management decisions. Can enduring personal values help explain why the older women in this study spent significantly more on personal care that did their younger counterparts? Isn't a possible explanation that many women in the older age cohorts view a weekly trip to the beauty salon as a symbol of success?

There were indications in the study results that the wealth effect may have been more important than the income effect for some service expenditures. Unearned income was a significant predictor of all service expenditure categories, with the exception of child care. It was one of the few factors that significantly explained the decision to hire domestic services. This aspect needs more attention.

The statistical methods used in this study were multivariate and highly appropriate for the research question being asked and for the distributional nature of the data. In short, it is a study which was well done and which contributes to the body of knowledge.

Chern and Lee: "Complete Demand Systems of Nondurable Goods and Services"

This study asked a methodological question: Are subsample means for consumer expenditures adequate for estimating parameters in demand models? The expenditure survey data for nondurable goods and services was used in aggregated form to estimate two linear and a quadratic expenditure model.

At issue first is the validity of using summary statistics in a demand model. Will they provide the same elasticity estimates as does the underlying disaggregated data? I believe this issue must be addressed before a complete demand model, using aggregated data, can be evaluated. The authors state that they are doing a parallel study using the disaggregated data in order to evaluate the adequacy of aggregated data to give valid estimates. That study should have preceded this one. It is needed in order to evaluate this one.

The statistical model used in the study involved a relatively large demand system (8 categories of nondurable goods and services), with only 30 observation points for estimating parameters. The authors indicate that some demand models were inappropriate for this few number of data points, thus the linear and quadratic systems were selected for this study. I need further evidence that 30 observation points are enough for any demand model. Further justification for the procedures used is needed.

This study is evidence of another shortcoming of the BLS Consumer Expenditure Survey data: it does not provide price information. The question addressed in this study would not have been necessary if price information were available to complement the disaggregate expenditure data. But then, if price information had been available, these researchers would have had too many observations to handle, rather than too few!

INVESTOR PORTFOLIO ALLOCATION : THE DEMAND FOR RISK

Colleen F. Gannon and Robert O. Weagley, University of Missouri-Columbia[1]

Research examining the portfolio management of the individual investor with respect to risk is not only limited but outdated. Most research was conducted in the early 1970s before the deregulation of the financial industry. In addition, most research has studied narrowly defined samples of clients of brokerage firms. While risk is easy to define within the context of a brokerage account, most households' assets are held in a wider variety of investment vehicles than those products available from brokers ten or more years ago. Given this, an examination of the factors which are associated with households' demand for risk within their total portfolio of assets is the focus of this paper.

Review of Literature

The treatment of asset allocation by textbooks tends to identify the goals of the individual and to describe the universe of investment opportunities as a part of a broad scale approach to investment analysis. Some writers have narrowed the focus to the investment problems of the individual and family but have added little more than a description of the environment in which the investment process takes place (Smith 1974). Moreover, academic research is scant with much of it being an application of return-risk portfolio theory applied to narrowly defined portfolios of common stocks (Hirshleifer 1958, 1966; Levy 1976; Fishburn 1976).

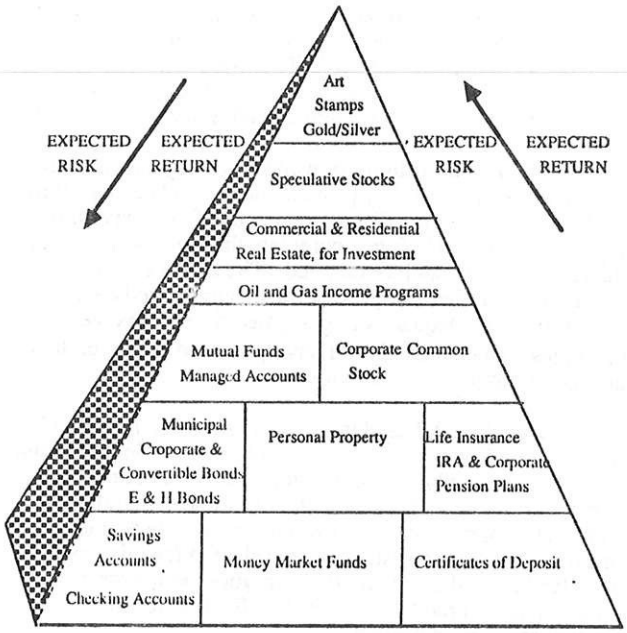
Decisions made by individuals can be classified into two distinct categories: those decisions which deal with current consumption and those in which current consumption is foregone in favor of investment toward greater future consumption. The well developed economic theory of consumer demand examines current consumption decisions and explains investment decisions through the theory of portfolio selection. A look at the empirical applications of portfolio theory reveals a primary focus on the allocation of investable wealth within a single category of investment assets -- common stocks. There has been little research that has focused on allocation of wealth on alternative asset categories such as savings accounts, bonds, real estate, commodities and business ventures.

Prescriptive Portfolio Management Theories

In working with their clients, many financial professionals utilize a model developed to illustrate the relationship between risk and return referred to as the pyramid of risk (Figure 1). The pyramid of risk helps the investor decide when and where to invest. The pyramid model is built on the idea that the investor should not progress to the second level of the pyramid until he/she has built a solid foundation of safe financial assets at the first level--insured savings deposits, treasury securities, money market accounts and an array of insurance coverage. These conservative investments represent the base of the pyramid. At each successive pyramid level, the degree of risk increases which brings about higher expected returns. Level two of the pyramid includes relatively low risk investments such as municipal, corporate and convertible bonds, personal property, IRA and corporate pension plans. Each successive level incorporates riskier assets including mutual funds, blue chip stocks, limited partnerships, and speculative stocks as well as non-financial investments such as collectibles, gold and silver, and precious gems. The pyramid of risk represents only one view of how portfolios of securities should be built according to risk and return criteria. It is important to recognize that the investor is not expected to demand assets at the higher levels of the pyramid until he has invested in assets of the lower levels of the pyramid. Given this, we would expect that riskier assets would make up a larger proportion of an investor's portfolio, the greater the wealth of the investor.

Figure 1

The Pyramid of Risk



Another method of asset allocation that differs from the pyramid of risk is to manage investment risk according to the investor's life-cycle. The concept differs from the way most experts illustrate asset allocation in that investors are encouraged to move betwen conservative and risky investments in seeking the balance that is best suited to their situation at each stage of their life-cycle (Figure 2).

The seven stages of investment developed by Bonnie Siverd is an example of this approach. Siverd takes the investor through the life-cycle and develops seven stages of investment that individuals should follow as they age. During these seven stages the investment priorities of the individual investors will rotate between safe, low return investments (stages one to three), to high risk, high growth investments during stages four and five when earned income peaks and then move to safer income oriented investments for the final stages.

The first stage of the investment process is primarily concerned with safety. At this point in time the individual is

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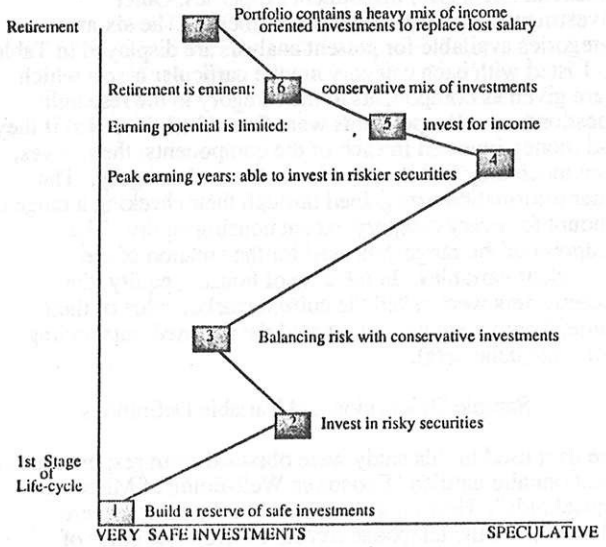
just starting out and an economic loss could be detrimental to the development of a secure financial base which affects future economic well-being. Early in the life-cycle, when earnings are at their lowest, the investor is less able to cover a substantial financial loss. This need for an emergency fund implies that all funds should be invested in relatively liquid and risk-free accounts until a substantial emergency fund is established. Following such establishment, the portfolio is ready to accept some risk.

Figure 2

The Seven Stages of Portfolio Investment



At the second stage of the investment process, the individual has already built an adequate emergency fund and is ready to make investment decisions involving risk. Providing for dependents is not likely at this stage, so risk should be more readily accepted. By now, it is assumed that the individual investor has developed a broad base of secure, liquid investments that will adequately meet any unforeseen financial crisis.

The third investment stage, is the stage of the life-cycle when most couples start their families and it is important for risk to be balanced with safety. Siverd recommends that investors should invest more in money market accounts, certificates of deposit, and other secure holdings to stabilize the number of risky investments already present in the portfolio.

The fourth investment stage is at a time when the investor is middle-aged with a steady stream of earned income, all children have been born, and the peak earning years for most workers has begun. The investor in the fourth stage should transfer securities to riskier investments such as blue chip stocks and stock mutual funds, because the higher income allows the investor to take on additional risk in the attempt to increase expected gains. If a loss occurs, it has less impact on the household's level of living because it is easier to replace the lost funds given the current earnings of the investor. In addition, a relatively safe portfolio of investments has been established to cushion the possible negative return on the risky investments. The investor will be investing in securities with the highest risk levels thus far.

In the fifth investment stage, the overall portfolio should shift to a more conservative mix that aims to protect assets for the investor's use in retirement. Here safety of principal becomes increasingly important since a loss will be more difficult to recover during the now relatively short earning horizon.

The sixth investment stage occurs late in the life cycle when retirement is eminent. The trend to a more conservative mix of investments should continue to take on even greater importance because of the reduced earning power of the household.

As the investor enters the seventh investment stage, he or she has reached retirement and the portfolio is prescribed to contain a heavy mix of income-oriented investments to provide retirement income. The investor should continue to keep some funds in holdings designed to increase in value as a hedge against inflation. These investments, although relatively conservative, are still more risk oriented than in the beginning of the investment process, but less risky than those held during the peak earning years.

Siverd's prescription for asset management recommends that households make their risk allocation in keeping with their stage in the life-cycle rather than by the amount of wealth they hold. As such, we would expect households to increase the proportion of their portfolio that is held in risky assets as they age, but at a rate that decreases as they age and eventually declines as retirement becomes eminent.

As implied by the pyramid model of asset allocation one would expect to find households to be allocating more of their wealth to the upper levels of the pyramid the greater their total amount of assets. However, life-cycle considerations may also affect such decisions as households would prefer more or less risk in their portfolio, depending on past investments, current earnings, and expected retirement. Risk in their portfolio should increase as they age until they reach an age where they recognize their limited time to earn income, retirement is eminent and they reduce the risk in their portfolio to preserve principal for their retirement years.

This study is an exploratory attempt to study the investment management practices of households in the context of these prescriptive management techniques with a broader definition of investments than merely their common stock portfolio. In addition, it will utilize an appropriate statistical technique to estimate the relationships between independent variables and a series of dependent variables defined as the relative proportion of total assets held in savings to various other investment categories. The research questions stated are: 1) Do households with greater wealth hold a greater proportion of their total portfolio of assets in riskier assets, as hypothesized by the pyramid of risk prescription of asset management? 2) Do households vary the proportion of total assets allocated to various risky assets as they age, as hypothesized by the life-cycle model of investment management? In addition, factors such as the presence of debt, total household income, the number of earners, the age of the youngest dependent, the retirement status of the household, and the respondents' perception of their control over their life as well as total assets and age will be controlled for to determine their effect on the allocation decisions of the household.

Empirical Model

The above imposes a constraint on the equations to be estimated that the sum of all proportional allocations sum to one. Given that all observations on the dependent variables can not be less than zero, nor greater than one, the sample is

truncated at both values. Given this, the multinomial logit model appears to offer an attractive compromise for estimating the system of equations.

The model can be described as follows. We start with a simple exponential function for the demand for a single asset. Let the price of an asset be $1 and the demand for the i^{th} asset be expressed as:

(1) $$Q_i = e^{f_i(x)} + u$$

Where

Q_i = is the quantity of investment category demanded
$f_i(x)$ = is a function of income, assets, debt, age, and household type for investment category i, and
u = error .

This function has the useful property that all predictions will always be greater than zero and the $f_i(x)$ may be made linear by taking the logarithm of each side:

(2) $$\ln(Q_i) = f_i(x) + u$$

Since adding up requires that the sum of all individual assets to equal total assets (A), we have:

(3)

$$\sum_{i=1}^{N} Q_i = A$$

If we made predictions from (1), we would find the estimated values to not satisfy (3) since the sum of the estimated values will not equal the measured total assets of the household due to the random error terms u.

This problem may be solved by defining the dependent variables to be the share of the portfolio of the household that is allocated to each investment category. The result of this is to have N equations:

(4)

$$W_i = \frac{Q_i}{A} = \frac{e^{f_i(x)+u}}{\sum_{j=1}^{N} e^{f_j(x)+u}} \quad i=1,\ldots N$$

which satisfies the adding property since

(5)

$$\sum_{i=1}^{N} W_i = \sum_{i=1}^{N} \frac{e^{f_i(x)+u}}{\sum_{j=1}^{N} e^{f_j(x)+u}} = 1$$

(6)[2] $$\ln(w_i/w_j) = (\beta_i - \beta_j) + (\beta_{i1} - \beta_{j1})\,ASSETS + \ldots$$
$$+ (\beta_{i10} - \beta_{j10})\,AGE + (u_i - u_j) .$$

[2]Since some asset categories may have a value of zero, some logarithms of ratios will be undefined. This was solved by adding the constant .0000001 to all calculated proportions.

The estimated β for assets will be equal to:

$$\hat{\beta} = \beta_{i1} - \beta_{j1}$$

Therefore, if $\hat{\beta}$ is significant and less than zero and assuming all asset categories

are normal goods, then $\beta_{j1} > \beta_{i1}$.

The i^{th} category was set to be the Savings category since it was expected to be the least risky investment category. Five equations will thus be estimated where the dependent variables will be the logarithm of the ratio of the proportion of total assets held in savings to the proportion of total assets held in each of the following N-1 categories: Housing Equity, Financial Securities, Investment Properties, Other Investments, and Retirement Investments. The six asset categories available for present analysis are displayed in Table 1. Listed with each category are the particular assets which were given as components to the category in the research questionnaire. Respondents were first asked (Yes/No) if they had money invested in each of the components; then, if yes, how much they had invested in each broad category. The latter information was gained through their checking a range of amount for every category except housing equity. The midpoint of the range was used for the creation of the dependent variables. In the case of housing equity, the homeowners were asked the current market value of their home, from which was subtracted the reported outstanding mortgage balance(s).

Sample Description and Variable Definitions

The data used in this study were obtained from responsees to a questionnaire entitled "Economic Well-Being of Missouri Households". Households included in the sample were selected from the telephone directories from the cities of Chillicothe, Trenton, Hannibal, Poplar Bluff, Quilin, Carthage, and Neosho. The total sample of 620 respondents is representative of the non-metropolitan areas of Missouri whose economies are based primarily on agriculture but have sufficient population to support a varied service sector. For the purposes of this study, 239 respondent households had sufficient information on their asset holdings for inclusion in the analysis. Appendix A contains the descriptive statistics for the variables used in the analysis. The model contains ten independent variables. They include:

1. Presence of Debt
   1=the household reported debt
   0=no debt was present
2. Total Household Assets
   1986 Dollars
3. Total Household Income
   1986 Dollars
4. Single Earner
   1=if retired
   0=if not
5. Dual Earner
   1=dual earner
   0=not dual earner
6. Age
   Average age in years of household head(s)
7. Age Squared
   Average age squared
8. Age of Youngest Dependent
   Years
9. Number of Dependents

10. How much control do you feel that you have over your life?
    1=no control
    2=very little
    3=some
    4=great deal
    5=complete control

Table 1: Investment Categories

Savings
- Savings Accounts
- Money Market Deposit Account
- Certificates of Deposit
- U.S. Treasury Notes
- U.S. Treasury Bills
- U.S. Savings Bonds

Housing Equity

Financial Securities
- Corporate Bond Mutual Fund
- Common Stock Mutual Fund
- Municipal Bond Mutual Fund
- Corporate Bonds
- Municipal Bonds
- Corporate Common Stock

Investment Properties
- Limited Partnership Investment
- Residential Rental Property
- Commercial Rental Property
- Agricultural Land
- Undeveloped Non-agricultural Land
- Recreational/Vacation Home

Other Investments
- Antiques
- Art Objects
- Gold and Silver
- Collector's Items

Retirement Investments
- Individual Retirement Account(s)
- Keogh Account
- Other Private Pension

Results

The five estimated equations are presented in Table 2. Each equation contains the same independent variables, which can be divided into two vectors. The first vector are the variables which were included as a measure of the pyramid of risk model of asset management, the Wealth Vector--Presence of Debt, Total Assets, Total Household Income, Single Earner Household, and Dual Earner Household.

The second vector were the variables which measured the position in the life-cycle and therefore were included to test the life-cycle model of portfolio management, the Life Cycle Vector--Age, Age Squared, Age of Youngest Dependent, Number of Dependents, and Control Over Life. The discussion will proceed by discussing each vector, and within each vector, each variable across all equations.

Of the variables in the wealth vector, the variable Presence of Debt had a negative, significant coefficient in three equations but was negative in all five equations. When the logarithm of the proportion of total assets held in Savings to the proportion held in Housing Equity is the dependent variable, Presence of Debt was significant at the .05 level. In the equation for Retirement Investments, the presence of debt was significant at the .01 level. Finally, when the logarithm of the

Table 2
Parameter Estimates

Independent Variables	Dependent Variables: The log of the ratio of the proportion of total assets held in savings to the proportion held in: Housing Equity	Retirement Investments	Financial Securities	Investment Properties	Other Investments
Total Assets	-0.0000062 (0.0000075)	-0.0000165** (0.0000065)	-0.000024*** (0.0000065)	-0.000023*** (0.0000060)	-.000025*** (.0000060)
Presence of Debt	-3.23227** (1.65018)	-3.38064** (1.42452)	-0.281798 (1.42827)	-1.170325 (1.38040)	-3.842178*** (1.33207)
Total Income	0.000016 (0.000027)	-0.0000230 (0.0000235)	-0.000010 (0.0000235)	-0.000011 (0.000023)	0.000011 (0.000022)
Single Earner	0.777699 (1.834263)	-1.928827 (1.583431)	0.765969 (1.587594)	1.624220 (1.534383)	1.487665 (1.480658)
Dual Earner	-0.3878686 (1.978557)	-2.707092 (1.707993)	0.914397 (1.712484)	1.009753 (1.655087)	2.487078 (1.597136)
Age	-0.79168*** (0.19967)	-0.495056*** (0.172363)	-0.54521*** (0.17282)	-0.406041*** (0.167024)	-0.246989 (0.161176)
Age Squared	0.00705*** (0.001886)	0.004634*** (0.001629)	0.005414*** (0.001633)	0.004420*** (0.001578)	0.002511* (0.001523)
Age of Youngest Dependent	-0.034108 (0.170368)	-0.103295 (0.147071)	-0.030441 (0.147458)	-0.119730 (0.142515)	0.089482 (0.137525)
Number of Dependent	-0.276156 (0.676143)	-0.194225 (0.583682)	-0.629328 (0.5852167	-0.053757 (0.565602)	-0.785326 (0.545798)
Control	1.955454** (0.646845)	0.596861 (0.558390)	1.009610 (0.559859)	1.376642*** (0.541094)	0.927131 (0.522148)
Intercept	13.722448	21.947756	17.640666	13.843391	13.973057

* significant at the .10 level
** significant at the .05 level
*** significant at the .01 level
Standard errors in parentheses

proportion of total assets held in Savings to the proportion held in Other Investments was the dependent variable, the presence of debt was significant at the .004 level. Given the negative coefficient for all five equations it appears that households do demand more risk in their portfolio if they have debt present in their portfolio[3].

These results indicate that the presence of debt significantly increases the proportion of assets allocated in the asset categories of Housing Equity, Retirement Investments and Other Investments relative to the proportion allocated to Savings. The aspect of Housing Equity and Other Investments as a consumption good may increase the likelihood of consumer credit use to complement the assets being held. The explanation given for the possibility that debt would increase the proportionate share of assets held in Retirement Investments, relative to Savings, can be explained by the fact that Savings would be the first investment category to be depleted to pay credit costs because of its liquidity. Retirement Investments are typically not as easily transferred into cash and at any point in time may have an expected rate of return that exceeds the cost of debt. This is particularly true given the penalties for early withdrawal that exist for retirement assets.

[3]An attempt to categorize the investment categories from less risk to greatest risk by comparing the coefficients on the asset variable was undertaken. One could tentatively rank the categories according to the magnitude of the asset coefficients. However, a test of the difference of the coefficients between equations revealed that they were not significantly different from each other.

The coefficient for the variable Total Assets was estimated to be negative in all five equations and significantly so in four of the equations. When the dependent variable was the logarithm of the proportion of total assets held in Savings to the proportion held in Retirement Investments, the Total Asset variable was significant at the .01 level. This indicates that as Total Assets increase, the proportion of a household's assets in Retirement Assets compared to Savings also increases. When Financial Securities is a component to the dependent variable, the Total Assets coefficient was negative and significant at the .0002 level. This indicates that as Total Assets increase, the logarithm of the proportion of total assets held in Savings to the proportion of total assets held in Financial Securities decreases. When the proportion of total assets used in Investment Properties was the denominator of the dependent variable, the Total Assets coefficient was significant and negative at the .0003 level. Finally, when the proportion of total assets held in Other Investments was the denominator of the dependent variable, the Total Assets coefficient was significant and negative at a .001 level. In total, these results support the contention that households do manage their assets, on average, by the principles underlying the pyramid of risk model of asset management -- that greater risk is demanded by households with greater wealth[4]. The remaining variables in the wealth vector -- total household income and dual earner household -- were not significant in any of the five equations.

The coefficients for the following variables in the life-cycle vector -- Age, Age Squared and Control -- were consistently estimated as theoretically expected and, generally, were statistically significant. The coefficients for the variables Age and Age Squared were estimated to have the direction of effect as expected and, therefore to support the life-cycle prescription of asset management. Age was significant and found to have a negative coefficient which was significant at a level of .01, or more, for every equation except that relating to the Other Investments category. When the proportion of total assets held in savings to the proportion held in Housing Equity was the dependent variable, Age was significant at .0001 level. This means that the proportion of assets invested in Housing Equity is greater relative to Savings, the older the age of the household. When Retirement Investments was a component of the dependent variable, Age was significant at the .004 level. As age increases, households, on average allocated a greater proportion of their total assets to Retirement Investments, relative to Savings. Investment in Financial Securities and Investment Properties, when components to the dependent variable, were also positively affected by age. This result, in conjunction with the previous results, indicates that as age increases, the proportion of a household's assets held in riskier asset categories also increases. The results support the hypothesis that the older the average age of the head(s) of household, the more concerned he/she becomes in meeting future retirement needs so categories other than savings are invested in. Age was not significant in the Other Investment category equation.

Age Squared was estimated to have a positive coefficient in the same four equations as Age and was also significant at a level of .01, or more. In addition, Age Squared was significant at the .10 level when the Other Investment category was a component to the dependent variable. Age Squared was significant at .0002 level when Housing Equity was a component to the dependent variable. This result indicates that as age increases, a larger proportion of the total asset portfolio is allotted to Housing Equity relative to Savings (as indicated by the Age variable results) but this occurs at a decreasing rate. Most households already purchase their residence by the time they reach the third or fourth stage of the life-cycle and much of their original mortgage debt may be repaid. Age Squared was also significant and positive for Financial Securities, Retirement Investments, and Investment Properties. In total, households demand more risk as they age but at a decreasing rate until they demand less risk when retirement is eminent.

The results for Age and Age Squared were taken and solved for the Age at which an additional year of age, on average, would begin to reduce the proportion of risk in a household's portfolio. As predicted by the life-cycle model of asset management, risk would begin to be reduced when the household reaches the fifth life-cycle investment stage. This stage is characterized by the nest beginning to empty and by the household realizing that the remaining time to save for retirement is relatively short. The age where the proportion allocated to risky assets begins to be reduced with an additional year of age was calculated to be 55 years for Housing Equity, 51 years for Retirement Assets, 54 years for Financial Securities, 48 years for Investment Properties, and 47 years for Other Investments.

The only other variable which was estimated to be significant to the allocation of assets to various asset categories is the variable Control. The variable was estimated to be positive in all equations and was significant in two. The variable was estimated to be significant in the equation where the dependent variable was the logarithm of the ratio of the proportion of total assets held in Savings relative to the proportion held in Housing Equity. The variable was significant at the .01 level . The Investment Properties category also found this coefficient to be significant at the .01 level. The result indicates that as households perceive greater control over life, the lower the proportion of assets will be held in Housing Equity and the Investment Properties category, relative to the proportion in Savings.[5] The variables Single Earner Household, Age of Youngest Dependent, and Number of Dependents were not found to be statistically significant.

Summary and Conclusions

The above empirical results support past researchers' results with more limited samples where it was found that households place a larger proportion of their assets in riskier assets the greater their level of wealth. This is consistent both with an average utility function, which appears to be risk averse, and with the prescriptive asset allocation pyramid of risk model. In addition, age or life-cycle factors also appear to temper a household's demand for riskiness in their portfolio as they pass through life. As they age, they take on increasing levels of risk but at a decreasing rate to a point where they begin to reduce the risk in their portfolio. At that point, they begin to realize that retirement is eminent and, hence, their inability to earn to replace funds that may be lost through risky investments dominates their investment strategy.

The multinomial logit model appears to perform relatively well in a situation where its properties are desirable. Admittedly, data limitations hampered the measurement of a wider range of portfolio attributes. The method appears to be

[4]This result may be questioned as the direction of effect is not clear. Perhaps, given the farm economy of 1986, those with real property simply perceived less control.

useful and could be applied to future studies in budget expenditure allocation studies as well as its continuing application in the study of asset allocation.

Implications for Future Research

Inherent limitations in the data source used for this study point to needed improvements that should be made in future analysis of investor portfolio allocation and the demand for risk. First, it would be preferred to have actual values of the amount invested in each category component, as well as each category, to construct more accurate and varied groupings for analysis. This study focused on the financial management practices of the household and thus sought general information on their asset and debt values. The private nature of this information, coupled with a mail questionnaire, created a problem of missing values in the analysis. To alleviate this problem, research, in the future, may include private interviews with the head of household to obtain the needed data. Secondly, there should also be a greater focus on the household's perception of risk in relation to the demand for risk. Thirdly, a larger sample size is needed for research of this nature.

Further limitations resulted from the sampling design used for the study. The sample for this study was taken from non-metropolitan communities in Missouri. Future research efforts should compare metropolitan with non-metropolitan households using the similar models to determine if differences in asset allocation exist between markets.

APPENDIX

Appendix A
Mean Values for all Variables

	Mean Value	Standard Deviation
LNRATHEQ (log of the ratio of savings to housing equity)	-1.56317	9.15798
LNRATRET (log of the ratio of savings to retirement investments)	7.11227	7.97277
LNRATFIN (log of the ratio of savings to financial securities)	6.13493	8.24417
LNRATINV (log of the ratio of savings to investment properties)	8.54254	7.77897
LNRATOTH (log of the ratio of savings to other investments)	8.70238	7.42454
Presence of Debt (1 if yes, O if not)	0.65975	0.47478
Single Earner (1 if yes, 0 if not)	0.30290	0.46047
Dual Earner (1 if dual earner, 0 if not)	0.40249	0.49142
Age of Youngest Dependent (years)	1.88174	4.11368
Number of Dependents	0.90871	1.11802
Control (1, no control; 5 complete control)	3.52720	0.89718
Age (average age in years of household head(s))	48.86929	17.44839
Age Squared	2691.39108	1883.39883
Total Assets (1986 dollars)	72,209	100,223
Total Income (1986 dollars)	28,144	27,418

REFERENCES

Cohn, Richard A, et al. (1975). "Individual Investor Risk Aversion and Investment Portfolio Composition." Journal of Finance. 30 (May 1975): 605-622.

Curley, Anthony J. (1969). "A Stochastic Simulation of the Personal Investment Decision." Journal of Finance. 24(Sept. 1969): 723-724.

Fishburn, Peter C. and Porter R. Burr (1976). "Optimal Portfolios with One Safe and One Risky Asset: Effects of Changes in Rate of Return and Risk." Management Science. 22(June 1976): 1064-1073.

Hirshleifer, J. (1958). "On the Theory of Optimal Investment Decision." Journal of Political Economy. 66(August 1958): 329-352.

Lease, Ronald C.; Leuellen, Wilbur G.; and Schlarbaum, Gary G. (1974). "The Individual Investor: Attributes and Attitudes." Journal of Finance. (May 1974): 413-438.

Levy, Haim (1976). "Multi-Period Consumption Decision Under Conditions of Uncertainty." Management Science. 22(July 1976): 1250-1267.

Levy, Haim (1973). "The Demand for Assets Under Conditions of Risk." Journal of Finance. 28(March 1973): 79-96.

Siverd, Bonnie (1986). "The Seven Stages of a Woman's Portfolio." Working Woman. (November 1986): 50-55.

Smith, J.P. and Ward, M.P. (1980). "Asset Accumulation and Family Size." Demography. 17(Fall 1980): 243-260.

Smith, Keith V. (1974). "The Major Asset Mix Problem of the Individual Investor." Journal of Contemporary Business. 3(Winter 1974): 52-58.

Tyrell, Tim and Tim Mount. "An Application of the Multinomial Logit Model to the Allocation of Budgets in the U.S. Consumer Expenditure Survey for 1972." Dept. of Agricultural Economics, Cornell University, working paper #78-20.

Uhler, R.S. and J.G. Cragg (1971). "The Structure of the Asset Portfolios of Households." Review of Economic Studies. 38(July 1971): 341-356.

TO OWN, TO RENT, OR TO RENT-TO-OWN: RENT TO OWN CONTRACTS REVISITED

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Studies of rent-to-own contracts have not taken account of various costs faced by the rent-to-own dealer, such as maintenance and repair, depreciation, service, and opportunity costs. Omission of these costs have biased upward the estimates of implicit interest rates on rent-to-own contracts. An economic model is developed which explicitly recognizes dealer costs in rent-to-own contracts. Empirical implementation of the model results in lower rent-to-own interest rates, yet still higher than typical usry ceilings.

TO OWN, TO RENT, OR TO RENT-TO-OWN: RENT-TO-OWN CONTRACTS REVISITED.

Rent-to-own contracts are a common form of contractual arrangement for many types of durable goods, such as television sets, washers and dryers, pianos, and furniture. Under rent-to-own contracts, the consumer is under no obligation to make payments for a given length of time [that is, the contract can be terminated at any time upon return of the product], yet if payments are made through a certain term, the consumer receives ownership of the product. Furthermore, unlike a strict purchase arrangement, while payments are made on the rent-to-own contract the dealer usually agrees to maintain and repair the product.[2]

Rent-to-own contracts have been criticized for their allegedly high interest rates implicit in the payment stream. For example, in comparing the retail price of the product offered by the dealer to the stream of payments on the rent-to-own contract, the North Carolina Attorney General's office has calculated APRs ranging from 70 percent to over 300 percent on TVs and appliances [4]. In a sample of rent-to-own contracts from Atlanta stores, Swagler [5] found estimated APRs ranging from 117 percent to 168 percent. In most states rent-to-own contracts are exempt from usury ceilings.

A flaw in the previous studies of rent-to-own contracts is that the studies have not considered the complexities of rent-to-own contracts, that is, the contracts are part rental contract and part purchase contract. Calculation of APRs has been done as if rent-to-own payments are pure purchase payments. The purpose of this paper is to examine the complex economics of rent-to-own contracts and use the resulting conclusions to calculate implicit interest rates on a sample of rent-to-own contracts. An attempt is also made to explain the variation in implicit interest rates between dealers.

The Economics of Rent-to-Own Contracts

Consider first the derivation of a pure rental payment (RENT) for a consumer durable good. For the owner-dealer of the durable good to willingly rent the good in period i, the rental payment, $RENT_i$, must equal or exceed four component costs [3, pp. 513-514]. The first cost is depreciation of the good in period i, measured by the product of the depreciation rate in i (d_i) and the cash value of the good at the beginning of the period, P. The second cost is maintenance and repair costs of the good, which the owner-dealer pays for, and which is measured by the product of the maintenance rate in period i (m_i) and the cash value of the good. Third are the costs of servicing the contract (collecting and processing payments), which we assume are unrelated to the cash value of the good. Servicing costs in period i are thus represented simply by s_{ri}. The last cost is the opportunity cost of having the cash value, P, committed to the good rather than in an investment earning the current interest rate. This periodic cost is $(r_i)x(P)$, where r_i includes a risk component equal to the same level of risk associated with the alternative use of \$P in the form of renting the durable good. Thus the minimum required rent payment in period i is:

$$(1)\quad RENT_i = d_i \times P + m_i \times P + r_i \times P + s_{ri}.$$

For simplicity, assume d_i and m_i are constant fractions of P, and that s_{ri} and r_i are constant over all periods. Also, for simplicity, only consider simple interest earnings for the opportunity cost. Then we can simplify (1) to:

$$(2)\quad RENT_i = d \times P + m \times P + r \times P + s_r.$$

The derivation of ownership payments is much simpler than the derivation of rental payments. If the owner-dealer of the durable good sells the good to the consumer, and if the consumer makes periodic payments for a total of n periods, then each periodic payment, BUY_i, is:

$$(3)\quad BUY_i = P * A(r) + s_o$$

where A(r) is the annuity constant,

$$[A(r) = \frac{r}{1-(1+r)^{-n}}],$$ r is the interest rate including a risk component, n is the number of payment periods, and s_o is the cost of servicing the purchase contract.

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[2] However, warranties can provide the same service for purchase arrangements.

In formulating the minimum payment required on a rent-to-own contract, consider the costs faced by the dealer-owner. Since dealers promise to maintain and repair the good with a rent-to-own contract, dealers incur the periodic cost m x P. Dealer-owners absorb depreciation costs, d x P, if the consumer doesn't complete the rent-to-own contract and returns the product. Let p_r be the probability that the consumer returns the product taken out with the rent-to-own contract. Then the dealer faces expected depreciation costs equal to p_r x d x P. Assume contract servicing costs are the same whether the consumer rents or buys the product; thus $s_r = s_o = s$, so servicing costs on the rent-to-own contract are s per period. Finally, the dealer-owner faces an opportunity cost of r•P per period if the consumer doesn't complete the rent-to-own contract and returns the product, or the dealer-owner would charge P x A(r) per period if the consumer completed payments and bought the product. The expected cost of this component is p_r x r x P + $(1-p_r)$ x P x A(r). Total rent-to-own costs (RTO) per period are thus:

$$(4)\quad RTO = m \times P + p_r \times d \times P + s + p_r \times r \times P + (1-p_r) \times P \times A(r).$$

Given values for RTO, m, P, p_r, d, s, and n, an iterative procedure can be used to find the implicit interest rate, r, which satisfies equation (4). This can be done both net of servicing costs (e.g., subtract s from gross RTO payments) and including servicing costs in RTO payments, as is typically the case with loan payments.

Empirical Results

Information on eleven rent-to-own contracts, seven for TVs and five for washers, are used in the analysis. The contract data are given in Table 1. The data were collected from rent-to-own dealers in Raleigh, North Carolina, during the summer of 1987. Values are given for P, RTO, and n. The stated purchase price, P, is the cost to the consumer of purchasing the product outright.

In calculating the implicit interest rate, r, estimates must be assumed for the parameters m, p_r, d, and s. Estimates for the parameters are taken directly from the rent-to-own industry. If this presents a bias it should be toward over-estimating industry expenses and under-estimating implicit interest rates. In other words, in estimating the implicit interest rates, the benefit of the doubt is given to the rent-to-own industry. The industry estimates for the parameters are: maintenance and repair costs (m) equal to 10 percent of revenues; depreciation rate (d) of 2.75 percent per month (implying a life expectancy of only 3 years); servicing costs (s) of 4 percent of revenues; and a probability of renting and returning the product (p_r) equal to .80 [5]. The probability rate of .80 is also estimated by the National Social Science and Law Center [2].

Table 1. Rent-to-own contract data.

Product	Purchase Price (P)	Rent-to-own Payment (RTO)	No. of Pymnts for Purchase (n)
20" TV	$385	$62.00	10
20" TV	499	45.95	18
19" TV	535	52.49	18
19" TV	340	43.96	13
20" TV	479	48.09	12
19" TV	325	21.95	18
19" TV	399	39.00	18
Washer	380	45.95	14
Washer	460	57.74	18
Washer	369	45.00	18
Washer	468	51.96	13
Washer	375	55.00	15

Source: Survey

There are two ways to use the parameters estimates m and s in calculating monthly maintenance and repair costs and service costs. One way is to multiply m and s by the monthly rent-to-own payment. The second way is to multiply m and s by the price of outright purchase (P), with the result equalling yearly maintenance/repair and service costs, and then divide by 12 to produce monthly maintenance/repair and service costs. Both methods are used.

Table 2 presents calculations for r using both estimates of maintenance/repair and service costs, and also both including and excluding service costs from RTO payments. Implicit interest rates are similar for all methods of calculation. In all cases but one the rates are above 60 percent annually, but the estimates are generally below Swagler's calculations.

Table 2. Estimated implicit interest rates on Rent-to-Own contracts.

	(A)		
Product	RTO	NETRTO	R
20" TV	$62.00	$44.85	127%
20" TV	45.95	28.54	61
19" TV	52.49	33.37	68
19" TV	43.96	30.33	98
20" TV	48.09	30.82	63
19" TV	21.95	11.73	33
19" TV	39.00	24.76	67
Washer	45.95	31.16	90
Washer	57.74	39.54	94
Washer	45.00	30.58	90
Washer	51.96	34.41	78
Washer	55.00	39.05	114

- - - - - - (B) - - - - -

	RTO	NETRTO	R
20" TV	$62.00	$47.33	136%
20" TV	45.95	30.38	66
19" TV	52.49	35.47	73
19" TV	43.96	32.08	104
20" TV	48.09	32.74	69
19" TV	21.95	12.61	37
19" TV	39.00	26.22	73
Washer	45.95	33.00	96
Washer	57.74	41.85	100
Washer	45.00	32.38	96
Washer	51.96	36.49	83
Washer	55.00	41.25	122

- - - - - - (C) - - - - -

Product	RTO	NETRTO	R
20" TV	$62.00	$49.30	143%
20" TV	45.95	29.48	64
19" TV	52.49	34.84	71
19" TV	43.96	32.74	107
20" TV	48.09	32.28	67
19" TV	21.95	11.23	31
19" TV	39.00	25.83	71
Washer	45.95	33.41	98
Washer	57.74	41.44	102
Washer	45.00	32.07	98
Washer	51.96	36.55	83
Washer	55.00	42.63	126

- - - - - - (D) - - - - -

Product	RTO	NETRTO	R
20" TV	$62.00	$50.45	144%
20" TV	45.95	30.98	67
19" TV	52.49	36.44	75
19" TV	43.96	33.76	111
20" TV	48.09	33.72	71
19" TV	21.95	12.20	35
19" TV	39.00	27.03	75
Washer	45.95	34.55	101
Washer	57.74	43.94	106
Washer	45.00	33.93	101
Washer	51.96	37.95	88
Washer	55.00	43.75	130

(A) r calculated using NETRTO = RTO - $m * RTO - p_r * d * P - s * RTO$

(B) r calculated using NETRTO = RTO - $m * RTO - p_r * d * P$

(C) r calculated using NETRTO = RTO - $m * P - p_r * d * P - s * P$

(D) r calculated using NETRTO = RTO - $m * P - p_r * d * P$

Another question which can be asked is how large the sum of maintenance/repair, depreciation, and servicing costs would have to be for the implicit interest rate to be comparable to other borrowing rates, say 18 or 24 percent. This can be derived from equation (4) by setting r equal to 18 or 24 percent. The results are in Table 3. Costs would have to be between 60 and 82 percent of RTO payments for the implicit interest rate to be 18 percent, and between 55 and 79 percent of RTO payments for the implicit interest rate to be 24 percent.

Table 3. Percentage of RTO payment attributed to maintenance/repair, depreciation, and service costs necessary for r to be 18% or 24%.

- - r = 18% - -

Product	RTO	Cost %
20" TV	$62.00	79.1%
20" TV	45.95	73.1
19" TV	52.49	74.8
19" TV	43.96	77.5
20" TV	48.09	69.8
19" TV	21.95	63.3
19" TV	39.00	74.7
Washer	45.95	76.9
Washer	57.74	80.3
Washer	45.00	79.7
Washer	51.96	73.9
Washer	55.00	81.6

- - r = 24% - -

Product	RTO	Cost %
20" TV	$62.00	76.2%
20" TV	45.95	68.1
19" TV	52.49	70.1
19" TV	43.96	74.0
20" TV	48.09	65.2
19" TV	21.95	56.6
19" TV	39.00	70.0
Washer	45.95	73.1
Washer	57.74	76.6
Washer	45.00	75.9
Washer	51.96	69.8
Washer	55.00	78.5

Explaining the Variation in Implicit Interest Rates

The implicit interest rates reported in Table 2 display noticeable variation, especially for TVs. Can any insight be provided in addressing the reason or reasons for this variation?

One hypothesis is that the implicit interest rate varies inversely with the median income of the dealer's customers. Dealers will consider lower income customers to pose greater risks of default and will therefore charge such customers higher implicit interest rates.

To test this hypothesis, the implicit interest rates calculated in Table 2 are regressed on the median income of the tract in which the dealer of the product was located. Tract median income for 1987 was taken from National Planning Data Cor-

poration [1]. Tract median income is certainly a proxy for customer income, since there is no assurance that the tract area is the same as the dealer's market area. The regression analysis is done separately for TVs (7 cases) and washers (5 cases), and each product regression is done separately for the four different estimates of implicit interest rates in Table 2.

The regression results are shown in Table 4. In all four regressions for TVs the implicit interest rate is inversely and significantly related to tract median income. The parameter estimates indicate that every $1000 increase in tract median income is associated with between a 1 and 1.5 percentage point reduction in the implicit interest rate. In contrast, the implicit interest rate for washers is not statistically significantly related to tract median income. However, all but one of the washer rent-to-own dealers are located in the same tract.

Table 4. Relationship between implicit interest rate on rent-to-own contracts and tract median income (t-statistics in parentheses).

TVs (n=7)
Dependent variable: Implicit interest rate (R)

	Intercept	Tract Median Income ($1000)	R^2
R, Panel A, Table 2	98.787*** (5.437)	-1.155$^+$ (-1.646)	0.35
R, Panel B, Table 2	105.657*** (5.528)	-1.202$^+$ (-1.628)	0.35
R, Panel C, Table 2	108.566*** (5.011)	-1.364$^+$ (-1.629)	0.35
R, Panel D, Table 2	117.406*** (5.377)	-1.472$^+$ (-1.855)	0.41

Washers (n=5)
Dependent variable: Implicit interest rate (R)

	Intercept	Tract Median Income ($1000)	R^2
R, Panel A, Table 2	97.701*** (4.890)	-0.273 (-0.239)	0.02
R, Panel B, Table 2	104.182*** (4.813)	-0.291 (-0.234)	0.02
R, Panel C, Table 2	106.182*** (4.463)	-0.291 (-0.213)	0.01
R, Panel D, Table 2	111.107*** (4.740)	-0.359 (-0.267)	0.02

*** significant at .01 level, 2 tail test
$^+$ significant at .10 level, 1 tail test

Conclusions

An economic model was used to derive the rent-to-own payment required by a owner-dealer and the required implicit interest rate. The model explicitly accounted for maintenance and repair costs borne by the owner-dealer, expected depreciation costs, service costs, expected interest earnings opportunity costs, and expected required annuity payments. These costs have been omitted in previous studies of rent-to-own contracts, an omission which can be used to claim that previous estimates of interest rates implicitly charged on rent-to-own contracts are too high. In implementing the model, parameter estimates for the owner-dealer costs were taken from the rent-to-own industry. Such estimates likely biased estimates of the implicit interest rate downward.

Using a sample of rent-to-own contract data from dealers in Raleigh, North Carolina, implicit interest rates were estimated in the range of 33 percent to 144 percent, with most estimates above 60 percent. These estimates are considerably lower than similar estimates in other studies, but are still far above typical usury ceilings. For implicit interest rates to be 18 or 24 percent, it was estimated that dealer-owner costs as a percent of rent-to-own payments would have to be in the range of 55 to 82 percent. This range is far above industry estimates.

The results of this study therefore suggest that implicit interest rates on rent-to-own contracts, after accounting for dealer-own costs, are still higher than typical usury ceilings. Reasons for the size of rent-to-own implicit interest rates were explored in a regression analysis which related implicit interest rates to median income of the dealer's census tract. For TVs a statistically significant negative relationship was found between the implicit interest rate and median tract income. This empirical finding is consistent with a hypothesis that higher implicit interest rates are charged to low income consumers, who have a higher risk of default on the rent-to-own contract.

REFERENCES

National Planning Data Corporation (1987). Household Income Distribution, Wake Co., N.C.

National Social Science and Law Center (1987). "A Study of Applicance Rental Practices: Applicance Rentals and Purchases by Low-Income Consumers." Clearinghouse Review (April): 1515-1522.

Nicholson, Walter (1983). Intermediate Microeconomics and Its Application, 3rd edition, Chicago: The Dryden Press.

Thornburg, Lacy H., Attorney General, State of North Carolina (1987). "Statement on H 1108- Representative Hackney's Rent-to-Own Bill." July 9.

Swagler, Roger M. (1986). "Rent-to-Own Programs: Is Consumer Protection Adequate?" Proceedings of 32nd Annual Conference of ACCI, St. Louis, Missouri, April 9-12.

Winn, Ed. (1983). Testimony before the Committee on Banking, U.S. Senate, regarding Bill S11-52, July 18.

RISK AVERSION AND OPTIMAL INSURANCE DEDUCTIBLES

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Decisions about insurance deductibles are faced by consumers and government agencies for a variety of private insurance and government programs such as Medicare. If maximization of expected utility is a valid goal, deductibles for individual insurance policies should amount to at least three percent of a consumer's total wealth. Implications for consumer education and public policy are discussed, including the need to teach consumers to choose insurance policies with higher deductibles.

Consumers face many decisions involving risk (Jensen 1986), including health and safety decisions, choice of occupations, information search, and most financial management decisions. The most powerful normative model for decision making with uncertainty is the expected utility model (Schoemaker 1982). Some researchers claim that even when consumers are exposed to all of the information necessary to maximize expected utility in relatively simple problems, many consumers act irrationally and in an inconsistent manner (Kunreuther 1976, 1978; Machina 1987; Tversky and Kahneman 1987). Although the expected utility model, and even more general 'logic of choice' models may not "... provide an adequate foundation for a descriptive theory of decision making" (Tversky and Kahneman 1987, p.68), the expected utility model does provide a plausible basis for a normative model for consumer education and government policy.

Much has been written on the topic of the expected utility model and risky decisions, but much of the literature is too abstract for direct use in consumer education and public policy discussions (Arrow 1971) or, in the case of the standard geometrical exposition (Green 1978, p.228, Deaton and Muellbauer 1980, p.397), too vague to provide specific guidance. The lessons which can be provided by expected utility theory could improve the information presented in many personal finance books regarding consumer decision making under uncertainty. For instance, personal finance textbooks often give the correct advice that one can reduce insurance premiums by choosing higher deductibles on property and health insurance. However, it might be inferred from a typical personal finance textbook that one might as well pay for a low deductible insurance policy if one has enough money (Garman, Eckert and Forgue 1985, Richards, Cooper and Fraser, 1984, Rosefsky 1985, Wolf 1984). (Sylvia Porter (1976) is an exception, as she strongly advocates high deductibles.) Discussion in the popular media of such topics as car rental collision deductibles, service contracts and supplemental Medicare insurance typically reflects little of the insights suggested by expected utility theory.

In this paper, a set of plausible utility functions will be used to illustrate some implications of the expected utility model for insurance deductibles, assuming risk aversion. The implications for financial management have been suggested in the past. For instance, Arrow (1971, p.100) stated that "... for small amounts at risk, the utility function is approximately linear, and risk aversion disappears." Most people, however, probably have little idea how to determine what constitutes "small" amounts at risk. The unique feature of this paper is the relatively simple exposition combined with very specific conclusions.

THE EXPECTED UTILITY MODEL

The concept of expected utility provides an explanation as to why purchase of insurance might be rational (Schoemaker 1982). In general, the expected utility E is equal to the sum of the terms p_i times $U(W_i)$, where p_i is the probability of State of the World i, and W_i is the individual's wealth if that state of the world occurs. The sum of the probabilities must total one.

For the purposes of this article, it will be assumed that utility is a function of wealth, that utility always increases with wealth, but that the marginal utility of wealth decreases as wealth increases. It is plausible to assume that most gambling provides direct pleasure and is not investment oriented (Bailey, Olson and Wonnacott, 1980).

MAXIMIZING EXPECTED UTILITY

The optimization problem facing a consumer will be assumed to be maximize expected utility:

(1) $E = p_1*U(W_0-D-C) + \ldots + p_n*U(W_0-D-C) + (1-p_1-p_2\ldots-p_n)*U(W_0-C)$

The insurance premium equals:
(2) $C = p_1*(1 + M)*(L_1-D) + \ldots + p_n*(1+M)*(L_n-D)$.

p_j = Probability of event causing loss worth L_j dollars.

D = Deductible (assumed uniform.)
M = Load, or "markup".
The load = (1/[Loss Ratio]) - 1.
W_0 = Initial wealth level, before any loss or payment of insurance. For simplicity, it will initially be assumed that all wealth is liquid.

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For a particular utility function, one can simply plug in values of the probabilities, losses and load in Equation 1, and find the deductible level which maximizes expected utility by brute force calculations, by calculus, or by some numerical optimization technique. What utility function is plausible? For financial decisions, utility functions with constant relative risk aversion (Deaton and Muellbauer 1980) are more reasonable than other utility functions. The quadratic utility function has the obvious defect that it decreases with wealth after some point. The negative exponential utility function is used for its ease of use rather than its correspondence with economic theory (Deaton and Muellbauer 1980, p. 402.)

RELATIVE RISK AVERSION

Utility functions can be characterized in terms of relative risk aversion, which is the same as the wealth elasticity of the marginal utility of wealth (Friend and Blume 1975). Relative risk aversion can be plausibly assumed to be constant for any person over usual ranges of wealth. Kimball (1988) provided an intuitive illustration of the concept of relative risk aversion, appropriate for utility functions with constant relative risk aversion. One type of utility function with this property is:

$$(3)\quad U = A - W^{(1 - r)} / (1 - r)$$

A is some positive constant, r = relative risk aversion, and W = total wealth, including human capital. (For r = 1, the appropriate form is U = the natural logarithm of W.)

A modified version of Kimball's (1988) example is as follows: Assume that you must choose an occupation in a country with no social security system and no welfare, and that once you choose an occupation it will be impossible for you to obtain income from any other source. You have no assets of any kind. You may choose one of two occupations: A or B. Occupation A pays you a tax-free real income of $50,000 per year forever, while Occupation B involves a gamble. If you choose Occupation B, the government in effect flips a coin, and you will have a fifty percent chance of having a real income of $100,000 tax-free forever, and a fifty percent chance of some lower income I. What is the lowest value of I for which you would be indifferent between Occupation B and Occupation A? Table 1 shows how your answer corresponds to your level of relative risk aversion. (The assumption of constant relative risk aversion allows one to scale up or down all of the numbers in the example.)

Economists have estimated average values of relative risk aversion ranging from about one to over 10 (Kimball 1988). In the context of the expected utility model, relative risk aversion relates to the extra utility of increased consumption if the gamble pays off compared to the lost utility because of decreased utility if you lose the gamble. For instance, if you have a relative risk aversion level of 4, you value the gain of utility from increasing your consumption from $50,000 to $100,000 the same as the loss of utility from decreasing your income from $50,000 to $40,548 (Table 1). The average utility gained per dollar if you choose Occupation B and win is about 19 percent of the average utility lost per dollar if you lose. It seems plausible that most people in affluent countries have levels of relative risk aversion of at least one, but not much more than ten. Friend and Blume (1975) suggest that their analysis of 1962 Survey of Consumer Finance data implies an average level of relative risk aversion in excess of two, assuming investors were informed and rational.

TABLE 1. Kimball's Illustration of Relative Risk Aversion.

Risk Aversion	Lowest Value of I
0	0
1	25,000
2	33,333
3	37,796
4	40,548
5	42,380
6	43,665
7	44,603
8	45,312
9	45,861
10	46,299
20	48,209

Table 2 shows the optimal deductible as a percent of wealth, by relative risk aversion level of the consumer, and the markup or load percent of the insurance policy. The table is calculated for losses with probabilities of ten and one percent. Typical markups might be five to ten percent for large group health insurance policies and 50 percent for small group health insurance policies (Marquis and Phelps 1987). The largest Medigap insurer in the United States had a markup or load of 28 percent, and some large companies had markups of over 90 percent. (Dennon 1987). Garman and Forgue (1988) state that some medical insurance companies have loss ratios of 0.25, which implies a load of 3.0.

TABLE 2. Optimal Deductible as a Percent of Total Wealth, One Loss.

Single Loss, p = .1

	Relative Risk Aversion		
LOAD %	4	6	8
20	4.9%	3.3%	2.5%
30	7.0%	4.7%	3.6%
40	9.0%	6.0%	4.6%

Single Loss, p = .01

	Relative Risk Aversion		
LOAD %	4	6	8
20	4.5%	3.0%	2.3%
30	6.4%	4.3%	3.3%
40	8.1%	5.5%	4.2%

The average load for property and casualty stock companies for the years 1978-87 is 0.28 (Best 1988). Low deductible policies tend to have high markups because of high administrative costs, moral hazard, and adverse selection.

The risk of simultaneous losses changes the optimal deductible level for each insurance policy, although if the losses are independent, the changes are very small. Consider two independent losses, each with probabilities of P, and with a probability p^2 that both losses would occur in the relevant time period. The probability that only one loss would occur is 2*p*(1-p). Table 3 shows the results for p = 0.1, and for p = 0.01. Extension of the results to three independent losses produces similar results, suggesting that the optimal deductible levels shown in Table 3 are approximately valid for combinations of many possible losses.

In general, the lower the probability of a loss, the lower the optimal deductible, although the optimal amount essentially levels off for probabilities of less than 0.01. This somewhat counter-intuitive pattern is shown in Figure 1, for two independent losses with equal probabilities. This pattern results from the high relative size of the insurance premium for high probability losses, which result in losses in utility of magnitude similar to the expected reduction in utility from the possible loss.

These results give a sense of what Arrow (1971, p.100) meant by a "small" amount at risk when he implied that for small amounts at risk, people should act as if they were risk neutral.

TABLE 3. Optimal Deductible as a Percent of Total Wealth

Two Losses, p = .1

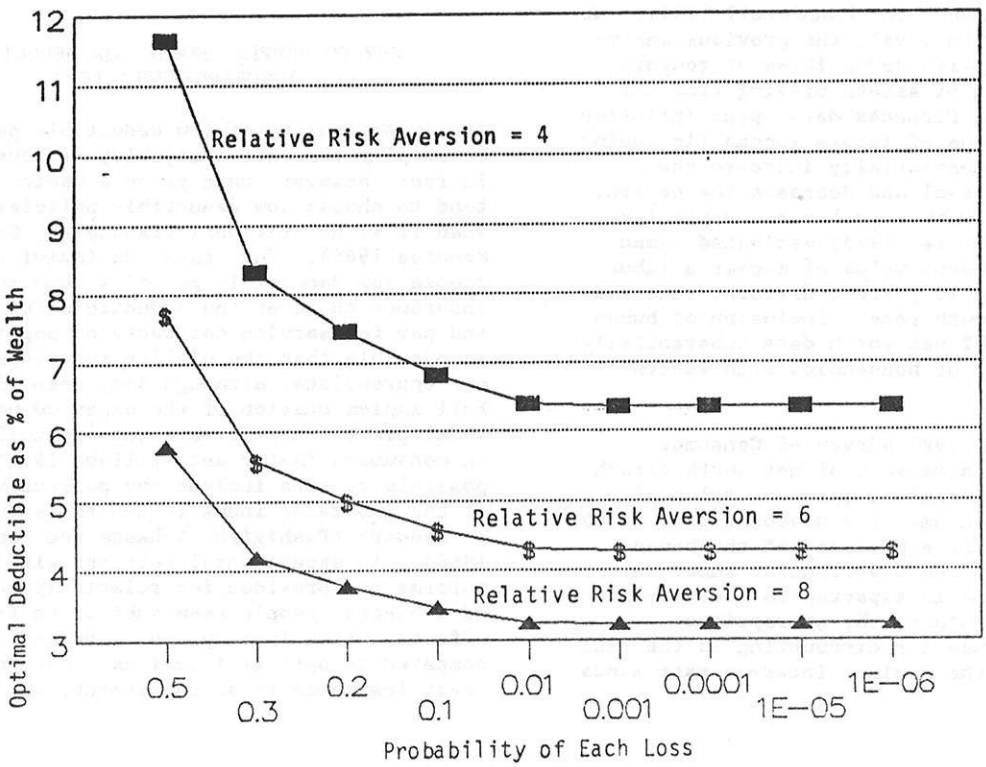
	Relative Risk Aversion		
LOAD %	4	6	8
20	4.8%	3.2%	2.4%
30	6.8%	4.6%	3.5%
40	8.7%	5.9%	4.4%

Two Losses, p = .01

	Relative Risk Aversion		
LOAD %	4	6	8
20	4.5%	3.0%	2.3%
30	6.4%	4.3%	3.2%
40	8.1%	5.5%	4.1%

If the maximum loss is less than three percent of total wealth, no private insurance sold to individuals is likely to be worthwhile. One should buy insurance only against losses which would amount to more than three percent of

FIGURE 1. Optimal Deductible as Percent of Initial Wealth, for Each of Two Independent Losses, Assuming Load = 30%, by Probability of Loss.



wealth. For some types of insurance, this is feasible because insurance companies allow the consumer to choose from a variety of deductible levels. If only zero deductible policies are offered, no insurance should be purchased unless the maximum loss is roughly twice the corresponding amount in Table 3.

The above analysis is extremely simplified, and the conclusion hinges on the definition of wealth. The definition of wealth becomes especially important if the possibility of a catastrophic loss is considered. For instance, using the previous example, but with initial wealth of $1,000, what is the maximum premium one should be willing to pay to avoid a one percent chance of a loss of $1,000 which would reduce one's wealth to zero? Given the simplifying assumptions, with zero wealth there would be zero income and presumably death would result. With a risk averse utility function, one might be willing to pay a substantial premium above the expected loss to insure against such a total loss.

In the real world of developed countries with social safety nets, such a scenario is not very likely. Almost anybody with enough money to pay for insurance premiums could manage to survive even if all financial assets dropped to zero. Many young adults set up households with essentially zero financial assets. Clearly, the present value of future income, including pensions, would be appropriate to include in a measure of wealth in some way.

Excluding cash (currency) on hand, the value of employer pension accounts, and tangible personal property other than autos and real estate, the median net worth of U.S. households was about $44,000 in 1986 (Avery and Kennickell 1989). At the median net worth level, the previous analysis is consistent with deductibles of roughly $1,300. Inclusion of assets missing from the Survey of Consumer Finances data, plus inclusion of the present value of future income (including pensions) would substantially increase the median net worth level and decrease the percentage of households with very low net worth levels. Friend and Blume (1975) estimated human capital as the present value of expected labor income, assuming a 10 percent discount rate and a four percent growth rate. Inclusion of human capital in the 1962 net worth data substantially reduced the number of households with wealth below $10,000.

An analysis of the 1983 Survey of Consumer Finance data with a measure of net worth (Prather 1987) and human capital (present value of annual household income at a discount rate of 15 percent for the life expectancy of the householder) results in the distribution shown in Table 4. If income is expected to increase with inflation in the future, the appropriate interest rate to use for discounting is the real interest rate -- the nominal interest rate minus

TABLE 4. Distribution of Net Worth, Human Capital and of Total Wealth, 1983.

Quintile	Net Worth	Human Capital @ 15 %	Wealth = Net Worth + Human Capital
20	660	53,290	56,910
40	7,513	99,960	114,570
60	33,428	158,360	182,750
80	87,042	240,410	306,170

the expected long run inflation rate. For instance, if one pays an interest rate of 20 percent per year on a credit card, and long run inflation is expected to be 5 percent per year, the real interest rate is 15 percent. For people with access to funds at a lower nominal rate than 20 percent (e.g., from own savings), use of a 15 percent discount rate to estimate human capital is very conservative. On the other hand, for a person with no access to legal credit, a 15 percent discount rate produces an overestimate of human capital. It seems plausible, however, that at least half of U. S. households could be considered to have total wealth of $100,000 or more. Use of the three percent rule suggested above would imply deductible levels of $3,000 or more.

For consumers with low levels of liquid assets but substantial property and/or human capital, use of credit may be a good alternative to cover losses not covered by insurance. The alternative of high deductibles and reliance on credit for emergencies may be rational if the load on the insurance is high. For consumers who cannot rely on credit for emergencies, or who do not want to, the traditional advice of building up levels of liquid assets is sensible.

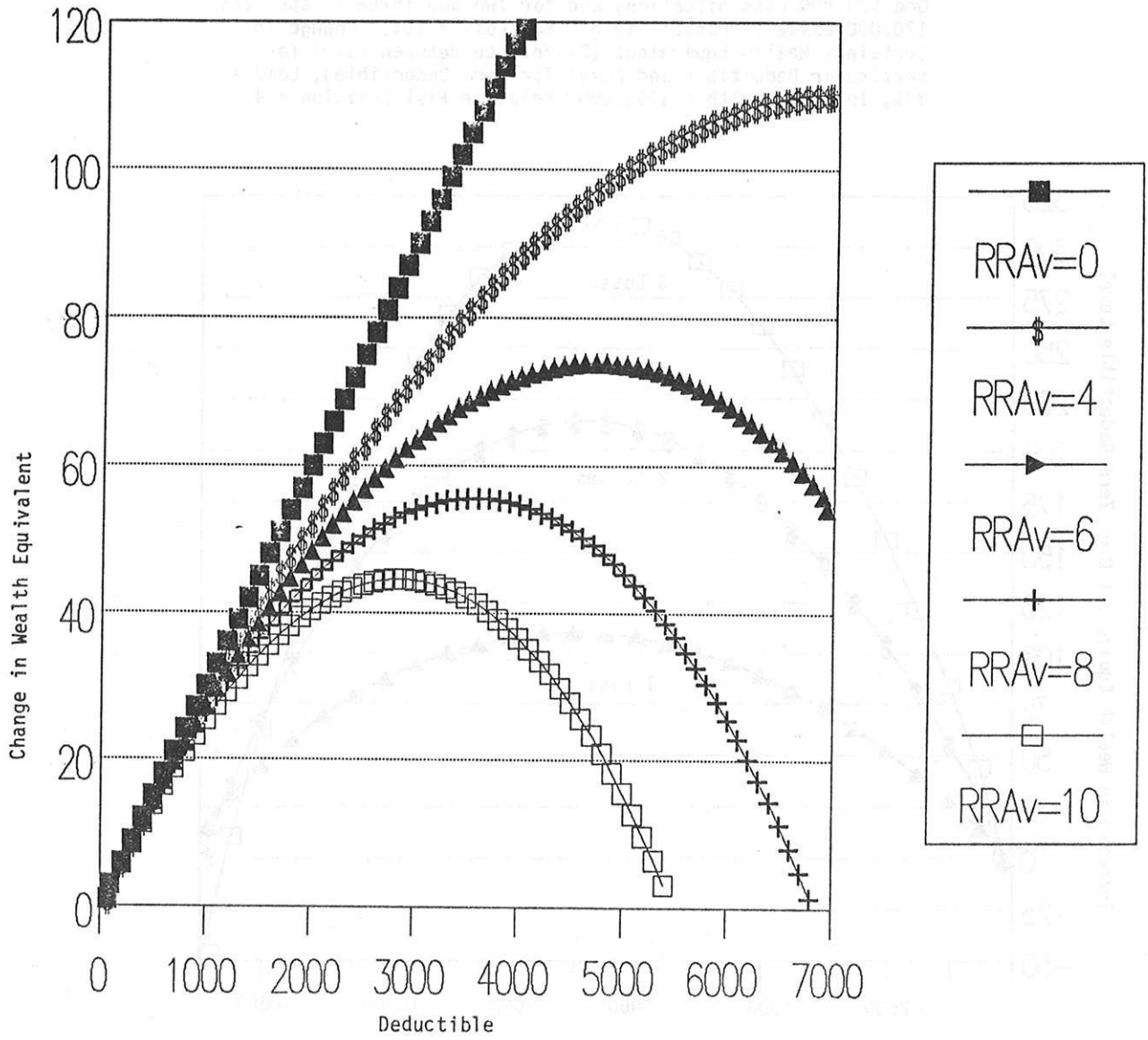
WHY DO PEOPLE CHOOSE LOW DEDUCTIBLE INSURANCE POLICIES?

The irrationality of low deductible policies seems plausible for a majority of households. In fact, however, when given a choice, people tend to choose low deductible policies, even when it is not rational (Pashigian, Schkade and Menefee 1966). Why, then, do individuals often choose low deductible policies, buy supplemental insurance to cover the deductible for Medicare, and pay for service contracts on appliances? It is possible that the utility functions used are not appropriate, although they seem plausible. Full implementation of the expected utility model places considerable intellectual burdens on consumers (Neter and Williams 1971). Other possible reasons include the persuasive efforts of the insurance industry and the requirements of lenders (Pashigian, Schkade and Menefee 1966). In experimental settings with full information provided for relatively sophisticated subjects, people seem subject to framing effects, which Tversky and Kahneman (1987) have compared to optical illusions. Many people may treat insurance as an investment, and prefer

likely returns on their premiums (Kunreuther 1976).

What is the cost to a consumer of making the wrong decision about the load? One might think that the load on the extra insurance would be an unnecessary cost, although that would be true only for risk neutral consumers. The value of insurance can be calculated by comparing the change in the certainty wealth equivalent of the consumer. The certainty wealth equivalent is the certain wealth which would produce the same utility as the expected utility of the uncertain situation. If expected utility E is based on the utility function U(W), then taking the inverse function of E will produce the certainty wealth equivalent. For instance, if utility is the square root of wealth, then the certainty wealth equivalent of the expected utility E is the square of E. Consider a medical insurance policy with a probability of loss 0.10, a load of 30%, and a consumer with initial wealth of $100,000. For a risk neutral consumer, for each $1,000 increase in the deductible, the monetary value of the increase in utility would be the load times the expected loss. For constant

FIGURE 2. Benefit of Increasing Deductibles Over Zero Deductible. Change in Certainty Wealth Equivalent (Difference Between Level for Particular Deductible and Level for Zero Deductible) for One Possible $20,000 Loss, Probability = 10%, Load = 30%, Initial Wealth = $100,000; for Risk Neutral (Relative Risk Aversion = 0) and for Risk Neutral Individuals, Relative Risk Aversion (RRAv) = 4, 6, 8, 10.

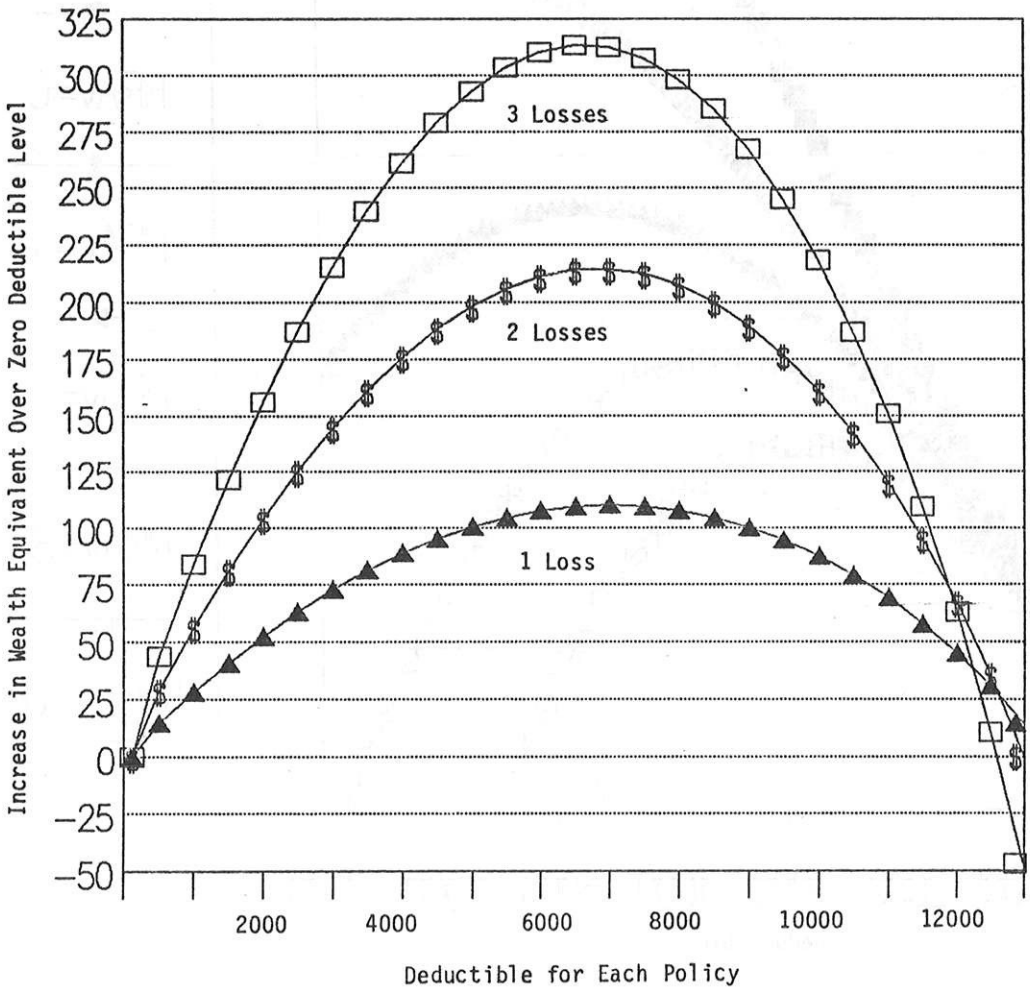


relative risk aversion utility functions, Figure 2 shows the increase in certainty wealth equivalent (compared to the level for a zero deductible) as the deductible increases. For a consumer with a relative risk aversion of four, the optimal deductible level of roughly $7,000 has a wealth equivalent $110 higher than the zero deductible level. This gives a rough idea of the value of education about insurance. Figure 3 shows increase in certainty wealth equivalent (compared to the level for a zero deductible) as the deductible increases from zero to $13,000, for a one loss situation, a two loss situation, and a three loss situation, for relative risk aversion of four.

IMPLICATIONS

Clearly, much more needs to be done to educate consumers on how to evaluate insurance. In addition to emphasis on comparison shopping for insurance, consumers need to consider insurance deductibles in the context of overall financial management. Financial education needs to stress that one of the benefits of maintaining liquid assets is reducing the need for low deductible levels for insurance policies. However, some evidence (Kunreuther 1976, 1978; Tversky and Kahneman 1987) suggests that there will be limits to how much consumer decision making abilities about risk can be improved by better education. Government agencies could play a role in helping consumers make better decisions.

FIGURE 3. Benefit of Increasing Deductibles Over Zero Deductible, for One $20,000 Loss Situation, and for Two and Three Independent $20,000 Losses, Probability of Each Loss = 10%. Change in Certainty Wealth Equivalent (Difference Between Level for Particular Deductible and Level for Zero Deductible), Load = 30%, Initial Wealth = $100,000, Relative Risk Aversion = 4.



For instance, if relatively high deductible auto insurance policies were required to be the standard policy presented, with lower deductible policies listed as extra cost, it is possible that this different way of framing the alternatives would make consumers more likely to make the optimal decision (Tversky and Kahneman 1987).

REFERENCES

Arrow, Kenneth J. (1971), Essays in the Theory of Risk-Bearing, Chicago: Markham Publishing Co.

Avery, Robert B. and Kennickell, Arthur B. (1989). "The Household Balance Sheet," Cornell Consumer Close-Ups, 1988-89:4.

Bailey, Martin J., Mancur Olson and Paul Wonnacott (1980), "The Marginal Utility of Income Does Not Increase: Borrowing, Lending, and Friedman-Savage Gambles," American Economic Review, 70 (No. 3; June): 372-379.

Best (A. M. Best Company) (1988). Best's Aggregates and Averages: Property-Casualty, 49th Annual Edition.

Deaton, Angus and John Muellbauer (1980), Economics and Consumer Behavior, New York: Cambridge University Press.

Dennon, A.R. (1987) "Are the Elderly Overinsured?", Consumers' Research, 70(3) (March) 16-19.

Friedman, Milton and Leonard J. Savage (1948), "The Utility Analysis of Choice Involving Risk," Journal of Political Economy, 56 (No. 4: August): 279-306.

Friend, Irwin and Marshall E. Blume (1975), "The Demand for Risky Assets," American Economic Review, 65 (Dec., no. 5):900-922.

Garman, E. Thomas, Sidney W. Eckert and Raymond E. Forgue (1985), Personal Finance, Boston: Houghton Mifflin Co.

Garman, E. Thomas and Forgue, Raymond E. (1988). Personal Finance, Boston: Houghton Mifflin Co.

Green, H. A. John (1978), Consumer Theory, New York: Academic Press, Inc.

Jensen, Helen (1986), "Household Risk Management and Human Resources," in Ruth E. Deacon and Wallace E. Huffman (eds.) Human Resources Research, 1887-1987, Iowa State University.

Kimball, M. S. (1988), "Farmers' Cooperatives as Behavior Toward Risk," American Economic Review, 78(1), 224-232.

Kunreuther, Howard (1976), "Limited Knowledge and Insurance Protection," Public Policy, 24 (No. 2; Spring): 227-61.

_____ (1978), Disaster Insurance Protection: Public Policy Lessons, New York: John Wiley & Sons.

Machina, Mark J. (1987), "Choice Under Uncertainty: Problems Solved and Unsolved," Journal of Economics Perspectives, 1 (No. 1; Summer): 121-155.

Marquis, M. Susan and Charles E. Phelps (1987), "Price Elasticity and Adverse Selection in the Demand for Supplementary Health Insurance," Economic Inquiry, 25 (No. 2; April): 299-313.

Neter, John and C. Arthur Williams Jr. (1971), "Acceptability of Three Normative Methods in Insurance Decision Making," Journal of Risk and Insurance, 38 (No. 3; September): 385-408.

Pashigian, B. Peter, Lawrence L. Schkade and George H. Menefee (1966), "The Selection of an Optimal Deductible for a Given Insurance Policy," Journal of Business, University of Chicago Press, 39 (No.1; January): 35-44.

Porter, Sylvia (1976), Sylvia Porter's Money Book, New York: Avon Books.

Prather, Carole (1987). Ratio Analysis of Personal Financial Statements: Household Norms, Ph.D., Kansas State University.

Richards, R. Malcolm, S. Kerry Cooper and Donald R. Fraser (1984), Personal Finance, Glenview, IL: Scott, Foreman and Co.

Rosefsky, Robert S. (1985), Personal Finance, New York: John Wiley and Sons.

Schoemaker, Paul J. H. (1982), "The Expected Utility Model: Its Variants, Purposes, Evidence and Limitations," Journal of Economic Literature, 20 (No. 2; June): 529-63.

Tversky, Amos and Daniel Kahneman (1987), "Rational choice and the Framing of Decisions," in Robin M. Hogarth and Melvin W. Reder (eds.), Rational Choice: The Contrast Between Economics and Psychology, Chicago: University of Chicago Press.

Wolf, Harold A. (1984), Personal Finance, Boston: Allyn and Bacon, Inc.

RISK, TIME PREFERENCE, AND INSURANCE

Discussion

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The three papers presented during this session take theory and/or its application one more step (a giant step in the case of at least one of the papers) in helping us understand decision making related to risk. Walden's paper addresses risk to a lesser degree than the others but certainly one motivation for using rent-to-own is the desire to avoid the risks associated with a credit purchase. Each of the papers also provides insights which can be applied in a prescriptive way to help consumers handle risk in a more rational manner. Walden and Gannon/-Weagley stop short of making explicit prescriptive remarks but readers will have no trouble translating the findings into advice for consumers.

INVESTOR PORTFOLIO ALLOCATION: THE DEMAND FOR RISK

This paper has broadened the application of portfolio theory beyond the traditional focus on common stock selection to the broad range of investment asset selection. Both the "pyramid of risk" framework and a life-cycle approach are applied and tested. The authors imply that most investment experts use the "pyramid of risk" when explaining and recommending investment decisions. A reader may be left with the question of whether experts do make predominant use of the pyramid model but the model does invite testing. A primary contribution of this paper is its inclusion of the life-cycle conceptualization. It was undoubtedly gratifying to the authors that the direct relationship between wealth and demand for risk implied by the pyramid model was not rejected but was enhanced by the inclusion of life cycle considerations. It was also interesting to this reader that the association of low levels of wealth with the selection of relatively low-risk investment vehicles fit well with Hanna's recommendation of choosing lower deductibles (hence lowered risk) when wealth is low.

An implication of the finding that demand for risk declines as retirement approaches is that this specialized reason for investing (to provide funds for retirement) affects the level of investment risk selected. One might wonder if other reasons or purposes for investing might affect the demand for risk. For example, the authors mention that investment entails foregone current consumption in favor of greater future consumption. One might ask, <u>whose</u> greater consumption. That is, might there be a different demand for risk if the investment funds are intended to serve as an estate to be passed on to heirs rather than for one's own future consumption.

It is a discussant's duty to react to perceived problems in a piece of work even when they are minor relative to the strengths as in the present case. One such concern is with the use of the term "weakly significant" to imply that a relationship was found but that it was not a strong one. Tests of statistical significance are used to guard against findings that are due to chance rather than to determine the strength of the relationship. It would be better to select an appropriate threshold level of significance (eg. $p<.05$) and/or report p values in order to determine if a relationship exists (or more accurately reject the hypothesis that one does not). Then in a separate consideration one should discuss the strength of the relationship that was found.

A second concern is with the proportion of usable returns upon which the findings are based. Not only is the 39 percent figure itself low but it raises questions concerning response bias and whether non-respondents were in some way different in their risk demand attributes than were respondents.

A third concern should not be construed as a weakness but rather as an implication of the approach taken in the study. This concern relates to the fact that the study was designed as a test of a model of demand for risk by observing behavior (or reported behavior) of investors. A broader question will need to be addressed in future research that the present study pioneers. That is, how much risk <u>should</u> investors demand. Obviously, should is a subjective term and thus is difficult to define. One criteria that might be used is whether an appropriate level of risk was selected to maximize the likelihood that the investment goal (eg. children's college) will be reached. Note the connection with the discussion above related to the effect of investment goals on demand for risk.

TO OWN, TO RENT, OR TO RENT-TO-OWN: RENT-TO-OWN CONTRACTS REVISITED

In discussing the second paper one cannot help being reminded of a tried and true response to criticism, "Walk a mile in my shoes." The rent-

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to-own industry has repeatedly replied to criticism of its implicit interest rates with such a response; referring to the unusual and misunderstood costs imposed by servicing rent-to-own contracts. Prof. Walden accepts this challenge from the industry, and uses its own data/estimates to recalculate implicit rent-to-own interest rates. The resulting rates are certainly lower than those previously mentioned in the literature but the rent-to-own industry certainly cannot find much solace in them and critics of the industry have even more defensible ammunition to use in their attacks.

The estimates of the added costs imposed on rent-to-own dealers when compared to the traditional purchase arrangement are very interesting and generous to the rent-to-own dealer. For instance, the depreciation component assumes a three year depreciation for appliances such as TVs and washing machines. One would have a difficult time justifying technological obsolescence in such a short time period let alone functional obsolescence. Another example is the 10 percent of revenues estimate used for maintenance and repair costs. Even if such high costs were incurred they would likely be borne by the manufacturer via a warranty rather than the rent-to-own dealer.

In addition to the absolute level of the implicit interest rates, Walden addresses the variation in those rates across rent-to-own dealers. His hypothesis that the income level of potential rent-to-owners might affect implicit interest rates charged by a dealer is supported by the data. However, he justifiably and honorably admits that the income level measure used (census tract median income for each dealer's locale) may suffer from validity problems. Nonetheless, and in this writer's mind at least, income level of potential rent-to-own customers might serve as a surrogate for a measure of consumer sovereignty in a specific dealer's market. Thus the poor pay more and are relatively powerless (when compared to higher income groups) in the rent-to-own market for all the classical reasons that have been addressed in the literature for other product and service markets.

What, then, can be said about prospects for change? First, it is clear that the rent-to-own industry will continue to be subject to criticism for its implicit interest rates. Even with Walden's generous use of industry cost estimates, rent-to-own charges are exceedingly high. This criticism will certainly continue to translate into calls for, and implementation of, regulatory limits on rent-to-own contracts. Secondly, one might wonder if the current high charges are simply a result of the classic undersupply and high potential return to innovators characteristic of new markets for high demand goods and services. In other words, as more dealers enter rent-to-own activity, the resulting competition might exert downward pressures on charges bringing them more closely in line with the true cost of doing business. An optimist might be drawn to such a scenario but Walden's results should dampen such optimism. Of the twelve contracts in his sample, one consistently had implicit rates in the low 30 percent range with the next highest being above 60 percent. In his oral presentation, Walden indicated that this particular contract was from a dealer in a high income area. It can be assumed that competition for rent-to-own dealers is higher in such an area both from other rent-to-own dealers and due to the many other traditional purchase and credit purchase options. Rent-to-own is most common in low-income areas where competition and consumer sovereignty are low. However, consumer sovereignty can be bolstered through information disclosure. Disclosures analogous to those required by the Truth-In-Lending Act (even when using industry cost estimates) might serve this purpose.

RISK AVERSION AND OPTIMAL INSURANCE DEDUCTIBLES

Any paper which effectively refutes and replaces the conventional wisdom is to be commended. Such is the case with Hanna's present work. The advice that low income/wealth consumers should select high deductibles in order to reduce premiums and that high income/wealth consumers should choose low deductibles because they can afford them is rendered obsolete. It is replaced with a 3 percent of wealth rule (if I might callously skip to the bottom line while acknowledging the rigor and sophistication of the analysis) which might serve as a guideline for the selection of insurance deductibles. The implication is that consumers have been much too risk averse in their selection of deductibles and that the prescriptive literature on this topic supports such behavior.

This problem is more than a situation involving erroneous perceptions of risk on the part of consumers and bad advice in the consumer advice literature. Deductibles of the magnitude that results from the present analysis are virtually unavailable in the marketplace. Health insurance might come closest to providing such deductible levels due to the use of coinsurance clause which provide for 20 percent contributions from the insured. But caps on such coinsurance often place maximums on the out-of-pocket expenses that are below the 3 percent of wealth rule (reasonably estimated in the paper as a median amount of $3,000 per household). Liability insurance is another problem area in that deductibles of any amount are generally unavailable and in some cases might be illegal (auto insurance).

Two final points fit a "bad news/good news" paradigm. On the negative side, the pre-presentation draft and the oral presentation itself used the terms "mark-up", "loss ratio", and "load factor" without sufficient definition and somewhat interchangeably. Mark-up refers to expenses, commissions and other non-loss related charges as a percentage of premium. Loss ratio refers to the ratio of loss related costs paid by the company to the premium (eg. a situation where losses were 25 percent of premium would have a loss ratio of 0.25). Thus, mark-up and loss

ratio (stated as a percentage) would equal 100 percent (or the premium). Load factor refers to the ratio of mark-up to loss ratio. Thus, a policy with a mark-up of 75 percent and a loss ratio .25 would have a load factor of 3 (.75 to .25) as was correctly noted in the paper. Knowledge of any one of these items will provide sufficient information to derive the other two as well.

On the positive side, Hanna calls for a regulatory requirement that higher deductible levels be the norm for standard insurance policies. Currently the converse is generally the case. Such a change would result in explicit disclosure of the dollar cost of low deductibles since they would result in a higher premium. One problem with this approach would be its impact on low-wealth consumers. Their optimal deductible might be lower than that in the standard policy and they would see that an increased premium would result from the selection of a lower deductible. Many might accept an inappropriately high deductible in order to avoid the extra cost of the lower deductible.

THE CHALLENGES OF MEASURING CONSUMER COMPETENCE

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Consumer education has been challenged from within and without to measure competence. The time is here to set the agenda and for a focused effort to identify educational needs. From this, the demand for consumer education can be justified and fulfilled.

Anyone expecting to find pat answers to measuring consumer competencies is probably reading the wrong paper. It is not very likely that the answers are readily available. Rather than look for the answers it is important to step back and clarify the questions. For the purpose of this paper, the following questions have been identified: 1) Why should competencies be measured?, 2) What competencies should be measured?, 3) Who should be the subjects of the measurement? and 4) For what purposes will the results of the measures be used?

Many may feel that these questions have been answered or that persons with a stake or interest in consumer education have similar perceptions as to priority or acceptable answers. I am not that certain. It is imperative that we answer these questions in order to develop a timely, resource effective and purposeful approach to measuring consumer competence.

Consumer education has been defined by writers, researchers and legislators. Bannister and Monsma (1982) developed the Classification of Concepts in Consumer Education which have been discussed (Vosburgh, 1987), implemented (Everett, 1988; Pershing, 1988), used in research (Hayes, 1988) and to a less extent validated. This is not to say that consumer education is defined or the concepts classified once and for all. Nor is it saying that we have agreement on the scope and content at any selected educational level. Rather it is time that reality was embraced. A recent Office of Technology Assessment report (U.S. Congress, 1988) entitled Technology and the American Economic Transition: Choices for the Future made the following statement related to the United States education enterprise and to the abstraction of skills needed in the labor force. I contend that the skills needed by consumers in the marketplace can be similarly characterized.

> A "skill" today means an ability to translate complex problems into solvable ones, an ability to find out what needs to be learned and to learn it, and an ability to absorb complex and often inconsistent information quickly. These skills are much more difficult to measure than basic bookkeeping, arithmetic, or memory skills. The perpetual problem of management in education is that the system tends to reward results that can be measured (and therefore make progress in what can be measured) while the most important products may go unmeasured. Developing adequate measurement techniques therefore becomes a critical priority for making progress in an educational system (p. 127).

There are two messages here to internalize. One is that measurement is essential to reward and progress in the system. Secondly, adequate measurement is no easy task. The essence of both messages is that consumer education needs to set the forces in motion to do measurement. Any further delay will put consumer education out of the system.

Even more recently, the Consumer Federation of America released Secondary Consumer Education: A Status Report (Brobeck and Cohart, 1988) in which the development of a competency test for adults is seen as one of two steps in improving the quality of consumer education and subsequently increasing societal awareness of its benefits. The other step is an award program for research on the benefits of consumer education.

The two reports referred to above are clearly stating what was earlier termed the 'time to embrace reality'. Few, if any, will dispute the realities that are present in the economic and educational sectors of our society. A list of a few of these realities makes the message clearer.

- -- Education makes a difference in people's lives
- -- The marketplace is dynamic and complex.
- -- Assessment of educational outcomes is here to stay.
- -- Consumers and society cannot afford using trial and error as the way to become competent.
- -- Consumer education has some exemplary programs but there is little in terms of a collective message, need, or accomplishment to communicate to those who make a difference in our system.

The list could go on, but the point is made. Something needs to be done now to have vital and recognized consumer education programs in the larger educational system.

Questions posed at the beginning of this will be explored in greater depth. The first question was 'why should competencies be measured?' In part that has been answered. It is the need to justify, develop and defend consumer education programs with varied objectives, methodologies, content and target groups. It is the quest of an answer to 'does consumer education make a difference?' The justification, development and defense of consumer education programs are essential to conform and compete in the larger educational arena for time, resources or bodies -- be they students or teachers.

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Other reasons to measure competence include but may not be limited to assessing needs, trends or cost/benefits.

The second question posed was 'what competencies should be measured?' I used the word competencies in my introduction and question because it was the title of the session. The real question is what should be measured or what data should be gathered to validate consumer education. Bannister and Monsma (1982) stated:

> Individuals and groups who participate in consumer education programs should gain competence in the knowledge and skills needed to make decisions and take actions as informed and responsible consumers in a broad spectrum of consumer behavior modes. Necessary roles for consumers range from learning to cope with their present circumstances to participating as citizens to influence change. (p. 8).

Let's take this statement apart and do a more thorough examination of what they are saying and what it means for measurement of competence. First, a list of the words and phrases that they used (in order of appearance in the statement), included:

** competence in knowledge
** ... and in skills
** make decisions
** take actions
** informed... consumers
** responsible consumers
** spectrum of behavior
** learning to cope with present circumstances to
** participating as citizens to influence change

Here we have nine different and possible outcomes of consumer education. It is actually more than nine as each describes a range of expectations which could be situation specific. Is it any wonder that we do not have a ready file of instruments to measure competence? In one sense it is easy to say other fields have developed instruments to measure competence. Why hasn't consumer education? First, much of the competence testing that occurs is focused—ability to drive a car, pilot a plane, diagnose and repair automobile transmission problems or understand the knowledge of a profession (law, medicine). At the same time, few would profess that these tests are not without problems in either assessing competence or in predicting its application. If we remind ourselves that everyone is a consumer and consumer education is not standardized, is it any wonder that we are near the very beginning of measuring competence.

The Bannister and Monsma statement gave us a list of items that could be measured. But the picture is more unclear when we stop and think of the many examples of evidence of competence that could be proposed. A few examples may be knowledge gain, satisfaction, resolution of complaints, dollars saved, spent or used in alternative ways. Actually, the question may be what do we define (or could we ever agree on a definition?) or describe as competent consumption generally or in specific situations? There are a number of variables that could be measured and similarly many ways to amass the evidence of competence. We do not have the time to debate and study the wide array of alternatives. Rather in order to make progress (which is more important and crucial than perfection), the knowledge and skills of selected groups should be measured.

The third question posed was 'who should be the subjects of the measurement?' It is easy to say that it should be the persons that have had the educational program experience. How else can you validate education? Yet the obvious answer may not be the best answer. Resources are limited, competencies are difficult to measure, and knowledge may not be a proxy for behavior or action. All of these are defendable arguments to justify whom to measure or not to measure. Therefore, as a field we need to consider what groups should be the target for measurement to get the most bang for the buck, make the greatest difference in advancing consumer education and have sufficient assurance of validity and reliability of measurement. Should it be students, teachers, developers of consumer education materials or designers of educational programs? There may not be one answer, but it is vital to grapple with options.

We should rethink whether the primary focus is to measure if 'education made a difference.' Would consumer education make a stronger case, at least initially, by measuring the lack of competencies? Or to put it another way, it is better to work from what is needed than what has been accomplished? If the former approach was selected, the choice would be to start with young people in the educational system. They are accessible, generally accepting of measurement and replaced annually. These are all advantages in both measuring competence and in developing programs to alleviate deficiencies. This is not to negate the importance of measuring other groups. General population adults are not easily accessible. We do not have a common or widely accepted system of preparing or credentialling consumer educators. Other groups with common characteristics could be identified but most have limitations that make accessibility and measurement an even more complex and complicated process than reaching young people in an educational setting.

The last question posed was 'for what purposes will the results be used?' In expanding an answer to this question we must keep in mind how measurement results can be misused. But at the same time this dilemma cannot be allowed to slow the process of developing measures to inaction or ineffectiveness.

Some purposes have been stated or at least alluded to in earlier discussion in this paper. These include but are not necessarily limited to the following:

-- What is the baseline competency level in the population?
-- What are the differences between literate and non-literate consumers?
-- What difference does education make in knowledge, skills, problem solving, decision-making, etc.?

-- What new competencies are needed to maintain literacy in a changing marketplace?
-- Are people more consumer literate today than they were in the past (a measure of trends)?
-- How do educational programs outcomes compare (content, methodology, school districts, states, nations)?
-- What is a qualified teacher?
-- What are the differences between qualified and unqualified teachers?
-- What outcome measurements provide meaningful data to impact the system? Reasons to affect the system may include the need to gain mandatory consumer education, improved resources, consistency in teacher preparation, motivation for life long learning, and rewards for program success.

Clarity is essential in competency measurement to assure that the purpose remains focused and manageable. There is not time or other essential resources available to attempt to do all things at once. We need an orderly progression from measuring current levels of competency in a selected population to measuring differences education makes for that and other populations in the longer term.

The task is not easy. We are not dealing with a single measurement instrument. Rather we are confronted with consumer diversity and marketplace dynamism that complicate efforts to measure competency. It is important to recognize that competency measurement is a long term process not a product. There have been numerous efforts to measure consumer competence. One need only review publications of the American Council of Consumer Interests to verify research that has been done. The foundation has been developed and will serve a valuable purpose. Now, unless we can identify how much more or what would be needed to have a more adequate foundation on which to measure competency, it is time to build upward. It is also a very exciting time to be launching testing efforts with the developments in artificial intelligence. Computers will allow questioning and evaluating competence as it more closely models real life than we have been able to do with closed-ended questioning of the past (Researchers believe..., 1988).

Basically, this is a call for change in consumer education. In writing on educational and social change, Maynard (1975) stated:

> A co-operative planned change process should be conceived and carried out as a training or educational enterprise for the members of the institution being changed. In such an educative process the participants acquire the skills, techniques, and habits required for additional growth and change, as well as those needed to achieve the present change program. (p. 9).

This 'cooperative planned change process' needs to begin sooner rather than later in consumer education. It is difficult to clearly identify the cooperators and their roles. It may well be a few select consumer educators (or their respective organizations), the states with mandated consumer education, persons or organizations in the testing business and dependable source(s) of support who will start consumer education on the path to progress now. We cannot wait!

REFERENCES

Bannister, Rosella & Monsma, Charles. (1982). Classification of concepts in consumer education. Monograph 137. Cincinnati, OH: South-Western Publishing Co.

Brobeck, Stephen and Cohart, Judy. (1988). Secondary consumer education: A status report. Washington, DC: Consumer Federation of America.

Everett, Glenda. (Spring 1988). Defining parameters for a consumer education program: A community college experience. Canadian Home Economics Journal, 38(2), 68-72.

Hayes, Rader. (1988). The classification of concepts in consumer education. Proceedings American Council on Consumer Interests. Columbia, MO: American Council on Consumer Interests, 350.

Maynard, Joe E. (1975). Criteria for analysis and evaluation of educational and social change. Madison, TN: P J Press.

Pershing, Barbara. (1988). Classroom and curriculum application of The classification of concepts. Proceedings American Council on Consumer Interests. Columbia, MO: American Council on Consumer Interests, 346-47.

Researchers believe artificial intelligence technology may be employed to score free-response test questions. (Winter 1988-89). ETS Developments, Vol. XXXIV(3), p. 4.

U.S. Congress, Office of Technology Assessment, Technology and the American Economic Transition: Choices for the Future OTA-TET-283 (Washington, DC: U.S. Government Printing Office, May 1988).

Vosburgh, R. E. (1987). What next for consumer education research? A look at the Wingspread conference proposals. Proceedings American Council on Consumer Interests. Columbia, MO: American Council on Consumer Interests, 267-269.