3	31%	63%
Changed from Employed to Retired	-36%	6 -22	.% -6	5% [~]	12%	37%
Stayed retired	-36%	6 -15	% 2	2% [~]	16%	31%
	-					

Computed by authors based 1983 and 1986 Survey of Consumer Finances

5. The table is available from the first author upon request.

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