ATHENS-CLARKE COUNTY RESIDENTS' HOUSEHOLDS' DEBT, RISK AVERSION AND EXPECTATIONS FOR THE FUTURE

by

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(Under the Direction of Deborah D. Godwin)

ABSTRACT

Using the data collected from Athens-Clarke County residents, this study investigated the effect of consumers' risk aversion and their expectations regarding the future economic environment on both the dollar amount of their households' total debt and the ratio of mortgage debt and auto debt to total debt, controlling socio-economic factors. Multiple regression with two hierarchical models was used to achieve the goal. Consumers' risk aversion, employment status and educational level was found to have significant relationship with their households' total debt. Meanwhile, the reliability and validity of 13-item instrument measuring respondents' financial risk aversion were examined with Cronbach's alpha and factor analysis. According to the reliability test and factor analysis results, ten items were retained to construct a ten-item instrument, which had an acceptable reliability with a Cronbach's alpha of 0.72.

INDEX WORDS: risk aversion, expectations for the future, total debt, mortgage debt, auto debt, reliability and validity, factor analysis

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CHAPTER 1

INTRODUCTION

Since the idea of borrowing from future income to meet current consumption needs was widely accepted, consumer debt has been growing much more rapidly than income (Bozworth & Huston, 1997). At the same time, the number of consumer bankruptcy filings has increased dramatically (Zhang & DeVaney, 1999). The use of consumer credit has aroused much research interest and much work has been done to explore the factors that affect the use of consumer credit and debt. Using the 1989 Survey of Consumer Finances data, Liao (1994) found that consumers' expectation regarding future inflation, their liquid assets and their credit constraints were negatively related to the dollar amount of consumer debt they held. If consumers held positive attitude towards credit or they were married, they had larger dollar amounts of consumer debt than those who held negative attitude towards credit or were not married. Age and income had a curvilinear relationship with the dollar amount of consumer debt. By examining the change in debt quintiles with the panel dataset from Survey of Consumer Finances (1983-1989), Godwin (1998) found that household size, marital status, expectations for inflation and time preference had symmetric influence on both directions of the change in consumer debt. Households' equity, their expectation for future real income, attitudes towards credit and access to the credit market affected the odds of a increase in consumer debt, whereas their age, risk aversion and employment had significant influence on the odds of a decrease in consumer debt.

In addition to the dollar amount and dynamics of household debt, the composition of household debt has also been studied. Households' total debt consists of consumer debt, mortgage debt, and other debt. Consumer debt is the dollar value of credit card debt, household loans for vehicles, education and other loans which can be identified as having a consumer purpose. Mortgage debt includes home loans and home equity loans used for households' principal residence (purchase, home improvement and repairs). Other debt is the dollar value of business debt, investment debt and real estate debt for property other than for the principal residence. Also using data from 1992 Survey of Consumer Finances, Bozworth & Huston (1997) found that 62% of all households had consumer debt, only 40% of households had mortgage debt, and 10% of households carried other types of debt. Household type was found to be an important factor that influences the composition of households' debt (Huston & Chang, 1997). Nuclear families, consisting of couples and children, held the highest dollar amount of both total debt ($78,000 on average) and consumer debt ($74,000 on average) but the lowest proportion of consumer debt to total debt (9%). The situation for single person households was found to be just the opposite.

However, most of the previous research has focused on the effect of households' demographic characteristics and financial status on the dollar amount and composition of households' debt. Only a few researchers have investigated the relationship between psychological aspects of consumer behavior and households' debt status. Liao (1994) studied 3,143 households from the 1989 Survey of Consumer Finance to analyze the influence of consumers' expectation for the future, attitudes towards credit, and risk aversion on households' use of consumer loans. This study found that consumers'

expectation about the future economic environment was negatively associated with their dollar amount of consumer loans, and their attitudes towards credit and their risk tolerance were positively related to the dollar amount of consumer loans. The results of a dynamic analysis of households' debt between 1983 and 1989 (Godwin, 1998) were consistent with Liao's findings.

Until now, little investigation has been done on the effect of consumers' expectation for future and risk aversion on the composition of household debt. An understanding of how these psychological factors influence the dollar amount and composition of household debt will greatly help us to understand consumers' debt behavior under uncertainty so that we can predict consumers' use of credit when the economic situation outside of and within the family changes. Under the same economic situation, different families may make different decisions on consumption and savings because they have different expectations for the future and different levels of risk aversion. This study will investigate consumption and savings behavior difference among households that may be caused by psychological factors.

The purpose of this study is to investigate the effect of Athens-Clarke county consumers' expectations for the future and their risk aversion on both the dollar amount and composition of their household debt. Some previous research provides preliminary insights into these potential relationships. According to Liao (1994), consumers' expectations for the future in this study will include four parts: Athens-Clarke county consumers' expectation for the future macroeconomic climate in the U.S., and their expectation for their households' future real income. Consumers with an optimistic opinion of future economic environment are more likely to hold large dollar amount of

debt (Liao, 1994). If consumers predict that interest rates will go up in the future, they would use more credit today because the price of borrowing is relatively lower now than it will be in the future. Thus, many researchers believe expected future interest rates should be positively related to the dollar amount of debt. Under this circumstance, consumers will be more likely to increase their mortgage loan and automobile loans and less likely to increase debt on credit cards. Since the absolute dollar amount owed on mortgage loans and automobile loans is usually larger than the absolute dollar amount of credit card debt outstanding, when interest rates decrease, the decrease in the total interest cost of the former is larger than that of the latter. Thus, the benefit from the decrease in interest rate for the mortgage loan and auto loan is more perceivable than that for credit cards. Though Godwin and Liao's studies did not find a significant relationship between expected interest rates and households' debt as hypothesized, the reason might be that many consumers lack knowledge about interest rates. In this study, the effect of consumers' financial knowledge will be taken into account when investigating the relationship between consumers' expectation for future interest rates and households' debt. When consumers expect high inflation rates in the future, they will be unwilling to reduce their debt (Godwin, 1998). If they expect high inflation, then they will increase the proportion of their mortgage loan and automobile loan to their total debt because the price of real estate would appreciate.

According to the permanent income and life cycle income hypotheses, by saving and borrowing households can maximize utility and even out their consumption over time, so the consumption depends on expected life time income (Bryant, 1990). When consumers expect their real income to go up substantially, then they would be more likely

to borrow from future income or borrow more money to meet their current consumption needs (Chang, Fan & Hanna, 1992). If consumers expect that their average life time income will be much higher than their current income, that means they possess a high ability to repay their debt in the future and their life time consumption level is much higher than their current consumption level. Thus, they will borrow more for durable goods such as houses and automobiles, rather than for other goods. By doing so, their consumption needs for houses and automobiles can be met at an early stage of their life cycle. So, the proportion of mortgage debt and automobile debt to total debt might increase. This hypothesis was found to be true among young, well-educated households who expected higher income in the future (Chen & Finke, 1996). They were more likely to have negative net worth and those households with negative net worth had much higher proportions of housing and transportation assets in their portfolio of assets.

Since their future situation is uncertain, when consumers act according to their expectations, they will face some risk. When risk is concerned, people tend to consider four elements of the situation: (a) the probability of gain, (b) the probability of loss, (c) the potential dollar amount of any loss, and (d) the potential dollar amount of any gain (Grable & Lytton, 1999). Suppose two households face the same risky financial choice. If their relative risk aversion levels are different, they will make different decisions. Though the four elements they consider are the same, their decision depends on whether they give more weight to the probability of loss and potential dollar loss or to the probability of gain and potential dollar gain. Therefore, consumers with a higher relative risk aversion level will hold less debt or will be more likely to experience a decrease in debt (Liao, 1994; Godwin, 1998).

An important issue in this study is the method of measuring consumers' risk aversion. Most of the research on the relationship between risk aversion and debt has used data from the Survey of Consumer Finances which measured risk aversion with only one item with four possible responses ranging from a complete unwillingness to take any financial risk to a willingness to take a substantial risk.

This item is a simplistic version to measure level of risk aversion because " it is not able to measure wide variations within the overall dimension of risk" (Grable & Lytton, 1999, p. 178). In order to address this, Grable & Lytton developed and tested a 13-item multidimensional instrument to measure consumers' level of risk aversion. Their factor analysis showed the instrument measured three constructs: (1) investment risk; (2) risk comfort and experiences; and (3) speculative risk. This new instrument had a Cronbach's coefficient alpha reliability of 0.7507, which is close to 0.8 recommended to assess risk aversion by other researchers (Isaac & Michael, 1995). However, some researchers have argued that individuals' allocation of their asset is a more reliable behavioral indication of risk aversion than their self-reported one (Riley & Chow, 1992). But even asset allocation sometimes may not be a good measure of individual's risk tolerance since some households face a liquidity constraint though they are willing to take more risk. Therefore, the 13-item instrument will be used in this study, and a methodological objective of this study is to retest the validity and reliability of this13-item instrument for measuring risk aversion.

Based on the theory and previous research, the hypotheses of this study are:

(1) Higher levels of debt outstanding will be held by households where respondents

a. have optimistic expectations about the future economic environment

b. have higher levels of risk aversion.

(2) Households who have a higher proportion of their total debt held as mortgage debt and auto loans

a. have optimistic expectations about the future economic environment

b. have higher levels of risk aversion.

Since some demographic characteristics (e.g. age, marital status, occupation and household type) and financial factors (e.g., income level, equity) were found to have significant effects on households' debt (Liao, 1994; Chen & Finke, 1996; Godwin, 1998), they were controlled while investigating the effects of the main independent variables. A hierarchical analysis with two models were conducted to achieve this goal. In the first stage of the model, only demographic variables and financial variables were allowed to enter. In the second stage, the previously discussed psychological variables were added to the model to investigate their effects after the effect of demographic variables and financial variables were controlled. First, individual t-tests were used to test each null hypothesis that there is no relationship between each dependent variable and each psychological variable. Then, the F-test were used to test the null hypothesis of overall effect of the five psychological variables: these five psychological variables altogether explain no additional variability of the dollar amount of respondents' households' debt and the proportion of their mortgage debt and auto debt to their total debt when other variables are controlled.

Limitations of the Study

Since this study will only investigate Athens-Clarke county households' debt behavior, the results cannot be generalized to all U.S. households. When studying the relationship between respondents' psychological factors and the composition of their households' debt, only their mortgage debt and auto debt will be taken into account because these two types of debt usually make up a large proportion of households' total debt and they are secured, debt other than these two types will be assumed to be unsecured debt, mostly credit card debt. However, the composition of households' debt is much more complicated than this assumption. My study cannot reveal the possible significant relationship between some respondents' expectations regarding the future and their risk aversion and other types of debt their households owe besides mortgage debt and auto debt.

CHAPTER 2

LITERTURE REVIEW

Since the 1980s the dollar amount of consumers' debt has grown substantially, and credit cards have been widely used both as convenience and an installment payment method. During this period, consumer debt went up an average of 8.8 percent per year, while credit card debt went up 13.5 percent annually. Buying houses with mortgages and buying cars with auto loans are also very common. Meanwhile, the number of personal bankruptcies grew continuously and set a new record in the 1990's when the whole country was experiencing great economic expansion. Low savings rates, high debt burdens, and high credit delinquencies make it hard and expensive to obtain consumer credit, which hindered overall economic growth. This situation attracted many researchers' attention who began trying to find out what drove up households' debt. A lot of research has been done to investigate the factors that influence the dollar amount of households' debt, households' debt burden and their debt portfolio. Some of them focused on the demographic and financial factors; some focused on psychological factors. Many researchers have explored the socio-demographic and financial factors that influenced the dollar amount of households' debt and the change in households' debt.

Economic Factors and Households' Debt

Using the panel data of the Survey of Consumer Finances, Godwin (1998) investigated the changes in households' consumer debt between 1983 and 1989, based on the life-cycle hypothesis. A cross-tabulation of quintiles was used to examine this change. Age of the respondent and age squared, household size, and marital status of the

respondent were used to reflect the life-cycle consumption demands. Household income and equity represented households' present resources. Respondents' education, expectations regarding inheritance and real income represented household' expected future resources. Also, their expectations about inflation and interest rates were measured. Households' preferences were represented by general attitude toward credit, approval of uses of credit, time preference, and risk aversiveness. Respondent's employment status, whether they had been turned down for credit, whether they had been balked at applying for credit, their race or ethnicity, and whether they received public assistance were asked to represent their access to credit and ability to borrow. Finally, households' economic changes between 1983 and 1989 were reflected by difference in household size, income, employment and marital status.

Logistic regressions were conducted to investigate the relationship between these independent variables and the odds of change in relative debt position. Four variables had symmetrical influences on both directions of change in consumer debt: household size, marital status, expectations about inflation, and time preference. Also, whether they received public assistance and their change in marital status had symmetrical effects on both the odds of higher relative debt position over time and the odds of lower debt. Respondents' expectations about inflation and their household size were positively related to the odds of increase in consumer debt, while their time horizons were negatively related to the increase of debt status. Household income in 1983 was curvilinearly related to the odds of increased debt. If they had received public assistance, the odds of an increase in consumer debt were lower than those who had not. Respondents who had changed their marital status had lower odds of an increase in debt than those who had not.

Equity, expected future real income, general attitudes toward credit, and access to the credit market only had effects on the odds of an increase in consumer debt, while age, risk aversion and change in employment status only had an effect on the odds of an decrease in consumer debt. The two variables reflecting households' access to the credit market, if they had been turned down or if they had been balked at applying for credit, were found significant, the odds of increase in consumer debt were higher. Those who had an increase in income had lower odds of an increase in consumer debt status.

As some research was interested in the absolute dollar amount of households' debt, some other research was interested in families' consumer debt burden. By analyzing the data from the 1989 Survey of Consumer Finances, Lin and DeVaney (1996) studied the factors related to consumer debt burden. They defined a family as a system consisting of three units: inputs, throughputs, and outputs. Inputs consists of resources and demands which were represented by income, age, number of children, education, attitude toward credit, and five family types categorized by adults' employment and career choices: one-wage and two-wage earners, one-career and two-career families, and career-wage earner families. Throughout processes included five financial management practices: financial planning period, shopping effort, risk aversion, shopping for credit terms, and loan payment behavior. The output of the family system was consumer debt burden that was measured by both the ratio of outstanding credit card balance to income and the ratio of outstanding consumer loans to income. The general linear model was conducted to test the differences of sample means. The Student-Newman-Keuls procedure was used as a *post hoc* comparison test. Chi-square was used to test the differences across qualitative variables. The Bonferroni correction of p-value was applied to pairwise comparison.

In the first stage, ordinary least squares and logistic regression equations were used to examine the effect of input variables on throughput variables. In this stage, two-career and career-wage-earner families were significantly more likely than other family types to take more risk and one-wage-earner families were the most risk aversive of all. One-wage-earner families were significantly less likely than on-career and two-career families to choose a lender based on the interest rate. It also showed that two-career families were less likely to be late with scheduled debt payments than were one-wage-earner and two-wage-earner families. The result of the first stage regression analysis showed that age and education were positively associated with financial planning period, amount of effort in shopping for credit, and choosing credit based on the interest rate, while they were negatively associated with risk aversion and late payment behavior.

In the second stage, Tobit regression was conducted to detect the relationship between input and throughput variables and the dependent variables---credit card debt burden and consumer loan debt burden. This analysis was necessary due to the fact that 35% of each family type had no credit card debt or consumer loan debt. Income, number of children, and the predicted values of risk aversion and late payment behavior were indicators of credit card debt burden. Income and the predicted value of risk aversion were negatively related to credit card debt burden. Number of children and the predicted value of late payment behavior were positively related to credit card debt burden. Income and education were negatively associated with consumer loan debt burden. Number of children was positively associated with consumer loan debt burden. Families who had not made late payments were more likely to have larger consumer loan debt burdens than those who had made late payments.

Using the 1989 Survey of Consumer Finances, Prather and Huyer (1996) studied the differences of consumer debt portfolio of American households across five income quintiles. In this study, household debt was classified into two categories, mortgage debt and consumer debt. Consumer debt consisted of four components: credit card debt, vehicle loan debt, consumer loan debt, and the portion of home equity loan debt that could be reasonably considered as consumer debt. Families were divided into five quintiles: Quintile 1: ≤$9,000; Quintile 2: $9,001- $19,000; Quintile 3: $19,001 - $30,000; Quintile 4: $30,001 - $48,000; Quintile 5: >$48,000. To profile the consumer debt portfolio for families in each quintile, means were calculated for both total income and the four components of consumer debt. Meanwhile, a ratio variable indicating the burden of consumer debt was also calculated by dividing total consumer debt by annual income. Since the data were unbalanced across the quintiles, multiple comparison tests with least-square means were used to detect the possible differences across five income levels. The analysis was conducted twice, once on the full sample that carried consumer debt, then on the sub-sample that carried each specific type of debt. The analysis revealed that income had a positive relationship with the total number of credit cards and total credit card debt. For vehicle loans, the percentage of households having such debt increased as income increased from Quintile 1 to Quintile 3. Quintile 5 had significantly larger consumer loan balances than other quintiles, but there were no statistically significant differences between the lowest four quintiles. The percentage of households having home equity loans in Quintile 4 and Quintile 5 was statistically significantly higher than in the lower quintiles. The total amount of consumer debt was positively related to income level for both the full sample and the sub-samples, which carry each

specific type of debt. When considering the ratio variable which indicated the burden of consumer debt, the pattern was different. The burden of consumer debt was significantly lower for Quintile 4 and Quintile 5 than for lower income levels. This study found that the pattern of credit use for Quintile 4 and Quintile 5 was significantly different, while it was similar between the two extreme income groups.

Using the 1992 Survey of Consumer Finances, Bozworth and Huston (1997) and Huston and Chang (1997), investigated household credit and debt portfolios by definition and household type. Total debt was divided into consumer debt, mortgage debt and other debt. Consumer debt was the dollar value of credit card debt, household loans for vehicles, education and other loans that could be identified with a consumer purpose. Mortgage debt included household loans and home equity loans used for the principal residence (purchase, home improvement and/or repairs). Household debt was the sum of consumer debt and mortgage debt. Other debt was the dollar value of business debt, investment debt and real estate debt other than for the principal residence. Of all the households in the samples, 62% of the households had consumer debt and 40% of the households had mortgage debt. A total of 72% of the households had some nonzero level of household debt. Only 16% of the households had other debt.

When studying the debt portfolio by household type, households were divided into five categories grouped by household composition and marital status: nuclear, single parent, couple-only, single person and other. Nuclear families consisted of the respondent, the spouse and all children. Single-parent families include the respondent and all children. The couple-only family was comprised only of the respondent and spouse. Considering that the financial decision for people of different employment status may be

different, single person households were divided into two types: respondents who were employed and respondents who were not employed. Nuclear households had the highest absolute dollar amount of total debt, while single person non-working households had the lowest level of total debt. As for consumer debt only, nuclear families had the highest dollar amount of consumer debt but the lowest proportion of consumer debt in their total debt. The reason may be the fact that mortgage debt consists of a large portion of their total debt for this group of families. Single person non-working households had the lowest absolute level of consumer debt but the highest proportion of consumer debt to total debt. This result was consistent with the life-cycle income hypothesis.

Social and Psychological Factors and Households' Debt

Although some of those studies above also investigated the effect of some psychological factors such as risk aversiveness, time preferences, and attitudes toward credit, their focus was on socioeconomic factors. Some other researchers have investigated the influence of psychological factors on consumer debt. Lea, Webley, and Walker (1995) investigated the differences in money management skill, economic socialization, and credit use behavior among non-debtors, mild debtors, and serious debtors. Consumers were classified into three credit status groups: non-debtors who had had no debt outstanding to Welsh Water Company within the past two years; mild-debtors who had paid their bill only after receiving the second request for payment following the normal bill within the past two years; and serious debtors against whom court action had been used for recovery of debt within the past two years.

Seven aspects were included in the social and psychological factors that were examined: (1) social support for debt; that wass, individuals' attitudes toward debt,

whether they think purchasing with debt was good or not; (2) economic socialization, represented by subjects' reports of their parents' use of and views on credit, whether their parents made purchase with credit, and their parents' attitudes toward credit; (3) social comparisons, which group of people consumers choose as their reference group; (4) money management styles, consumers' budgeting and money management skills; (5) consumer behavior, that is, consumers' purchase patterns or what kind of goods they regarded as luxury and what kind of goods they regarded as necessities; (6) time horizons, represented by the time consumers can wait to receive a certain amount of return; (7) locus of control, that is, whether subjects were more likely to believe they are influenced by external versus an internal causes. The purpose of this study was to examine all the social and psychological variables within one study in order to assess their relative importance in affecting households' debt status. Economic variables were also included in this study.

Four samples of about 1,000 households were randomly drawn from households within the area supplied by Welsh Water Company by this company's staff, one sample each of non-debtors and mild debtors, and two samples of serious debtors. The oversample of serious debtors was to obtain enough data on serious debtors because the response rate from serious debtors was usually very low. All data were first examined, and the statistical significance of the relationship between each socio-psychological variable and debt status was tested in case there were any non-monotonic relationships. Then, ordered logit regression models were used to test the influences of these economic, social and psychological variables on the households' debt status. A 17-item scale of attitudes toward debt was constructed. Two psychometric scales, attitudes toward debt

and locus of control, were included in the 17-item scale, although the latter had a Cronbach's alpha of only 0.32, which was far from being a satisfactory level. Though the attitude scale had a high Cronbach's alpha of 0.77, it had no validity because scale values did not differ significantly between different debt groups. Factor analysis revealed that only those items closely related to money management showed significant differences between the groups of debtors. This finding contradicted most other research which had found a significant effect of respondents' attitudes toward debt on their debt burden. This scale was abandoned in later analysis.

All other variables were grouped into ten indices. Although these researchers reported no details about the construction of their measurement instrument, the items comprising each of these ten indices could be discerned from their presentation of results. Three items were included in a poverty index. Respondents who were female, with low income, not working full time or retired, or had more children in the household had higher scores on this poverty index. Respondents' friends and family's reaction to their debt represented their social support for debt. Respondents' economic socialization index included whether their parents had been well off, whether their parents were better off than they were, and whether they had stopped receiving pocket money young. Respondents' social comparison index was represented by which group of people they chose from their friends, family, people at work, or people on TV as a comparison group. Respondents got high scores on the poor money management index if they had no bank or building society account, had low self-rating of money management, and did not set aside money for regular bills. If they used hire purchase or "loan man" and did not use credit cards, they were coded as using low status credit. Their consumer behavior was

represented by whether they bought cigarettes, whether they bought Christmas presents for children, and whether they owned a car and a telephone. Their luxury perception index was determined by whether they considered Christmas presents for children as a necessity, and whether they considered a car or telephone as a luxury. A short time horizon index referred to respondents' reluctance to wait to receive a large prize and large discount to induce them to accept pre-payment for bills.

In the multivariate logit analyses of these indices, only the poverty index, the economic socialization index, the money management index, and the index of the use of low status credit were found to have a significant effect on consumer's debt status. The results showed that those who were in poverty, had poor money management skills, and used low status credit, and those whose parents had been well off, were more likely to have more debt. Poor money management and use of low status credit might be both the causes and consequences of heavy debt.

Using the data from the 1989 Survey of Consumer Finances, Liao (1994) investigated the effect of psychological factors including individuals' expectations for the future, attitudes toward credit, and financial risk tolerance on the total dollar amount of households' consumer loans. Though attitudinal factors were the major concern of this study, socio-demographic and financial variables were also included in the statistical analysis to find the determinants of the dollar amount of consumer loans. Since many observations had zero on the dependent variable, Tobit analysis was used. This study found that consumers' expectation about the future economic situation was negatively related to their dollar amount of consumer loans and attitudes towards credit and risk tolerance were positively related to the dollar amount of consumer loans. Among socio-

demographic and financial factors, age and income had an inverted U-shaped curvilinear relationship with the dollar amount of households' consumer loans, and number of earners had a positive relationship with the dollar amount of households' consumer loans, while liquid assets and credit constraint were negatively associated with the dollar amount of households' consumer loans. Married and homeowner households had more consumer loans than those who were single and did not own their house.

Conceptual Definition and Measurement of Consumer's Risk Aversion

Among those psychological factors, consumers' financial risk aversion aroused great interest because many researchers and practitioners found that it was an important factor when consumers made family financial decisions. A number of researchers, including Grable and Lytton (1998), Grable and Joo (1999), Grable and Joo (2000), Riley and Chow (1992), Schooley and Worden (1996), Sung and Hanna (1996), investigated demographic, economic and psychological factors related to consumers' financial risk aversion. When investigating respondents' risk aversion, which is one of the most important psychological factors when investors make decisions, researchers used different instruments. Most of them used the only one item question with four possible answers in the Survey of Consumer Finances, such as Chang, Fan and Hanna (1992), Godwin (1998), Grable and Lytton (1998), Liao(1994), Lin and DeVaney (1996), and Sung and Hanna (1996); some used four or five Likert-type items with four possible choices, such as Grable and Joo (1999), and Grable and Joo (2000); and others used a relative risk aversion index derived from household asset allocation, such as Riley and Chow (1992). The one item in the Survey of Consumer Finances (SCF) is the most

widely used instrument. However, its validity and reliability have never been tested. Therefore, the results found before about the relationship between risk aversion and households' debt may not be reliable. The asset allocation method is also used by many researchers. The study by Schooley and Worden (1996) showed that this method was consistent with the one item question in the SCF, but since the reliability and validity of either of these measurements have never been tested, this study failed to prove that the asset allocation method is a good measurement instrument for assessing respondents' risk aversion.

Using the data from the 1983 and 1986 Survey of Consumer Finances, Sung and Hanna (1996) examined the effects of income and demographic characteristics on risk tolerance. One item with four possible answers was used to measure respondents' risk tolerance.

"Which of the following statements on this page comes closest to the amount of financial risk that you are willing to take when you save or make investments?

1. Take substantial financial risk expecting to earn substantial returns
2. Take above average financial risks expecting to earn above average returns
3. Take average financial risks expecting to earn average returns
4. Not willing to take any financial risks" (Grable & Lytton, 1999, p. 178).

The first and second responses were combined and three categories were used as an ordinal dependent variable. The independent variables were income, income squared and demographic variables, including age, household size, education, occupation, race, number of earners, and household type. Total household pretax income was adjusted by the 1982-1984 Consumer Price Index. Income was averaged over 1982, 1983, 1984 and

1985 to provide a better estimate of households' average lifetime income. The ordered probit model with maximum likelihood methods was used to analyze the effects of income and demographic variables on risk tolerance. Income and education produced a positive effect on consumers' risk tolerance. Income and income squared together have a linear positive effect on consumers' risk tolerance until income reaches $100,000 per year. When consumers' income increases from $100,000 to $1,120,000 per year, their risk tolerance also increases but at a decreasing rate. For the age variable, consumers' risk tolerance decreased with age after 45. Self-employed household heads and farmers were significantly more likely to be willing to take risks than similar household heads with other occupations. Married respondents and single males were more risk tolerant than respondents in female-headed households.

Grable and Lytton (1998) did a study to determine what variables would differentiate between levels of investor risk tolerance and to classify individuals into risk tolerance categories using the data from the 1992 Survey of Consumer Finances. They also used the question described above with four answers to measure consumers' risk tolerance. The first two categories were combined to form a dependent variable with three categories: high risk tolerance, average risk tolerance and no risk tolerance. Independent variables include gender, age, marital status, occupation, self-employment, income, race, and education. Multiple discriminant analysis was used to separate, discriminate, estimate, and classify individuals into risk-tolerance categories. The result indicated that gender, married status, single but previously married status, professional occupational status, self-employment status, income, white, black or Hispanic race, and educational level were significant in differentiating among three levels of risk tolerance.

Standardized coefficients showed that education and gender were relatively more important in differentiating among levels of risk tolerance than some of the other variables. Respondents who were male and had high educational levels were more risk tolerant than females or those with lower educational levels. A generalized squared distance function using a *posterior* probability of membership in each risk category was used to estimate the classification efficacy of the demographic variables in this study. Overall, the procedure correctly classified 48% of the respondents, which was statistically significant at the .01 level. This procedure over classified respondents into high and no risk-tolerance levels, while under classifying respondents into the average risk-tolerance category.

Grable and Joo (1999) investigated demographic and socioeconomic factors related to risk tolerance. Data for this study were collected from a random sample of white-collar clerical workers from a large southwestern university in 1998 (n=220). Respondents' financial risk tolerance was measured by combining responses to four Likert-type scale financial risk questions into a risk-tolerance index:

(1) In terms of investing, safety is more important than returns;

(2) I am more comfortable putting my money in a bank account than in the stock market;

(3) When I think of the word "risk" the term loss comes to mind immediately;

(4) Making money in stocks and bonds is based on luck.

Four responses to these questions were: strongly agree, tend to agree, tend to disagree, and strongly disagree. Possible risk tolerance scores ranged from 4 to 16 with higher scores representing higher levels of financial risk tolerance. Ordinary Least Squares

regression was used to detect the relationship between those factors of interest and respondents' financial risk tolerance. The whole model included respondents' gender, age, marital status, education, income, ethnic background, financial knowledge, housing ownership, number of dependents, and financial solvency. Collinearity diagnostics were used to examine possible multicollinearity problems among the independent variables and no problems were discovered. The full model explained 24% ($F=5.98$, $p<.001$) of the variance in financial risk tolerance. Education, income, ethnic background, financial knowledge, home ownership, the number of dependents, and financial solvency were significant predictor variables at the .05 level. Positive relationships between education, financial knowledge, solvency ratio and financial risk tolerance were found in this study. Respondents' home ownership and number of dependents were found to have a negative relationship with their risk tolerance. Non-white respondents tended to be more risk tolerant than white respondents.

There were some findings in this study that contradicted previous studies. First, respondents' number of dependents had negative relationship with their financial risk tolerance, while Sung and Hanna (1996) found no relationship between household size and risk tolerance. Second, no statistically significant relationship between respondents' age and their financial risk tolerance was found in this study, which was not consistent with practitioners' general beliefs and the findings of Sung and Hanna (1996). Thrid, the finding that non-whites were more risk tolerant contradicted with Sung and Hanna's (1996) findings. In addition, marital status and gender were not significant related to financial risk tolerance, which is inconsistent with most of the previous literature (Sung & Hanna, 1996, Grable & Lytton, 1998). Another significant finding of this study is that

homeowners were less risk tolerant than others, which had not been reported in previous studies.

Grable and Joo (2000) did a further study on financial risk tolerance, which included psychological factors besides demographic and socioeconomic factors with a convenience sample of 250 college students from a large southwestern university. Respondents' risk tolerance was measured with five Likert-type items with four possible choices: strongly agree, tend to agree, tend to disagree, and strongly disagree. These five items were:

(1) Investing is too difficult to understand;

(2) I am more comfortable putting my money in a bank account than in the stock market;

(3) When I think of the word "risk" the term "loss" comes to mind immediately;

(4) Making money in stocks and bonds is based on luck; and

(5) In terms of investing, safety is more important than returns.

The index ranged from 5 to 20, with higher scores indicating higher risk tolerance. Independent variables included respondents' age, gender, income, racial and ethnic background, economic expectations, financial knowledge, birth order, money ethic, and locus of control. Both money ethic and locus of control were measured with four-choice Likert type items. A money ethic scale measured respondents' psychological relationship with money. Respondents with high scores had high levels of appreciation and desire for money. An ordinary least squares regression analysis was conducted to test the significance of each independent variable, holding other factors constant. Three variables were found to be significant at the .05 level: gender, financial knowledge, and locus of

control. Respondents with an internal locus of control were more risk tolerant than others. Respondents with higher scores in financial knowledge were also more risk tolerant than those with lower scores. Men tended to be more risk tolerant than women.

While each of the previously discussed studies measured risk aversion with a self-report questionnaire data collection method, other studies have incorporated or compared different measurement methods. Riley and Chow (1992) suggested assessing individual risk aversion by examining households' asset allocation. They derived relative risk aversion indexes by examining households' asset allocation, using the data from the longitudinal Survey of Income and Program Participation. These researchers divided assets into four classes: personal property, real estate, bonds and risky assets. Unfortunately, this study did not give the definition and components of risky assets. Risky assets were all assets except those placed in the other three categories. Though real estate can be a hedge against inflation risk, some direct investment in commercial buildings and residential real estate might be very risky if the vacancy rate and maintenance expenses are high or the market price goes down when the economic environment turns bad. Indirect investment in a mortgage trust is also highly risky. If debtors pay their mortgages much quicker than expected or interest rates drop substantially and debtors rush to refinance, mortgage trust shareholders might suffer a great loss. It is also not reasonable to put all bonds in a risk-free assets category. Interest rate changes will cause the price of long-term bonds to fluctuate a lot, which may cause capital loss to investors unless investors hold bonds until maturity. Investors of junk bonds bear great default risk. Regarding the safety of principal, only Treasury bonds, U.S. savings bonds and high quality corporate bonds can be put into a non-risky asset

category. The measurement of risky assets in this study is definitely not a good one, which would make the final result possibly invalid. Relative risk aversion was calculated as the ratio of risky assets to wealth and relative risk aversion index was one minus the ratio; this index was coded such that a high index score indicated high risk aversion.

A multiple regression model was conducted to study the effect of respondents' age, education, total household wealth, and annual income of the participant on their relative risk aversion. Also included were three dummy variables created to differentiate those who were retired and not retired, those who were under the poverty level and above the poverty level, and those who were wealthy and not wealthy. If respondents' age was over 65, then the age dummy variable was 1, otherwise 0. The poverty dummy variable was 1 if respondents' household income was over $10,989, otherwise 0. The wealthy dummy variable was 1 if households' net worth was over $178,419, otherwise 0. Each variable in the model was significant at the 0.01 level. Age, education, income and net worth variables were negatively related to the relative risk aversion index. Respondents over 65 had higher relative risk aversion than those under 65, while those who were over the poverty line and had total household net worth over $178,419 had lower relative risk aversion than those who were under the poverty line and had total household net worth equal to or below $178,419.

Schooley and Worden (1996) compared two different risk aversion measures: attitudes measured by respondents' self-reports and asset allocation by analyzing the data from the 1989 Survey of Consumer Finances. The actual risk taken by households was measured by the ratio of risky assets to wealth. Risky assets included the market value of mutual funds, corporate stock, precious metals, and all real estate held for investment

purpose, the face value of all bonds except U.S. savings bonds, amounts accumulated in pension accounts, loans to individuals, and an estimate of human capital. Assets defined as risk-free assets were checking and savings accounts, money market accounts, U.S. savings bonds, the cash value of life insurance, call accounts, certificate of deposits, and IRA accounts. This measurement of risky assets is better and clearer than that in Riley and Chow's study. However, it probably classified too many assets into the risky category, which caused respondents' measured risk aversion to be higher than it really is. Money market mutual funds and some income funds have a low risk level, and because investment grade corporate bonds are also of high quality, they can be included in the low risk asset category. Human capital was considered a risky asset, but no detail was given to assess whether this classification is appropriate. Wealth was measured as the total amount of risky and risk-free assets minus the value of mortgage and consumer debt. Home equity was excluded from wealth, which also made the ratio of risky assets to wealth much larger than it should be. Households' self-reported risk tolerance was measured by the question with four answers in the SCF. One-way ANOVA was used to examine whether the calculated relative risk aversion was consistent with the risk aversion reported by households. It was found that means of relative risk aversion significantly different between three responses on the self-reported risk aversion: above average, average and no risk, but there was no significant difference between "substantial" and "above average" categories. This analysis showed that respondents' portfolio allocations were reliable indicators of attitudes toward risk and respondents understand their risk tolerance.

Then, multivariate regression models were analyzed to investigate the determinants of relative risk aversion among socioeconomic characteristics and attitudinal factors. The log of household wealth had a positive relationship with relative risk aversion, while household income was not a significant factor. Nonwhite households and those who wanted to leave their estates to their heirs had higher risky assets to wealth ratios than white households and those wanted to leave nothing after death. Those respondents who were retired had lower ratios of risky assets to wealth than nonretired respondents. Respondents who had less confidence in Social Security and pension income had larger portions of their portfolio in risky assets than those who had more confidence in Social Security and retirement pension income.

Since researchers used three different instruments to measure consumers' financial risk aversion and the reliability and validity of all these instruments have never been tested, it is hard to assess and compare their results. There is an urgent need for both a valid and reliable instrument to measure consumers' risk aversion so that research results on risk aversion and its effect on consumers' debt are more convincing. Grable and Lytton (2000) developed a 13-item self-report instrument to measure an individual's financial risk tolerance. At the beginning of the development of this instrument, 100 items assessing an individual's risk tolerance were chosen from academic and trade publications. After a face validity check, some irrelevant items, which did not measure respondents' financial risk tolerance, were eliminated and only 50 items were left for further analysis.

For convenience, data were collected from undergraduate and graduate students of a southern university for a pilot study. Bivariate and multivariate item analyses were

conducted to test the validity of the instrument. In bivariate analysis, correlation coefficients for each pair of 50 items were obtained. Respondents who were generally highly risk tolerant would also be highly risk tolerant on one item. Thus, those items showing inconsistent correlations with other items were eliminated. To address the problem of multicollinearity among independent variables, those items that are too strongly correlated were also removed. In addition, items offering a risk-free choice were eliminated to prevent respondents' choice from skewing to the non-response categories, which would reduce the validity of the instrument.

Then, index scores were obtained for each respondent using the remaining items. Each choice was coded from 1 to 4, higher points indicated a higher level of risk tolerance, whereas lower points indicated a lower level of risk tolerance. In some questions, there were only two choices, the low risk choice was coded 1 and the high risk choice was coded 3 instead of 2. The reason may be that researchers intended to differentiate respondents' risk tolerance more clearly so that their scores were distributed on a larger scale instead of focusing in the middle. The total index score of each respondent was obtained by summing up the points the respondent scored on each item. Then, a multivariate analysis was conducted by regressing total index scores on each of the remaining items. This analysis showed that 20 items were highly correlated with the total index score.

The next step was to test the reliability and validity of the 20-item instrument. Data were collected from a convenience sample of faculty and staff from a southern state university (N = 1,075) using this instrument for further analysis. This sample represented a group with higher education, income and socioeconomic levels than the general

population. The reliability estimate (which type of reliability was not specified) for this instrument was 0.78, showing an acceptable level of consistency. The correlation coefficients between each item and the total index scores were between 0.20 and 0.67 and the average item-total reliability was only 0.45. It suggested that some items had only a weak relationship with the total index score. A multivariate item analysis was also conducted as was done in the pilot study by regressing each item score with other item scores and the total index scores. The analysis indicated a strong relationship between each item and the total index score. However, insufficient data were provided in Grable and Lytton's article to assess the average interitem reliability which was important in refining this instrument.

These 20 items were thought to measure eight dimensions of individual's financial risk tolerance: guaranteed vs. probable gambles, general risk choice, choice between sure loss and sure gain, risk as experience and knowledge, risk as a level of comfort, speculative risk prospect theory, and investment risk. Each item assessed one or more of these dimensions. Therefore, factor analysis was used to assess the multidimensionality in the instrument. The eigenvalue-one criterion, the scree test, the proportion of variance accounted for, and the interpretability of the resulting factors were considered. Results from the factor analysis suggested that the13 items measured 3 dimensions of an individual's financial risk tolerance: investment risk, risk comfort and experience, and speculative risk. Another purpose of the factor analysis was to eliminate items that did not make a significant contribution to the measurement of underlying dimensions. Seven items were eliminated because their factor loadings were lower than 0.45. However, item two was left in the instrument though its factor loading was 0.4442

because excluding this item significantly reduced the Cronbach's alpha coefficient for the index (from 0.7507 to 0.7274). The results of the factor analysis was consistent with the correlation coefficients between each item and the total index score. The correlation coefficients between seven removed items and the total index score were quite low (the minimum was 0.20 and the maximum was 0.49). The correlation coefficient between item two and the total index score was the fourth highest among 20 items. Data on the average interitem correlation of each item were not provided, so the influence of the seven removed items on average interitem reliability cannot be seen. The concurrent validity was examined by comparing this 13-item instrument with the one-item SCF instrument. The correlation coefficient of 0.5358 indicated that these two instruments measured the same construct, but the single item could not measure all the dimensions.

Summary

Most previous studies that investigated the socio-demographic and financial factors related to the dollar amount and portfolio of households' debt obtained similar results. However, only a few of these studies had a close study of psychological factors. Though Lea, Webley, and Walker (1995) explored some psychological factors, they only examined consumers' debt status with respect to utility bills. This is not enough to reveal the whole picture of households' total debt, which has many complex components. In this study, the relationship between respondents' psychological factors and their households' debt is the main interest. Since the reliability and validity of instruments measuring risk aversion influence the reliability of final results, it is a major concern before examining the relationship of main interest. Grable and Lytton (2000) 13-item questionnaire was chosen to measure respondents' risk aversion because it has been tested and achieved an

acceptable reliability and validity. Meanwhile, its reliability and validity were examined and the questionnaire was refined in this study because the convenience sample of faculty and students in the former study cannot represent the characteristics of other households.

After testing the reliability and validity of the13-item questionnaire, the relationship of main interest was examined. Previous research, which combined socio-economic and psychological factors, included too many socio-economic variables, thus the effect of psychological factors was weakened because many socio-economic variables are highly correlated with psychological variables, especially risk aversion. Grable and Lytton (1998), Grable and Joo (1999), Grable and Joo (2000), Riley and Chow (1992), Schooley and Worden (1996), Sung and Hanna (1996) have found some socio-demographic and economic characteristics such as education, income, ethnic background, financial knowledge, and home ownership had a significant relationship with respondents' risk aversion. Socio-economic characteristics were carefully chosen in this study in order to see the effect of psychological factors on households' debt status clearly.

CHAPTER 3

METHODOLOGY

Research Design

In order to investigate the effect of Athens-Clark county consumers' expectations for the future and their risk aversion on the dollar amount and composition of their households' debt, an *ex post facto* cross-sectional multivariate design was used. A questionnaire was mailed to a randomly selected sample of Athens-Clark county residents. In this questionnaire, the dollar amount of respondents' total household debt was measured as one dependent variable. The dollar amount of their mortgage debt and auto debt were also measured and then the proportion that their mortgage debt and auto debt comprised of their total household debt was calculated as the second dependent variable.

The independent variables are divided into three categories----socio-demographic variables, financial variables, and psychological variables (Table 1). The main interest of this study is the relationship between the dollar amount and composition of respondents' household debt and respondents' psychological factors. The psychological variables include respondents' expectation for the future general economic situation in the U.S., their expectation regarding future inflation, their expectation for future interest rates, their expectation for their households' future real income, and their risk aversion. Socio-demographic variables include respondents' age, household size, household type, employment status, occupation, educational level, and knowledge about consumer credit. Financial variable is respondents' total household income.

Table 1

Independent variables

Socio-demographic	Age
(covariates)	Employment status*
	Occupation*
	Educational level
	Household size
	Household type*
	Financial Knowledge
Financial	Total household income
(covariates)	
Psychological	Expectation for the future economic environment
(main variables)	Risk aversion

Note: Variables with asterisks are measured with a nominal level of measurement.

Previous studies have found that respondents' age, education, household income, equity, household size, marital status, and employment status had significant influence on the dollar amount of households' debt (Liao, 1994; Chen & Finke, 1996; Godwin, 1998). In addition, household type was also found to be an important factor that influences the composition of households' debt (Huston & Chang, 1997). Also, how respondents manage their households' debt according to their expectations for the future and their risk aversion depends on how much financial knowledge they have. Therefore, these independent variables were controlled while the analysis investigated the main effects of psychological variables on the dollar amount and composition of respondents' household debt. Besides the effect of those socio-demographic and financial variables on dependent variables, they also have an influence on risk aversion. Siegel and Hoban (1982) found that relative risk aversion was higher for less wealthy households and lower for more wealthy households when wealth was calculated as net worth inclusive (NWI). Riley and Chow's finding (1992) is consistent with the above conclusion, i.e., consumers' risk aversion decreased if their income was above the poverty level and decreased significantly once their wealth rose to the top 10% of the population. In addition, they found that after retirement, consumers' risk aversion increased with age. Both the above studies used the asset allocation method to measure consumers' risk aversion.

Grable and Lytton (1998) used the one-item measurement in the 1992 Survey of Consumer Finances to measure consumers' risk aversion. They examined the relationship between consumers' risk tolerance and their demographic characteristics. They found that being male, married and white, and having a professional occupation, high total household income, and high education level were associated with high level of

risk tolerance. When they examined the standardized canonical discriminate function coefficients, they found the combination of gender and education most explained the differences between groups categorized by level of risk tolerance. Therefore, those demographic variables such as respondents' gender, occupation, educational level were also controlled to eliminate the threat to the internal validity of the study arising from the relationship between these variables and risk aversion.

Since the dependent and independent variables are measured at the same time in an *ex post facto* cross-sectional multivariate design, it minimizes most of the threats to internal validity such as the history threat, maturation threat, testing threat, instrumentation threat and mortality threat. Manipulation of the independent variables in this study is not feasible and, even if it were possible, it will change the real picture of the main effects because of the researcher's interference. Its external validity is quite high. There is no pretest sensitization, no selection and treatment interaction, and no history and treatment interaction. The most serious threat to internal validity for this design is selection threat. As it was mentioned before, the variation in the dollar amount and portfolio of respondents' household debt might be caused by the variation of respondents' age, income level, household size, and marital status, etc. rather than by the variation of psychological variables. These socio-demographic and financial variables will be statistically controlled when investigating the main effects.

Another threat to internal validity of this design is ambiguity of cause and effect because the dependent variables and independent variables are measured at the same time. Especially for the effect of risk aversion on the dollar amount of respondents' household debt, it is hard to tell which one is the cause and which one is the effect. It is

possible that a respondent is risk tolerant so his/her household holds a large amount of debt. It is also possible that a respondent's household holds a large amount of debt, so he/she becomes risk averse to avoid more debt. This threat was addressed carefully in a later interpretation of the statistical analysis.

Sampling Plan and Data Collection

The main interest of this study is to investigate how Athens-Clark county consumers' expectations for the future influence the dollar amount and composition of their households' debt. A three-stage random sampling was used to collect data to achieve the goal. There are five main independent variables and ten control variables, so according to the rule-of-thumb, the minimum sample size is 150. The dependent variables are both ratio level of measurement. Of the independent variables, some (such as respondents' household income, expectations for the future economic environment, and risk aversion) are ratio or interval level of measurement and some (such as respondents' employment status) are nominal level of measurement. Therefore, multiple regression analysis with dummy variables was used to explore the relationship between independent variables and dependent variables. In order to collect enough data for the statistical analysis and reduce type I and type II error, 500 households were selected from the Athens-Clark county telephone book. In the first stage, a page number was randomly selected from the telephone directory. Then, a column was randomly selected from this page. At last a row was randomly selected from this column, which contains the name, address and phone number of the selected subject. Since this directory includes some other areas besides Athens-Clarke County, if the selected subject was not in Athens-Clarke County, then the next name which was in this county was selected instead.

In March, 2002, 500 questionnaires were mailed to the selected households to measure dependent and independent variables. Over the next weeks, 97 questionnaires were returned as undeliverable. The major problem in collecting data is getting a sufficient percentage of responses. In order to address this problem, a letter of transmittal and self-addressed return envelope with pre-paid postage were enclosed with the questionnaire. In the letter of transmittal, the purpose and significance of this study were briefly explained and the questionnaire is requested to be returned by a particular date so that subjects would not put it aside to do later. The letter of transmittal also contained the consent form and explained that subjects' participation was totally anonymous. The self-addressed return envelopes with pre-paid postage allowed subjects to respond with a minimum of inconvenience. Previous studies proved that the second and the third follow-up letters were effective in increasing the percentage of questionnaire returns (Borg & Gall, 1979). Therefore, two weeks later, the follow-up postcards were sent to remind the households to respond. Twenty days later, the response rate was calculated and found to be lower than 20%. In order to increase the percentage of responding subjects and investigate the reason of low response rate, telephone calls were made. During a two-week period 254 reminder calls were made to randomly selected respondents at weekday night and on weekend. Thirty-seven of the phone numbers had been disconnected or were wrong numbers, and another 134 subjects could never be reached. Among those who were reached in a telephone call, 31 subjects refused to cooperate. Three main reasons they mentioned were worry about privacy, lack of financial knowledge to answer the questionnaire, and lack of time. By May 31, a total of 76 completed questionnaires were

received and response rate is 20.5%. The whole process of the data collection was conducted under the guidance of the Human Subjects Center at the University of Georgia.

Generally speaking, random sampling usually has high external validity, but in this study the telephone book was used as the sampling frame, which does not include households who do not have a phone and who do not want to be listed in the phone book, so this reduces the external validity of the sampling plan to some extent. Also, there were three stages in this sampling and each stage produced some sampling error. Since the data were collected at one time, it is impossible to explore the change of the relationship between Athens-Clark county residents' debt and their expectations for the future and their risk aversion across time. When considering the above factors, the result of this study can be generalized to Athens-Clark county residents with medium high external validity. This sampling plan is much more convenient and less time and money consuming than simple random sampling. Compared to other probability and nonprobability samplings, the external validity of this sampling plan is higher for the same sample size.

In order to test the reliability and validity of 13-item instrument to measure respondents' financial risk aversion and compare how differently adults and students respond, a convenience sample of 157 undergraduate students was also obtained in two classes in the Department of Housing and Consumer Economics at the University of Georgia. Data were collected during one class period in each of the two classes during April 2002.

Measurement

In this study, the two dependent variables are dollar amount of respondents' household total debt and the proportion of their mortgage debt and auto debt to their total debt. The dollar amount of respondents' household total debt, mortgage debt and auto debt were measured with open-ended items. Then the ratio of their mortgage debt and auto debt to their total debt was calculated as the second dependent variable.

Each socio-economic variable was measured with a one item open-ended question. Of the two main independent variables, Athens-Clarke county residents' expectations regarding the future economic environment was measured with four items. Their expectation regarding future general economic situation in the U.S., expectation regarding inflation, expectation about the interest rates in the future and expectation for their future income were measured with four semantic differential scale items. And then, respondents' scores on each item were added together to construct the expectation index. Respondents' expectations regarding the future economic environment were measured by these four items because these items were related with each other. Inflation rate and interest rates are the signs of general economic situation and respondents' expectations about their households' total income depends on their expectation about future economic situation in the U.S. such as employment rate and inflation rate. However, only one item is not enough to reflect respondents' expectations regarding the future economic environment both outside and inside their households.

Respondents' financial risk aversion was measured with a self-report 13-item instrument that was developed by Grable and Lytton (2000). Though this instrument was tested before and had a satisfactory Cronbach's alpha of 0.77, the data in the original

study were collected through a convenience sample of university faculty and staff. This sample cannot represent the characteristics of Athens-Clarke county residents and the whole U. S. population, so in this study the reliability and validity of this instrument were tested again and refined with the data collected from the three-stage random sample of Athens-Clark county residents. At the same time, the reliability and validity of the instrument were also tested with the convenience sample of 157 undergraduate students. Then the results from these two samples were compared to see whether they were consistent. Since there is only one measurement of both dependent variables and independent variables in this study, there is no need to examine the test-retest or alternate form reliability. First, a bivariate analysis was conducted to test the internal consistency of the instrument. Pearson correlation coefficients was calculated by correlating each item with the total index score and then the average item-total reliability was checked with the average of those correlation coefficients. In addition, average interitem reliability was also tested with Cronbach's alpha coefficient. Grable and Lytton's research suggested that these 13 items measured three dimensions of individual's financial risk tolerance, so a factor analysis was also conducted to investigate the underlying dimensions of the instrument.

When measuring respondents' financial risk aversion, the coding of respondents' choices in each item was reversed---- a higher score indicates more risk averse and a lower score indicates less risk averse. Respondents' risk aversion was coded as the sum of their scores (range from 13 to 47) for each item. It is an interval level of measurement. In later statistical analysis, the total index scores were used in multiple regression models with other independent variables.

Data Analysis

Two dependent variables in this study, the dollar amount of households' debt and the proportion of households' mortgage debt and auto debt to their total debt, were both measured with a ratio level of measurement. Independent variables are divided into three categories: socio-demographic variables, financial variables, and psychological variables. The main independent variables of interest are psychological variables, including respondents' expectation for the future general economic situation in the U. S., expectation regarding future inflation, expectation of future interest rates, expectation for their households' future real income, and risk aversion. Since respondents' expectations regarding the future situation are highly correlated, an expectation index was created as the sum of scores in each question for statistical analysis. All psychological variables were measured with an interval level of measurement. Socio-demographic variables and financial variables were controlled in the statistic analysis. Among socio-demographic variables, respondents' age, household size, educational level, and knowledge about consumer credit were measured with interval level of measurement whereas their marital status, employment status and occupation, and their household type are measured with a nominal level of measurement. The financial variables, both respondents' total household income and equity, were measured with a ratio level of measurement.

In order to decide the final version of instrument to enter statistical analysis, the reliability of 13-item instrument to measure respondents' risk aversion was tested first with item-total coefficient and Cronbach alpha coefficient. Using the student sample, the instrument has a Cronbach alpha of 0.7093, while it has a Cronbach alpha of 0.7069 when using resident sample which are both acceptable for measuring an attitude variable.

However, the correlation coefficients with the total scale for item 6 (0.1874), item 8 (0.1685) and item 10 (0.1473) were very low, and deleting these three items increased the Cronbach alpha coefficient to 0.7239. Then, factor analysis was used to study how many dimensions the instrument measured and to decide whether to delete these three items. Principal component method was used to decide the number of factors and varimax rotation method was used to decide the factor pattern. Four factors were retained in student sample, which retained 52.30% of the variance. Item 10 causes some problem in factor pattern, because it was a split item. Using the resident sample, six factors were retained, which retained 73.62% of the variance. Items 6, 8 and 10 do not contribute to the other factors. According to the results of reliability and factor analysis, items 6, 8 and 10 were deleted and the other 10 items were retained to obtain the risk aversion index for later analysis.

After the instrument measuring risk aversion was refined, the analyses to test the hypotheses began. Considering the level of measurement of both dependent variables and independent variables, multiple regression analysis with dummy variables is the most appropriate statistic analysis procedure. The variables measured with a nominal level of measurement were treated as dummy variables to compare the differences between levels. There were two levels in marital status and employment status, respondents' marital status was coded 1 if they are married, and 0 otherwise. Their employment status was coded 1 if they are employed, and 0 otherwise. There are three levels in respondents' occupation. Respondents' occupation was asked with open-ended item and was turned into two dummy variables. It was coded 3 if they are professionals, managers or lesser professionals; coded 2 if they are teachers, administrators, salesmen or clerks; coded 1 if

they are skilled or semi-skilled operators. However, this variable was abandoned because there were two many missing values. Household type was also turned into three dummy variables. Nuclear household was coded 3, single-person household was coded 2, single-parent household was coded 1, and couple-only household was coded 0. In the regression models, independent variables with nominal levels of measurement which were coded 0 were omitted categories, so there were eight dummy variables.

As previous research has found that socio-demographic variables and financial variables which are included in this study had significant effect on the dollar amount of households' debt (Liao, 1994; Chen & Finke, 1996; Godwin, 1998), those variables will be controlled statistically when investigating the main effects of psychological variables. A hierarchical multiple regression analysis which included two models was used to investigate the relationship between psychological variables and the dollar amount and composition of households' debt, *ceteris paribus*. First, all bivariate correlation coefficients between the dependent variables and independent variables were obtained and the dependent variables were regressed on all the socio-demographic variables and financial variables. This step served two purposes: one was to address the multicollinearity problem; the other was to check for possible violation of underlying assumptions of the linear regression model. Among those socio-demographic variables and financial variables, respondents' age, education level and occupation, and their households' income may be highly correlated. If so, including all of them would reduce their partial sum of squares, and thus, reduce their unique explanatory power in explaining the dependent variables. Therefore, those independent variables with very high Pearson correlation coefficients with other independent variables were examined.

Only the independent variable having the highest correlation coefficient with the dependent variables were selected for further analysis. According to this criterion, age, educational level, employment status, household size, financial knowledge index and income left. In the second step, a forward selection regression procedure was conducted on the selected variables with a significance level of 0.5. The significance level was much higher than traditional alpha level of .05 so that the independent variables having potential explanatory power of variability on dependent variables would not be excluded from analysis too early. The models chosen by this step are model A in this hierarchical analysis. Respondents' educational level, employment status, and financial knowledge index were chosen to enter the model for the total amount of households' debt:

Model A1 : $Y_1 = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \varepsilon_1$ (R_{A1}^2)

Where Y_1 is the dollar amount of respondents' households' debt, β_0 is constant, X_1 is educational level, X_2 is employment status, X_3 is financial knowledge index, and ε_1 is error term. β_i's are regression coefficients of corresponding independent variables. R_{A1}^2 is the coefficients of determination for this model.

Respondents' educational level, employment status, and income were chosen to enter the model for the composition of households' debt:

Model B1 : $Y_2 = \gamma_0 + \gamma_1 X_1 + \gamma_2 X_2 + \gamma_3 X_3 + \varepsilon_2$ (R_{B1}^2)

Where Y_2 is the proportion of respondents' mortgage debt and auto debt to their households' total debt, γ_0 is constant, X_1 is educational level, X_2 is employment status, X_3 is income, and ε_2 is error term. γ_i's are regression coefficients of corresponding independent variables. R_{B1}^2 is the coefficients of determination for this model.

Then, the assumptions of normality, constant variances and independence underlying the appropriate use of ordinary least squares (OLS) regression were checked. Both plots (box plot and normal probability plot) and test statistics (Shapiro-Wilk and Kolmogorov-Smirnov tests) showed the normality assumption underlying both models was met. Then, residual plots against predicted values of dependent variables and each independent variable were obtained to check the equal variance assumption. The plots showed that variances in households' total debt and ratio of households' mortgage debt and car debt to total debt had systematic change with educational level and income, respectively. Therefore, OLS estimation is not efficient and weighted least square is better. However, the coefficients estimated with weighted least square for both models were not much different from those with ordinary least square, which suggested that unequal variance problem was not serious thus weighted least square was not very helpful. Therefore, both models were still estimated with ordinary least squares.

Then, the five psychological variables were added to model A to obtain model B:

Model A2 : $Y_1^* = \beta_0^* + \beta_1^* X_1 + \beta_2^* X_2 + \beta_3^* X_3 + \beta_4^* X_4 + \beta_5^* X_5 + \varepsilon_1^* \; (R_{A2}^2)$

Model B2 : $Y_2^* = \gamma_0^* + \gamma_1^* X_1 + \gamma_2^* X_2 + \gamma_3^* X_3 + \gamma_4^* X_4 + \gamma_5^* X_5 + \varepsilon_2^* \; (R_{B2}^2)$

Y_1^* and Y_2^* represent the same dependent variables in model 2 as Y_1 and Y_2, respectively, in model 1. X_4 is respondents' risk aversion index and X_5 is their expectations for the future. β_i^* and γ_i^* (i = 1, 2, 3, 4, 5) are the corresponding regression coefficients of X_i. The coefficient of determination of these two models are denoted by R_{A2}^2 and R_{B2}^2.

The null hypotheses of there is no relationship between each main independent variable and the dependent variables were tested with an individual t-value:

H0: $b_i = 0$ vs. Ha: $b_i \neq 0$ ($\alpha = .05$)

If the individual null hypothesis is rejected, an unstandardized coefficient (b-value) indicates the direction and magnitude of the relationship between the independent variable and dependent variables. A negative b-value shows a negative relationship and a positive b-value shows a positive relationship. The absolute value of b indicates the variability of dependent variables with one unit change of corresponding independent variables, *ceteris paribus*. A standardized coefficient (β-value) enables us to compare the relative effect of the independent variables on the dependent variables.

Finally, an F-test was conducted to examine whether or not these psychological variables made additional contributions to explaining the variability on the dependent variables that was statistically significant:

H0: $R_{A1}^2 = R_{A2}^2$ vs. Ha: $R_{A1}^2 \neq R_{A2}^2$ ($\alpha = .05$)

H0: $R_{B1}^2 = R_{B2}^2$ vs. Ha: $R_{B1}^2 \neq R_{B2}^2$ ($\alpha = .05$)

If the null hypothesis is rejected, it means that the psychological variables significantly improve the explanation of the variability in the dependent variables over the basic model including just the socio-demographic and financial variables.

CHAPTER 4

RESULTS

The main purpose of this study is to investigate how psychological factors such as risk aversion and expectations about future economic environment influence households' total debt burden and debt portfolio and whether they significantly increase the explanatory power in the variability of both dollar amount and composition of households' debt to socio-economic factors. Two hierarchical models were used to achieve this goal. Meanwhile, since the reliability and validity of the instrument measuring respondents' risk aversion will influence the study of its effect on households' debt status, the 13-item instrument developed by Grable and Lytton (2000) was examined again with Cronbach's alpha and factor analysis.

Description of Sample

After two-month data collection, 76 completed questionnaires were returned. The descriptive results are shown in Table 2. These respondents' ages range from 19 to 84 with the mean of 44. Among the 76 respondents, 39.47% of them have Bachelor's degree, 18.42% have Master's degree, and 19.74% are Ph.D, which is obviously higher than the general population because Athens is a university town. About two-thirds (63.16%) of them are employed in a paid job. About one-half of the households (51.32%) had total household income over $60,000 in 2001, which is also obviously higher than average household income level in the U. S. Single person households are the largest group (42.67%) in the sample, followed by couple only households (33.33%) and nuclear family households (21.33%), and single parent households comprise only 2.67% of the

Table2
Summary of independent variables (n = 76)

Variables	Level	n	%	Mean	Median	STD
Age	≤30	21	27.63	43.59	39	17.81
	31-40	21	27.63			
	41-50	8	10.53			
	51-60	11	14.47			
	>60	15	19.74			
Employment status	Employed	48	63.16			
	Not employed	28	36.84			
Income	<$10,000	7	9.21	$46,2000	$65,000	$88,150
	$10,000-19,999	3	3.95			
	$20,000-29,999	5	6.58			
	$30,000-39,999	10	13.15			
	$40,000-49,999	8	10.53			
	$50,000-59,999	4	5.26			
	$60,000-69,999	4	5.26			
	$70,000-79,999	6	7.89			
	$80,000-89,999	10	13.16			
	$90,000-99,999	1	1.32			
	≥$100,000	18	23.68			
Educational level	High school drop-out	2	2.63			
	High school	4	5.26			
	Some college	11	14.47			
	Bachelor	30	39.47			
	Master	14	18.42			
	Ph.D	15	19.74			

To be continued

Table2 (Continued)
Summary of independent variables (n = 76)

Variables	Level	n	%	Mean	Median	STD
Occupation (Missing=29)	Professional or less professional, executive and manager	39	82.98			
	Skilled labor	6	12.77			
	Non-skilled labor	2	4.26			
Household type	Couple only	25	33.33			
	Single parent	2	2.67			
	Single person	32	42.67			
	Couple with children	16	21.33			
Household size (Missing=3)	1	16	21.92	2.36	2	1.13
	2	33	45.21			
	3	10	13.70			
	4	10	13.70			
	5	4	5.48			
Financial knowledge	3	5	6.58	6.13	6	1.37
	4	4	5.26			
	5	13	17.11			
	6	19	25.00			
	7	24	31.58			
	8	11	14.47			
Risk aversion (13-item)	22-30	15	19.74	33.83	33	4.36
	31-35	37	48.68			
	36-40	18	23.69			
	41-46	6	7.89			
Risk aversion (10-item)	≤20	1	1.32	27.08	27	3.81
	21-25	26	34.21			
	26-30	32	42.10			
	31-35	17	22.36			
Expectations	9-11	7	9.21	13.89	14	1.80
	12-14	35	46.05			
	15-17	34	44.74			

sample. The median household size of these respondents is 2. They have an average score of 6.13 on financial knowledge. Most of them (90.79%) expect that the future economic environment will be at least the same or a little better. Over 70% of these respondents have medium level of financial risk aversion (score between 31 and 40).

These respondents hold an average amount of mortgage loan of $43197.37 and an average car loan of $3981.70 (Table 3). Their average total debt is $81034.57 and their average ratio of mortgage debt and car debt to total debt is 0.43. Among these respondents, 44 households (57.89%) do not have any mortgage debt for a main residence and 58 households (76.32%) do not have any car debt for family use, but only 24 of them (39.34%) hold neither kind of debt. Only 14 households (19.74%) hold no debt at all.

Retest of the risk-aversion instrument

First, reliability and factor analysis were conducted on Grable and Lytton's (2000) 13-item instrument measuring respondents' risk aversion using both the resident sample (n = 76) and student sample (n = 157). Item frequencies of this instrument for resident sample and student sample are shown in Table 4. The choices of three items (items 1, 6, 7 and 13) do not have much variance in the resident sample. To item 1 (friends' description of the respondent as a risk taker), nobody chose "a real risk avoider", only one chose "a real gambler", while the rest of them (98.68%) chose the other two answers. Half of them (50%) chose "willing to take risks after completing adequate research", and about another half of them (48.68%) chose "cautious". Maybe most respondents regard "willing to take risks after completing adequate research" as "cautious". To item 6, only one respondent chose "thrill" as the word that came to mind first when thinking of risk. To item 7

(investment choice between government bonds against hard assets), only one respondent chose to sell government bonds, put all money into hard assets and borrow additional money to buy more, and two respondents chose to put all money into hard assets but do not borrow to buy more. To item 13 (investment in gold mining), only one respondent chose to invest six month's salary and another one chose to invest three month's salary. Respondents' choices in these items suggest that they did not think the choices of above average risks were much different from the choices of substantial risks, so little variance was found between these two choices. This result is consistent with Sung and Hanna's (1996) results. When they examined the effects of income and demographic characteristics on risk tolerance, they used the one item instrument with four answers to measure respondents' risk tolerance in the 1983 and 1986 Survey of Consumer Finances. The four possible answers were no risk, average risk, above average risk, and substantial risk. They combined above average risk and substantial risk categories because there was not much variance between these two.

The item-total correlation and Cronbach's alpha coefficients were obtained to test the internal consistency of the instrument (Table 5). The standardized variables for both samples had a Cronbach's alpha over 0.70, which is acceptable for an instrument measuring a psychological construct. Most of the items had similar item-total correlation coefficients across the two samples. However, items 6 and 8 have low correlations (0.1921 and 0.1814 respectively) with the total index in the resident sample, but have moderate correlation (0.3372 and 0.4059 respectively) with the total index in the student sample. However, after checking how adults and students responded to these two questions, it was interesting to find that they actually responded quite similarly. To item 6

Table 3
Summary of dependent variables (n = 76)

Variables	Level	Percent	Mean	Median	STD
Mortgage debt	$0	57.89	$43197.37	$0	$65483.44
	$1,000-40,000	5.27			
	$41,000-70,000	10.52			
	$71,000-100,000	10.53			
	$101,000-130,000	9.21			
	$131,000-150,000	2.64			
	$151,000-350,000	3.95			
Car debt	$0	76.32	$3981.70	$0	$11323.01
	$100-1,000	2.64			
	$1,100-10,000	7.89			
	$10,100-20,000	9.21			
	$20,100-82,600	3.95			
Total debt	$0	19.74	$81034.57	$46775	$113453.03
	$100-1,000	6.58			
	$1,100-10,000	7.89			
	$10,100-30,000	11.84			
	$30,100-60,000	7.90			
	$60,100-100,000	13.16			
	$100,100-160,000	21.05			
	$160,100-250,000	6.58			
	$250,100-695,300	5.26			
Mortgage + car debt / Total debt (Missing=15)	0	39.34	0.43	0.32	0.43
	0.01-0.30	9.84			
	0.31-0.70	14.75			
	0.71-0.99	22.96			
	1	13.11			

Table 4
Item frequencies for risk aversion instrument (resident sample and student sample)

Item		Description	Resident		Student	
			n	%	n	%
1	In general, how would your best friend describe you?					
	1	A real gambler	1	1.32	15	9.55
	2	Willing to take risks after completing adequate research	37	48.68	84	53.50
	3	Cautious	38	50	54	34.39
	4	A real risk avoider	0	0	4	2.55
2	Which would you take if you were on a TV show?					
	1	A 5% chance at winning $100,000	8	10.53	9	5.73
	2	A 25% chance at winning $10,000	10	13.16	29	18.47
	3	A 50% chance at winning $5,000	32	42.11	75	47.77
	4	$1,000 in cash	26	34.21	44	28.03
3	You lose your job three weeks before vacation. You would:					
	1	Extend your vacation	2	2.63	8	5.10
	2	Go as scheduled	16	21.05	66	42.04
	3	Take a much more modest vacation	24	31.58	52	33.12
	4	Cancel the vacation	34	44.74	31	19.75
4	What would you invest $20,000 on?					
	1	Invest it in stocks or stock mutual funds	37	48.68	37	23.57
	2	Invest it in safe high quality bonds or band mutual funds	18	23.68	73	46.50
	3	Deposit it in a bank account, money market account, or an insured CD	21	27.63	47	29.94
5	How comfortable are you investing in stocks or stock mutual funds?					
	1	Very comfortable	25	32.89	17	10.83
	2	Somewhat comfortable	35	46.05	88	56.05
	3	Not at all comfortable	16	21.05	52	33.12
6	Which words comes to mind first when thinking of risk?					
	1	Thrill	1	1.32	14	8.92
	2	Opportunity	14	18.42	26	16.56
	3	Uncertainty	56	73.68	106	67.52
	4	Loss	5	6.58	11	7.01

To be continued

Table 4 (Continued)
Item frequencies for risk aversion instrument

Item	Description	Resident		Student	
		n	%	n	%
7	Experts predict prices of hard assets to increase. Most of your assets are in government bonds. You would:				
	1 Sell the bonds, put all money into hard assets and borrow additional money to buy more	1	1.32	2	1.27
	2 Sell the bonds, put the total proceeds into hard assets	2	2.63	11	7.01
	3 Sell the bonds, put half the proceeds into money market account, and the other half into hard assets	29	38.16	78	49.68
	4 Hold the bonds	44	57.89	66	42.04
8	Given the best and worst case returns of investment choices, which would you prefer?				
	1 $4,800 gain best case; $2,400 loss worst case	7	9.21	14	8.92
	2 $2,600 gain best case; $800 loss worst case	39	51.32	75	47.77
	3 $800 gain best case; $200 loss worst case	21	27.63	49	31.21
	4 $200 gain best case; $0 gain/loss worst case	9	11.84	19	12.10
9	Which of the following would you choose?				
	1 A 50% chance to gain $1,000 and 50% chance to gain nothing	20	26.32	76	48.41
	2 A sure gain of $500	56	73.68	81	51.59
10	Which of the following would you choose?				
	1 A 50% chance to lose $1,000 and a 50% chance to lose nothing	58	76.32	124	78.98
	2 A sure loss of $500	18	23.68	33	21.02
11	Which of the following investment choices would you select to put all your money in?				
	1 Commodities like gold, silver, and oil	2	2.63	3	1.91
	2 A portfolio of 15 common stocks	12	15.79	29	18.47
	3 A mutual fund that owns stocks and bonds	48	63.16	75	47.77
	4 A savings account or money market mutual fund	14	18.42	50	31.85
12	Which of the following investment choices would you find most appealing?				
	1 10% in low-risk 40% in medium-risk 50% in high-risk	5	6.58	7	4.46
	2 30% in low-risk 40% in medium-risk 30% in high-risk	47	61.84	77	49.04
	3 60% in low-risk 30% in medium-risk 10% in high-risk	24	31.58	73	46.50
13	How much would you invest in gold mining?				
	1 Six month's salary	1	1.32	0	0
	2 Three month's salary	1	1.32	16	10.19
	3 One month's salary	32	42.11	89	56.69
	4 Nothing	42	55.26	52	33.12

Table 5
Reliability test of 13-item risk aversion questionnaire (student sample and resident sample)

	Resident Sample (n = 76)		Student Sample (n = 157)	
	Standardized Variables		Standardized Variables	
Item	Correlation with total	Alpha	Correlation with total	Alpha
1	.4076	.6794	.5056	.6689
2	.2654	.6983	.3729	.6870
3	.3150	.6918	.1630	.7140
4	.2036	.7063	.3408	.6912
5	.3883	.6820	.3201	.6940
6	.1921	.7078	.3372	.6917
7	.4541	.6730	.1844	.7113
8	.1814	.7091	.4059	.6826
9	.2241	.7037	.3480	.6903
10	.1620	.7115	.1112	.7204
11	.5155	.6645	.3964	.6838
12	.6097	.6510	.4524	.6763
13	.3938	.6813	.3903	.6847
Cronbach Alpha		.7069		.7093

(word associated with “risk”), 73.68% of the residents and 67.52% of the students chose answer 3 (“Uncertainty”). To the same item, 18.42% of the residents and 16.56% of the students chose answer 2 (“Opportunity”). To item8 (best and worst case returns of investment choices), 51.32% of the residents and 47.77% of the students chose answer 2 ($2,600 gain and $800 loss). To the same item, 27.63% of the residents 31.21% of the students chose answer 3 ($800 gain and $200 loss).

What made the item-total correlation coefficients so different across the two samples is how residents and students responded to other questions. Residents and students reacted quite differently in some items, such as items 3, 4, 12 and 13. In item 3 (decision about vacation when losing job), nearly half of the residents (44.74%) chose “Cancel the vacation”, while only 19.75% of students gave up this vacation, instead, most of them (75.16%) chose either “take a more modest vacation” or “ go as scheduled”. This reflects adults and students treat leisure much differently and adults consider more seriously about their financial situation than students do. This may explain why item 3 has low correlation with total index in student sample but has moderate correlation with total index in resident sample.

Residents and students also responded quite differently to item 4 (investment choice among saving, low-risk investment and high-risk investment). About half of the residents (48.68%) chose to “invest in stocks or stock mutual funds”, while about half of the students (46.50%) chose to “invest in safe high quality bonds or bond mutual funds”. Similarly, more residents (68.42%) were willing to take more risk in investment choice among different combinations of low-risk, medium-risk and high-risk investments (item 12) than students (53.50%). However, in item 13 (gold mining investment), more than

half of the residents (55.26%) would invest nothing in the gold mine, while 56.69% of the students would invest one month's salary. Their different reactions to these questions reveals that adults are willing to take more risk when making an investment in something like stock and bonds, but they are more cautious about speculative investment in instruments such as gold than students. In the student sample, items 1, 12 and 8 have the highest correlation (0.5056, 0.4524, and 0.4059 respectively) with the total index, while in resident sample, items 12, 11 and 7 have the highest correlation (0.6097, 0.5155 and 0.4541 respectively) with the total index. Items 1 (friends' description of the respondents as a risk taker) and 8 (best and worst case returns of investment choices) are rather abstract questions about risk in general that deal with nothing specific about investment tools. But items 7 and 11 are about choices between relatively safe instruments such as bonds, savings accounts and mutual funds and speculative instrument such as gold, silver and oil. Students and residents responded to questions about general risk similarly, but they responded quite differently to questions involving specific investment tools.

Items 9 (sure gain vs. 50% chance to gain more or nothing) and 10 (sure loss vs. 50% chance to lose more or nothing) reveal another interesting point about how people react differently to the word "gain" and "loss". In both the student and resident samples, item 10 has the lowest item-total correlation (0.1112 and 0.1620 respectively), but item 9, which is the same kind of question as item 10, has higher item-total correlation (0.3480 and 0.2241 respectively). About half of the students selected either choice in item 9, but most of them (78.98%) selected the riskier choice in item 10 (50% chance to lose more or nothing). A similar pattern was observed in the resident sample, where most of them (73.68%) selected the less risky choice in item 9, but most of them (76.32%) selected the

riskier choice in item 10. These two items suggest how people associate the concept of "risk" with the words "loss" and "uncertainty". When there was no mention of the possibility of "loss" (as in item 9), the choice with uncertain situation (50% chance to gain more and 50% chance to gain nothing) was considered to be riskier than the choice with sure gain, which is consistent with Grable and Lytton's suggestion. However, when the possibility of "loss" and "uncertainty" were mentioned in the same item, the word "loss" went to respondents' mind first and the choice with sure loss was consider to be riskier. Thus, a sure loss of $500 was considered to be riskier than a probable loss of nothing, although there is still a 50% chance of $1,000 loss, which contradicts Grable and Lytton's suggestion. This also suggests that an abstract question like item 6 (the word comes to mind first when thinking of "risk") does not reflect respondents' real feeling about risk. Though 67.52% of the students and 73.68% of the residents selected "uncertainty" in item 6 as the word comes to their mind first when thinking of "risk", while only 7.01% of the students and 6.58% of the residents selected "loss", the pattern of their responses across item 9 and item 10 may suggest that the word "loss" comes to their mind first when thinking of "risk". Although risk is associated with four elements: probability of gain, probability of loss, the dollar amount of potential gains, and the dollar amount of potential loss, respondents do not treat them in the same way and the same order. Respondents' different reaction in item 9 and item 10 suggests that more research need to be done to understand their risk perception more specifically regarding the four elements rather than as a whole.

Besides the reliability test, factor analysis was also conducted to see how many dimensions the 13-item instrument measures (Table 6 and Table 7). The principal

components method was used to derive the factors and the Varimax rotation method was used to study the factor pattern. Factors with an eigenvalue of greater than one were retained. According to this criterion, six factors were retained in the resident sample (Table 6), which retained 73.62% of the variance in the 13 items. Factor one contained items 13, 7, 11, 12 and 3. All items in this factor except item 3 were about respondents' choice of relatively safe investment against speculative investment. Only item 3 was about vacation decision when losing the job. Factor two contained items 4 and 5, which measured respondents' experience and comfort in investment against savings. Factor three included items 9 and 2, which were about respondents' choice between sure gain and uncertain chance of gain. Items 1 and 6 were in factor four. Both of them were about respondents' risk preference in general. Factor five contained only item 8 and factor six contained only item 10. There were two split items: item 12 and item 1. The loadings of item 12 on factor one and factor two were very close (0.49 and 0.45, respectively). Item 12 may reflect respondents' choice of savings against investment (factor two) and their choice of relatively safe investment against speculative investment (factor one) as well, because this item does not involve specific investment instruments and it is only various combination of low-risk, medium-risk and high-risk investments. The loadings of item 1 on factor three and factor four were also very close (0.50 and 0.52 respectively).

In the student sample, four factors were retained, which together retained 52.30% of the variance in the 13 items (Table 7). Factor one included items 1, 6, 2 and 9. Among these four items, two of them (items 1 and 6) were about respondents' risk aversion in general; the other two (items 2 and 9) were about respondents' choice of sure gain against uncertain chance of gain. Factor two contained items 4, 5, 11, and 10. Items 4 and 5 were

Table 6
Factor analysis results of the resident sample (n = 76)

Item		Factor pattern					
		1	2	3	4	5	6
13	The amount would be invested in hard asset	0.81					
7	Investment decision about bonds vs. hard assets	0.76					
11	Invest certain amount in different investment tools vs. hard assets	0.65					
12	Preferred low-risk, medium-risk and high-risk combination in investment choice	0.49	0.45				
3	Decision about vacation when losing the job	0.47					
4	Choice about saving vs. investment		0.82				
5	Investment experience and comfort in stocks and stock mutual funds		0.81				
9	Choose from sure gain and 50% chance of gain			0.91			
1	Friends' description as a risk taker			0.50	0.52		
2	Certain win vs. uncertain chance of winning different amount of money in TV game			0.47			
6	The word comes to mind first when thinking of "risk"				0.92		
8	Preferred gain/loss combination in investment choice					0.87	
10	Choose from sure loss and 50% chance of loss						0.82
	Variance retained			73.62%			

Table 7
Factor analysis results of the student sample (n = 157)

Item		Factor pattern		
		1	2	3
1	Friends' description as a risk taker	0.72		
6	The word comes to mind first when thinking of "risk"	0.65		
2	Certain win vs. uncertain chance of winning different amount of money in TV game	0.63		
9	Choose from sure gain and 50% chance of gain	0.56		
4	Choice about saving vs. investment		0.78	
5	Investment experience and comfort in stocks and stock mutual funds		0.70	
11	Invest certain amount in different investment tools vs. hard assets		0.59	
10	Choose from sure loss and 50% chance of loss		0.46	
13	The amount would be invested in hard asset			0.71
7	Investment decision about bonds vs. hard assets			0.48
12	Preferred low-risk, medium-risk and high-risk combination in investment choice			0.45
3	Decision about vacation when losing job			
8	Preferred gain/loss combination in investment choice			
	Variance retained		52.3%	

about respondents' experience and comfort of investment against savings. Item 11 was about respondents' choice of relatively safe investment against speculative investment. Item 10 was respondents' choice of sure loss against uncertain chance of loss. Factor three included three items (items 13, 7 and 12), which were about respondents' choice of relative safe investment against speculative investment. Items 3 and 8 were in the last factor.

If one combines factors three and four, and factors five and six in the resident sample, then the rotated factor patterns are similar to those of the student sample. The reasons mentioned above in reliability analysis might explain the inconsistency in the factor pattern between two samples caused by items 3, 8 and 10. The fact that items 6, 8 and 10 did not make contribution to the first three factors which included the other ten items suggested that these three items were not related to the other items. The factor pattern results were consistent with the reliability results, which showed items 6, 8 and 10 had low correlation coefficients with the total index. Based on their factor pattern and the fact that deleting item 6, 8 and 10 would increase Cronbach's alpha coefficient to 0.7239, these three items were deleted and the risk aversion index was constructed on the left 10 items for later statistical analysis. After deleting item 6, 8 and 10, factor analysis was conducted again on the 10 items left and three factors were retained which retained 57.8% of the items' variance (Table 8). Factor 1(except for item 3) is speculative risk in hard assets. It included items 7, 13, 3 and 11. Factor 2, including items 4, 5 and 12, is investment risk regarding stocks, bonds, and other common investment tools. Factor 3 is abstract and general attitude towards risk. Items 9, 2 and 1 were in this factor.

Table 8
Factor analysis results of 10-item instrument (resident sample)

Item	Description	Factor pattern		
		1 Speculative risk	2 Common investment instrument risk	3 General risk attitude
7	Investment decision about bonds vs. hard assets	0.75		
13	The amount would be invested in hard asset	0.71		
3	Decision about vacation when losing job	0.65		
11	Invest certain amount in different investment tools vs. hard assets	0.65		
4	Choice about saving vs. investment		0.83	
5	Investment experience and comfort in stocks and stock mutual funds		0.78	
12	Preferred low-risk, medium-risk and high-risk combination in investment choice		0.52	
9	Choose from sure gain and 50% chance of gain			0.83
2	Certain win vs. uncertain chance of winning different amount of money in TV game			0.63
1	Friends' description as a risk taker	0.50		0.58
	Variance retained		57.8%	

Table 9
Factor analysis results of Grable & Lytton's 13-item instrument

Item	Description	Factor pattern		
		1 Investment risk	2 Risk experience and comfort	3 Speculative risk
4	Choice about saving vs. investment	0.744		
5	Investment experience and comfort in stocks and stock mutual funds	0.635		
12	Preferred low-risk, medium-risk and high-risk combination in investment choice	0.604		
11	Invest certain amount in different investment tools and hard assets	0.472		
8	Preferred gain/loss combination in investment choice	0.465		
1	Friends' description as a risk taker		0.590	
6	The word comes to mind first when thinking of "risk"		0.528	
7	Investment decision about bonds vs. hard assets		0.503	
13	The amount would be invested in hard asset		0.492	
3	Decision about vacation when losing the job		0.459	
9	Choose from sure gain and 50% chance of gain			0.587
10	Choose from sure loss and 50% chance of loss			0.577
2	Certain win vs. uncertain chance of winning different amount of money in TV game			0.444
	Variance retained		33.3%	

Some findings of the factor analysis in this study are not consistent with Grable and Lytton's (2000) study (Table 9). In Grable and Lytton's study, four factors, which explained 38.6% of the variance, were retained with minieigen criterion. The researchers retained only three factors, which retained 33.3% of the variance of 13 items. Factor one was investment risk, which included items 4, 5, 12, 11, and 8. Factor two was risk comfort and experience, which contained items 1, 6, 7, 13 and 3. The last factor was speculative risk, which had items 9, 10 and 2. However, the factor pattern was not very clear. Items 8, 3 and 2 were split items. All items' loadings on factor four were not reported so which of them had high loadings on factor four was unknown. In this study, four factors, which retained 52.30% of the variance, were retained using the same criterion in the resident sample (Table 6). The factor patterns of items 2, 9, 4, 5, 11, 7 and 13 were similar in both studies. In Grable and Lytton's study, items 4, 5 and 11 were in factor one (investment risk), and items 7 and 13 were in factor two (risk comfort and experience). Actually, items 4, 5, 11, 7 and 13 were all about investment risk. However, items 7, 13 and 11 were about the choice of relatively safe investment instruments such as bonds, bond mutual funds and stocks against speculative investment instruments such as gold, silver and oil. Items 4 and 5 were about respondents' experience and comfort to invest their money in instruments such as bonds, stocks and stock mutual funds rather than saving their money in CDs and money market accounts. Therefore, it is reasonable that items 7, 13 and 11 were in the same factor, and items 4 and 5 were in the same factor.

Test of Substantial Hypotheses

After respondents' risk aversion index was determined, hierarchical multiple regression models were used to test the hypotheses. First, bivariate analysis was used to investigate the multicollinearity problem and to check the goodness-of-fit of the model. Pearson correlation coefficients between both independent and dependent variables were obtained and among those independent variables that were highly correlated, only the one that had the highest correlation with the dependent variables was chosen. According to this criterion, age, educational level, employment status, household size, financial knowledge, and income were in the set of variables available for entering into the model. With a forward selection procedure set at a .50 significance level, only educational level, employment status and financial knowledge index were selected to enter model A for the dollar amount of total households' debt. Educational level, employment status and income were selected to enter model B for the composition of households' debt.

After the covariates were decided, normality and equal variances assumptions were tested. The normality assumption for model A, analyzing total debt, could not be rejected at .05 significance level using both the Shapiro-Wilk test ($p = .7570$) and the Kolmogorov-Smirnov test ($p = .1500$). The normality assumption for model B, analyzing the proportion of debt held in mortgage and car loans, could not be rejected at 0.05 significance level using both the Shapiro-Wilk test ($p = .2330$) and the Kolmogorov-Smirnov test ($p = .1500$). Box plots and normal probability plots also confirmed that the normality assumption was met for each model.

Then, residual plots against predicted values of dependent variables and each of the independent variables were obtained to check the equal variance assumption. The

plots showed that variances in households' total debt became larger as respondents' educational level increased and variances in the proportion of households' mortgage and car debt to total debt became larger as respondents' income rose. Since the variances were not constant but showed some systematic patterns, it suggested that weighted least squares were more appropriate than ordinary least squares, so weighted least squares were used to estimate the parameters of the final model. However, the coefficients estimated with weighted least squares for both models were not much different from those estimated with ordinary least squares, which suggested that unequal variance was not a serious problem. Thus, weighted least squares were not very helpful. Both models were still estimated with ordinary least squares for the subsequent hypotheses tests.

Hypotheses Test about Households' Total Debt

The first set of hypotheses was tested with model A1 and A2 (Table 10). Model A1 included only the three covariates identified in the previous step as explanatory variables for total dollar amount of households' debt. Results showed that respondents' educational level ($t = 3.18$, $p = .0022$) and employment status ($t = 3.62$, $p = .0005$) had statistically significant positive relationships with the dollar amount of households' debt. Financial knowledge ($t = -2.17$, $p = .0333$) had statistically significant negative relationship with the dollar amount of households' debt. Each additional level of education is associated with a large increase in households' total debt. For example, the households whose head has Bachelor's degree hold about $30,788, on average, more debt than those households whose household head has only some college. Households whose head is employed hold an average of $87,995 more debt than those households whose head is not employed. Each additional point respondents scored on the financial

Table 10
Factors related to the dollar amount of households' debt (n = 76)

Independent Variables	b-value	β	t-value	b-value	β	t-value
Intercept	12304	0	0.21	363831	0	2.78**
Education level	30788	0.33	3.18**	20084	0.22	2.11*
Employment status	87995	0.38	3.62***	81070	0.35	3.57***
Financial knowledge	-19195	-0.23	-2.17*	-19508	-0.24	-2.29*
Risk aversion				-10801	-0.36	-3.61***
Expectations				-523	-0.01	-0.08
F-value = 8.56***				F-value = 8.54***		
R-square = .2630				R-square = .3788		

*p<.05 **p<.01 ***p <.001

knowledge index, households had $19,195 less total debt on average. The standardized coefficients showed that employment status (â = 0.38) had the strongest effect on households' total debt, followed by educational level (â = 0.33). The null hypothesis that no variance in the dollar amount of households' debt can be explained by the set of three independent variables was rejected ($F = 8.56$, $p < .0001$). The R-square for the model of .2630 suggested that respondents' educational level, employment status and financial knowledge explained about 26% of the variability in the dollar amount of households' debt, while the adjusted R-square was .2323.

Model A2 includes these same three covariates plus respondents' risk aversion and expectations for the future. The first null hypothesis of this study is that there is no statistically significant relationship between respondents' risk aversion and the dollar amount of their households' debt was rejected ($t = -3.61$, $p = .0006$). *Ceteris paribus*, there was a statistically significant negative relationship between respondents' risk aversion and their households' total debt. For every additional point respondents scored on the risk aversion index, households have $10,801 less on average in total debt. The second hypothesis, that there is no statistically significant relationship between respondents' expectations regarding the future economic environment, could not be rejected ($t = -0.08$, $p = .9336$). When other factors were controlled, respondents' expectations for the future did not related to households' total debt. Standardized coefficients showed that respondents' risk aversion (â = -0.36) had the strongest effect on households' total debt, followed by their employment status (â = 0.35) and financial knowledge (â = -0.24). The overall null hypothesis that no variance in the dollar amount of households' debt is explained by the set of five independent variables was rejected

($F = 8.54$, $p < .0001$). The R-square of .3788 suggested that these three socio-economic variables and two psychological variables explained about 38% of the variability in households' total debt burden. Compared with the R-squares of model A1, model A2, which included the two psychological variables, increased the explanatory ability of households' total debt by about 12 percentage points. The overall null hypothesis that psychological variables do not make a statistically significant contribution to the explaining of variability in the dollar amount of households' debt was accepted ($F = 3.0370$, $p = .0543$). However, the p-value is very close to .05 significance level. Thus, further research with a larger sample size and respondents of more variable and more typical educational and income levels needs to be done on this issue.

Hypotheses Test about the Composition of Households' Debt

The second set of hypotheses was tested with model B1 and model B2 (Table 11). These hypotheses focused on the composition of households' debt and, more specifically, the proportion of households' debt held as mortgage and auto loans. Since 15 respondents had no debt at all, it was impossible to analyze the composition of their households' debt and they were excluded. Only 61 observations were left for this analysis. Respondents' employment status ($t = 3.17$, $p = .0016$) is the only independent variable in Model B1 that has a statistically significant relationship with the ratio of mortgage and car debt to total debt when other variables were controlled. The ratio of mortgage debt and car debt to households' total debt of those who are employed is about 36 percentage points higher than the ratio of those who are not employed. The overall null hypothesis that no variance in the composition of households' debt is explained by the set of three independent variables was rejected ($F = 5.38$, $p = .0025$). The R-square for the model of .2207

Table 11

Factors related to the composition of households' debt (n = 61)

Independent Variables	b-value	β	t-value	b-value	β	t-value
Intercept	0.29	0	1.21	1.55	0	2.34*
Education level	-0.08	-0.19	-1.48	-0.11	-0.28	-2.10*
Employment status	0.36	0.38	3.17**	0.35	0.37	3.12**
Income	0.01	0.15	1.14	0.02	0.19	1.45
Risk aversion				-0.03	-0.24	-1.95
Expectations				-0.03	-0.12	-1.04
F-Value = 5.38**				F-Value = 4.25**		
R-Square = .2207				R-Square = .2785		

*p<.05 ** p<.01 *** <.001

suggested that respondents' educational level, employment status and households' income explained about 22% of the variability in the composition of households' debt, while the adjusted R-square was .1797.

Model B2 included, in addition to the three previously selected covariates, two psychological variables, respondents' risk aversion and their expectations regarding the future. Only respondents' educational level ($t = -2.10$, $p = .0400$) and employment status ($t = 3.12$, $p = 0.0029$) were statistically significant related to the composition of households' debt when other variables were controlled. The ratio of mortgage debt and car debt to households' total debt for those whose head has Bachelor's degree is about 11 percentage points lower than for those whose head has only some college. The ratio of mortgage debt and car debt to households' total debt for those whose head is employed is about 35 percentage points higher than the ratio for those whose head is not employed. The standardized coefficients showed that respondents' employment status ($\hat{a} = 0.37$) had stronger effect on the ratio of mortgage and car debt to total debt than their educational level ($\hat{a} = -0.28$). Though the null hypotheses that respondents' risk aversion has no statistically significant relationship with the composition of households' debt could not be rejected ($t = -1.95$, $p = .0563$) at .05 significance level, its p-value is very close to the significance level. Due to the fact that the data size of this study is limited to explore the variables with potential significance, the relationship between respondents' risk aversion and the composition of their households' debt worth more study. Another null hypothesis that respondents' expectations regarding future economic environment has no statistically significant relationship with the composition of households' debt could not be rejected ($t = -1.04$, $p = .3028$). The overall null hypothesis of no variance in the composition of

households' debt explained by the set of five independent variables was rejected ($F = 4.25$, $p = .0025$). The R-square for the model of .2785 suggested that these three socio-economic variables and two psychological variables explained about 26% of variability in the composition of households' debt. The adjusted R-square is .2130. Compared with the R-squares of model B1, model B2, which included two psychological variables, did not increase the explanatory ability of the composition of households' debt very much (4%). The overall null hypothesis that psychological variables do not make significant contribution to the explaining of the variability in the composition of households' debt confirmed this conclusion, it was rejected ($F = 0.5635$, $p = .5725$).

CHAPTER 5

SUMMARY AND DISCUSSION

Previous research has fully investigated how socio-economic factors influence households' debt burden. The purpose of this study is to investigate the relationship between psychological factors, such as respondents' risk aversion and expectations regarding their future economic situation, and the dollar amount and composition of their households' debt. Meanwhile, this study also performed some methodological analyses of Grabel and Lytton's (2000) 13-item self-report instrument assessing respondents' risk aversion. Because of the focus on the effect of risk aversion on debt behavior, the reliability and validity of this instrument are very important. *Ex post facto* cross-sectional multivariate design was used in this study. Subjects were selected through a three-stage random sampling from the Athens-Clarke County telephone directory. Five hundred questionnaires were mailed initially and 76 completed questionnaires were returned. Meanwhile, a convenience sample of 157 undergraduate students was also obtained to retest 13-item instrument measuring risk aversion and to compare the results of the student sample and the resident sample. Using Cronbach's alpha and factor analysis, the instrument was refined as a 10-item instrument with three factors measuring respondents' general feeling about risk, risk concerning common investment instruments and speculative risk about investment in tangible assets. Among the psychological variables, a significant negative relationship between respondents' risk aversion and the dollar amount of their households' debt was found, and the effect of respondents' risk aversion on the composition of households' debt was very close to the .05 significance level.

Respondents' expectations regarding the future economic environment had no significant effect on either the dollar amount or the composition of households' debt.

Description of Sample

The sample of this study has an average age of about 44. Since the subjects were selected from a university town, the educational level and income level of the sample are higher than the general population. The median income of 76 respondents is $65,000 and about 77% of them have at least college degree. Future research with a larger sample size and respondents of more typical educational level and income levels needs to be done. Most respondents have moderate financial knowledge and medium level of risk aversion. Most of them expect the future general economic environment to stay the same or become a little better.

These respondents hold an average amount of mortgage loan of $43197.37 and an average car loan of $3981.70. Their average total debt is $81034.57 and their average ratio of mortgage debt and car debt to total debt is 0.43. Among these respondents, 44 households (57.89%) do not have any mortgage debt for a main residence and 58 households (76.32%) do not have any car debt for family use, but only 24 of them (39.34%) hold neither kind of debt. Only 14 households (19.74%) hold no debt at all.

13-item Instrument Measuring Risk Aversion

Methodological procedures were performed on the 13-items instrument assessing risk aversion to test its reliability and validity. Cronbach's alpha and item-total correlation coefficients were obtained to examine each item. Meanwhile, factor analysis was conducted to identify the underlying dimensions the instrument measured. The factor pattern of items 4, 5, 7, 13, 11, 12, which are risk dealing with investment in savings

account, bonds, stock, mutual funds, gold and oil, is very similar in both the student and resident sample. Their correlation coefficients with the total index are also acceptable. The factor pattern of items measuring respondents' risk aversion in general, especially items 6, 8 and 10, is not very clear. Items 6, 8 and 10 had very low correlation coefficients with the total index and they did not make contribution to the other factors containing other ten items, which confirmed their low correlation with the total index. Therefore, these three items were deleted and the other ten items were used to construct risk aversion index, which was used in later statistical analysis to study the relationship between respondents' risk aversion and their households' debt status. Factor analysis was also conducted on the 10-item instrument. Three factors, which retained 57.82% of the variance of ten items, were retained. Factor 1(except for item 3) is speculative risk in hard assets. Factor 2 is investment risk regarding stocks, bonds, and other common investment instruments. Factor 3 is abstract and general attitude towards risk.

Some of the findings in this study were not consistent with Grable and Lytton's (2000) study. One common finding of these two studies is that item 6 (word associated with "risk") and 10 (sure loss vs. 50% chance of loss) had the lowest correlation with the total index in both studies. Another common point is that the Cronbach's alpha of the instrument is over 0.70, which is acceptable. The major difference between the methodological findings of these two studies is in factor analysis. The factor pattern of items 2, 9, 4, 5, 11, 7 and 13 is similar in both studies and both studies identified the items measuring investment risk. However, the items included in each factor were different. In Grable and Lytton's (2000) study, items dealing with investment risk were loaded on two factors. Some (items 4, 5, 12, 11 and 8) were included in investment risk,

and others (items 7 and 13) were included in risk experience and comfort. In this study, these items were loaded differently on two factors. Items 7, 13 and 11 were included in speculative risk dealing with investment in hard assets such as gold and oil. Items 4, 5 and 12 were included in risk dealing with investment in savings account, bonds and stocks.

The first item of this instrument is another version of the one-item instrument in SCF, which had the correlation of about .41 with the total index score. This suggests that the one item in SCF measures respondents' general risk aversion and respondents understand their risk preference; however, it is not enough to measure respondents' risk preference when facing investment choice involving instruments such as savings accounts, bonds, stocks and tangible assets. The very high item-total correlation of items 7, 11, 12, and 13 confirmed this.

Psychological Factors' Effect

The main interest of this study is the effect of respondents' risk aversion and expectations regarding the future economic situation on the dollar amount and composition of their households' debt. There are two independent variables in this study. One is the dollar amount of households' total debt, the other is the ratio of mortgage and car debt to total debt. In order to see whether two psychological factors add significant additional explanatory ability to the model with only socio-economic factors, two hierarchical models were used.

Using forward selection procedure, respondents' educational level, employment status and financial knowledge were included in model A1 as covariates for the dollar amount of households' total debt. Then respondents' risk aversion and expectations

regarding the future economic situation were introduced to obtain model A2. Using the same selection procedure, respondents' educational level, employment status and household income entered model B1 as covariates for the composition of households' debt. Then two psychological variables were introduced to obtain model B2.

Multiple regression with ordinary least squares was conducted on each model. All three socio-economic factors in model A1 and model A2 were found to have significant effect on households' total debt. Respondents' educational level and employed status had significantly positive relationship with households' total debt. Respondents' financial knowledge had significant negative effect on their households' total debt. When these covariates were controlled, respondents' risk aversion had statistically significant negative effect on households' total debt, and their expectations regarding the future economic situation had no statistically significant effect on households' total debt. Two psychological factors did not significantly increase the explanatory of households' total debt to the model with only socio-economic factors. However, the p-value ($p = .0543$) is very close to the .05 significance level. Thus, further research with a larger sample size to study the effect of psychological factors is necessary.

Only respondents' employed status had a significant positive relationship with the composition of households' debt in model B1. In model B2, the effect of both educational level and employed status was found to be significant. Respondents' educational level had statistically significant negative relationship with the composition of households' debt. Neither psychological factor was found to have statistically significant effect on the composition of households' debt. Obviously, two psychological factors did not

significantly increase the explanatory of households' total debt to the model with only socio-economic factors.

The finding that respondents' educational level and employment status were positively related to the dollar amount of households' debt were not surprising and it is consistent with previous research (Godwin, 1998; Bozworth and Huston, 1997). Respondents' educational level and employment status also reflect their income, which was found to have positive relationship with the dollar amount of households' debt in most previous studies. Few researchers have studied the effect of respondents' financial knowledge on their debt. It is not surprising to find that respondents' financial knowledge is negatively related to the dollar amount of households' debt. This study found that risk aversion is a predictor of households' debt burden, which is also consistent with previous study. This study is the first one to use 10-item self-report instrument to investigate the effect of respondents' risk aversion on households' debt burden. Most previous studies used the one-item instrument in the Survey of Consumer Finances. This finding suggested that this 10-item instrument was valid in assessing respondents' risk aversion.

When investigating the factors related to the composition of households' debt, only the effect of respondents' employment status was found to be significant. This is consistent with the finding above. Employed households have $87,995 more debt on average than non-employed households, and since mortgage and car debt is usually a large proportion of households' total debt, that means most of the $87,995 will be on mortgage debt and car debt. Meanwhile, non-employed status means a lower ability to qualify for mortgage debt and car debt. Therefore, the ratio of mortgage and car debt to households' total debt for employed households is significantly higher than that for non-

employed households. Neither risk aversion nor expectations regarding the future economic environment was found to be significantly related to the composition of households' debt. However, the effect of respondents' risk aversion ($t = -1.95$, $p = .0563$) was very close to the significance level of .05. The limited sample size may be the reason why a statistically significant relationship was not found. Further study need to be done on the effect of risk aversion on the composition of households' debt.

No statistically significant effect of respondents' expectations regarding future economic environment was found on either of the two dependent variables. One possible reason is that this study is static so it cannot examine how people adjust their debt and asset allocation when their expectations about the future economic situation change. Another reason may be that the variation in respondents' expectations is too small to reflect any difference. A dynamic study with large sample size is necessary to explore the effect of respondents' expectations on their debt acquisition and repayment.

The results of this study suggest that practitioners need to pay attention to consumers' risk aversion level when giving them financial suggestions. Teaching consumers how to use credit to improve their utility from consumption and how to allocate their assets and debts wisely in the range of risk level that consumers feel comfortable is the work practitioners need to do. The kind of investment suggestions that is high above or way below consumers' risk aversion level cannot satisfy consumers' need even if it is theoretically the best. Consumers' knowledge about credit and investment also plays a part here. How respondents responded to each item in risk aversion instrument suggested that they understood the relative risk level of each investment choice, however, this did not mean they fully understand the risks associated

with each investment tool and the choices to diversify these risks. Practitioners need to educate consumers in this aspect so that consumers' asset allocation and debt acquisition reflect their real risk aversion level rather than the result of misunderstanding of various types of risk.

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APPENDIX I

Grable & Lytton's (2000) Risk Tolerance Instrument

1. In general, how would your best friend describe you as a risk taker?

   a. A real gambler (4)

   b. Willing to take risks after completing adequate research (3)

   c. Cautious (2)

   d. A real risk avoider (1)

2. You are on a TV game show and can choose one of the following. Which would you take?

   a. $1,000 in cash (1)

   b. A 50% chance at winning $5,000 (2)

   c. A 25% chance at winning $10,000 (3)

   d. A 5% chance at winning $100,000 (4)

3. You have just finished saving for a "once-in-a-lifetime" vacation. Three weeks before you plan to leave. You lose your job. You would:

   a. Cancel the vacation (1)

   b. Take a much more modest vacation (2)

   c. Go as scheduled, reasoning that you need the time to prepare for a job search (3)

   d. Extend your vacation, because this might be your last chance to go first-class (4)

4. If you unexpectedly received $20,000 to invest, what would you do?

   a. Deposit it in a bank account, money market account, or and insured CD (1)

   b. Invest it in safe high quality bonds or bond mutual funds (2)

   c. Invest it in stocks or stock mutual funds (3)

5. In terms of experience, how comfortable are you investing in stocks or stock mutual funds?

   a. Not at all comfortable (1)

   b. Somewhat comfortable (2)

   c. Very comfortable (3)

6. When you think of the word “risk” which of the following words comes to mind first?

   a. Loss (1)

   b. Uncertainty (2)

   c. Opportunity (3)

   d. Thrill (4)

7. Some experts are predicting prices of assets such as gold, jewels, collectibles, and real estate (hard assets) to increase in value; bond prices may fall, however, experts tend to agree that government bonds are relatively safe. Most of your investment assets are now in high interest government bonds. What would you do?

   a. Hold the bonds (1)

   b. Sell the bonds, put half the proceeds into money market accounts, and the other half into hard assets (2)

c. Sell the bonds and put the total proceeds into hard assets (3)

d. Sell the bonds, put all the money into hard assets, and borrow additional money to buy more

8. Given the best and worst case returns of the four investment choices below, which would you prefer?

a. $200 gain best case; $0 gain/loss worst case (1)

b. $800 gain best case, $200 loss worst case3 (2)

c. $2,600 gain best case; $800 loss worst case (3)

d. $4,800 gain best case; $2,400 loss worst case (4)

9. In addition to whatever you own, you have been given $1,000. You are now asked to choose between:

a. A sure gain of $500 (1)

b. A 50% chance to gain $1,000 and a 50% chance to gain nothing (3)

10. In addition to whatever you own, you have been given $2,000. You are now asked to choose between:

a. A sure loss of $500 (1)

b. A 50% chance to lose $1,000 and a 50% chance to lose nothing (3)

11. Suppose a relative left you an inheritance of $100,000, stipulating in the will that you invest ALL the money in ONE of the following choices. Which one would you select?

a. A savings account or money market mutual fund (1)

b. A mutual fund that owns stocks and bonds (2)

c. A portfolio of 15 common stocks (3)

d. Commodities like gold, silver, and oil (4)

12. If you had to invest $20,000, which of the following investment choices would you find most appealing?

a. 60% in low-risk investments 30% in medium-risk investments 10% in high-risk investments (1)

b. 30% in low-risk investments 40% in medium-risk investments 30% in high-risk investments (2)

c. 10% in low-risk investments 40% in medium-risk investments 50% in high-risk investments (3)

13. Your trusted friend and neighbor, an experienced geologist, is putting together a group of investors to fund an exploratory gold mining venture. The venture could pay back 50 to 100 times the investment if successful. If the mine is a bust, the entire investment is worthless. Your friend estimates the chance of success is only 20%. If you had the money, how much would you invest?

a. Nothing (1)

b. One month's salary (2)

c. Three month's salary (3)

d. Six month's salary (4)

APPENDIX II

Questionnaire Used in Study

I. First, we would like to know some things about you and your family.

1. Your age? _____

2. Your number of years of education? _____

3. Your highest diploma or degree? _____

4. Are you employed in a paid job? 1 YES 0 NO

4.a. If employed, your job title or occupation?

5. Are you married? 1 YES 0 NO

6. How many people are there in your family? _____

7. What is other family members' relationship with you? _____

II. Now, we would like to know some things about what you think.

	TRUE	FALSE
1. To get a higher interest rate on savings, you must put your savings in a riskier type of savings account.	1	2
2. The annual percentage rate or APR tells you the dollars you pay in interest on a loan.	1	2
3. Banks cannot pay more then 5 1/2% interest on checking accounts.	1	2
4. Getting simple interest on your savings means that your money will grow faster than if you receive compound interest.	1	2

5. The longer you "tie up" your money (agree to leave it in an account), the lower the interest you will get. 1 2

6. Any money that you put in a bank is insured against loss for up to $100,000 per depositor. 1 2

7. If you have $100 today it is worth more than the promise that you will get $100 in 5 years from now. 1 2

8. Liquid assets are those things that you own that cannot easily be "cashed in" in the short-run. 1 2

III. Now we would like to know about your feelings. Please circle the number of the answer that best corresponds to your feeling about the statement.

1. Thinking about business conditions and the economy in the country as a whole, do you think that during the next 12 months we'll have good times financially or bad times or what?

5 VERY GOOD TIMES

4 GOOD TIMES

3 NEITHER GOOD NOR BAD TIMES

2 BAD TIMES

1 VERY BAD TIMES

2. About one year from now, do you expect that your family's total income will increase, decrease, or just about the same as now?

5 INCREASE MUCH

4 SOME INCREASE

3 ABOUT THE SAME

2 SOME DECREASE

1 DECREASE MUCH

3. Do you think that during the next 12 months we'll have high inflation rate or low inflation rate or what?

5 ZERO INFLATION RATE

4 LOW INFLATION RATE

3 MEDIAN INFLATION RATE

2 HIGH INFLATION RATE

1 VERY HIGH INFLATION RATE

4. Do you think interest rate will increase or decrease or what in the next 12 month?

5 INCREASE A LOT

4 INCREASE A LITTLE

3 STAY THE SAME

2 DECREASE A LITTLE

1 DECREASE A LOT

Now, we would like to know about your feeling about risks.

1. In general, how would your best friend describe you as a risk taker?

1 A real gambler

2 Willing to take risks after completing adequate research

3 Cautious

4 A real risk avoider

2. You are on a TV game show and can choose one of the following. Which would you take?

    4 $1,000 in cash

    3 A 50% chance at winning $5,000

    2 A 25% chance at winning $10,000

    1 A 5% chance at winning $100,000

3. You have just finished saving for a “once-in-a-lifetime” vacation. Three weeks before you plan to leave. You lose your job. You would:

    4 Cancel the vacation

    3 Take a much more modest vacation

    2 Go as scheduled, reasoning that you need the time to prepare for a job search

    1 Extend your vacation, because this might be your last chance to go first-class

4. If you unexpectedly received $20,000 to invest, what would you do?

    3 Deposit it in a bank account, money market account, or an insured CD

    2 Invest it in safe high quality bonds or bond mutual funds

    1 Invest it in stocks or stock mutual funds

5. In terms of experience, how comfortable are you investing in stocks or stock mutual funds?

    3 Not at all comfortable

    2 Somewhat comfortable

    1 Very comfortable

6. When you think of the word “risk” which of the following words comes to mind first?

    4 Loss

    3 Uncertainty

    2 Opportunity

    1 Thrill

7. Some experts are predicting prices of assets such as gold, jewels, collectibles, and real estate (hard assets) to increase in value; bond prices may fall, however, experts tend to agree that government bonds are relatively safe. Most of your investment assets are now in high interest government bonds. What would you do?

    4 Hold the bonds

    3 Sell the bonds, put half the proceeds into money market accounts, and the other half into hard assets

    2 Sell the bonds and put the total proceeds into hard assets

    1 Sell the bonds, put all the money into hard assets, and borrow additional money to buy more

8. Given the best and worst case returns of the four investment choices below, which would you prefer?

    4 $200 gain best case; $0 gain/loss worst case

    3 $800 gain best case, $200 loss worst case3

    2 $2,600 gain best case; $800 loss worst case

    1 $4,800 gain best case; $2,400 loss worst case

9. In addition to whatever you own, you have been given $1,000. You are now asked to choose between:

    3 A sure gain of $500

    1 A 50% chance to gain $1,000 and a 50% chance to gain nothing

10. In addition to whatever you own, you have been given $2,000. You are now asked to choose between:

    3 A sure loss of $500

    1 A 50% chance to lose $1,000 and a 50% chance to lose nothing

11. Suppose a relative left you an inheritance of $100,000, stipulating in the will that you invest ALL the money in ONE of the following choices. Which one would you select?

    4 A savings account or money market mutual fund

    3 A mutual fund that owns stocks and bonds

    2 A portfolio of 15 common stocks

    1 Commodities like gold, silver, and oil

12. If you had to invest $20,000, which of the following investment choices would you find most appealing?

    3 60% in low-risk investments 30% in medium-risk investments 10% in high-risk investments

    2 30% in low-risk investments 40% in medium-risk investments 30% in high-risk investments

    1 10% in low-risk investments 40% in medium-risk investments 50% in high-risk investments

13. Your trusted friend and neighbor, an experienced geologist, is putting together a group of investors to fund an exploratory gold mining venture. The venture could pay back 50 to 100 times the investment if successful. If the mine is a bust, the entire investment is worthless. Your friend estimates the chance of success is only 20%. If you had the money, how much would you invest?

    4 Nothing

    3 One month's salary

    2 Three month's salary

    1 Six month's salary

VII. Now, we need some information about your financial status.

1. We would also like to know something about the debts that you owe now.

$_____Outstanding bills

$_____Car loans (for only family use)

$_____Home equity loan (for main residence, not for commercial purpose)

$_____Mortgage loan (for main residence, not for commercial purpose)

$_____Home equity loan (for commercial or investment purpose)

$_____Mortgage loan (for commercial or investment purpose)

$_____Charge accounts

$_____Credit cards

$_____Installment loans

$_____Other Loans

2. What is your total family income before taxes last year? Please circle the number of the category that includes your income.

1	None	11	$25,000 - 29,999
2	$1 - 2,499	12	$30,000 - 34,999
3	$2,500 - 4,999	13	$35,000 - 39,999
4	$5,000 - 7,499	14	$40,000 - 49,999
5	$7,500 - 9,999	15	$50,000 - 59,999
6	$10,000 - 12,499	16	$60,000 - 69,999
7	$12,500 - 14,999	17	$70,000 - 79,999
8	$15,000 - 17,499	18	$80,000 – 89,999
9	$17,500 - 19,999	19	$90,000 – 99,999
10	$20,000 - 24,999	20	$100,000 and over