The Risk Tolerance and Stock Ownership of Business-Owning Households

This study uses data from the 1992-2001 Surveys of Consumer Finances to examine the difference in risk tolerance and stock ownership of three types of households: households which do not own a business, households which own and manage a business and households which own but not manage a business. Non-manager business owners are the most likely to be willing to take risks and to hold stocks. Manager-business owners are more willing to take risk than nonowners. Understanding the differences between household types provides better understanding of risk tolerance and investment choices of all households.

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Introduction

Family businesses make important contributions to the economy, with 23 million businesses increasing their receipts by 22% between 1997 and 2002 to reach $22.6 trillion (Bergman & Tobler, 2005). Astrachan and Shanker (2003) concluded that family businesses are a key source of funding for new startups that create employment and promote economic and technological progress. Family firms' acknowledged role in creating new technologies, jobs and wealth rests on their ability to innovate and take risks (Zahra, 2005). Interconnectedness between the family and business system creates a unique situation for financial planners who might be working with those business-owning families (Danes, Fitzgerald & Doll, 2000). Although previous researchers pointed out that financial risk tolerance makes significant difference in household portfolio decision-making and it is a crucial factor related to household investment and financial goal achievement, few studies have examined how business-owning households differ from non-business-owning households in terms of financial risk tolerance and how households' risk tolerance relates to their financial behavior measured by stock ownership. The objectives of this study are to analyze the difference in levels of risk tolerance and stock ownership between two different types of business owning households and between business owning households and those that do not own a business. This study will also improve understanding of factors related to risk tolerance and stock ownership for households that do not own a business.

Literature Review

Risk Tolerance

A number of studies have analyzed financial risk tolerance using the risk tolerance question in the Federal Reserve Board's Survey of Consumer Finances. The question is:

"Which of the statements on this page comes closest to the amount of financial risk that you and your (spouse/partner) are willing to take when you save or make investments?

    1. Take substantial financial risks 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 and Lytton (2001) discussed that measure of risk tolerance and concluded that it was a reasonably reliable measure of investment risk tolerance. Yao, Hanna and Lindamood (2004) reviewed the origin of the measure, which was first included in the 1983 Survey of Consumer Finances (SCF). Only a small percent of respondents have chosen the "Substantial" response over the years, and a modest percent have chosen the "Above average" response, so many researchers have combined the first three responses into a "Some risk" category in order to have more robust estimates of the effects of demographic variables on risk tolerance, and of risk tolerance on investment choices.

Xiao (1996) found that stock ownership is higher for households willing to take some risk than for those who are unwilling to take any risk. Using 1992 SCF data, Sung and Hanna (1996) analyzed the 1992 SCF and found that factors such as non-investment income, having liquid assets greater than three months of income, having non-liquid financial assets being greater than six months of income, the number of years until expected retirement, education, and self-employment had a positive effect on whether a household is willing to take some risk. Single females, Hispanics, and respondents in the "other" race category (mainly Asians) were less willing to take some risk.

Yao et al. (2004) examined changes in risk tolerance from year 1983 to 2001 using SCF data. They had a large combined dataset, so could analyze factors related to all four levels of risk tolerance in the SCF measure. They first tested an ordered logit model, but found that based on a Score test, ordered logit was not appropriate. They therefore used a cumulative logit analysis comparing three levels of risk tolerance: some risk compared to unwilling to take any risk, high risk (substantial or above average) compared to willing to take average risk or unwilling to take any risk, and substantial risk compared to the three lower levels of risk. They found that willingness to take financial risk tends to increase when stock returns increase and decrease when stock returns decrease.

Yao and Hanna (2005) examined gender differences in responses to the SCF risk tolerance question for a combination of the 1983, 1989, 1992, 1995, 1998 and 2001 datasets. They noted that the gender of the respondent in couple households could be identified in the SCF, and that females were respondents in many married couple and opposite sex partner households. They found that females in married couple and partner households were significantly less likely to be willing to take risks than males in otherwise similar households. Females in single head households were more willing to take some risk than females in otherwise similar couple households.

Risk-Taking and Decision-Making in Business-Owning Households

A large body of research related to business-owning households has been focused on the success of family business and its interconnection with family (Haynes, Walker, Rowe & Hong, 1999; Olson, Zuiker, Danes, Stafford, Heck & Duncan, 2003).

Researchers also focused on the entrepreneurs' risk taking and factors associated with it. Winter, Fitzgerald, Heck, Haynes and Danes (1998) noted the failure rate of new businesses, though they speculated that family businesses might have a better chance of survival than non-family businesses. Chen and DeVaney (2002) examined the factors affecting the household net worth of employees and business owners and proposed that business owners with more net worth are more likely to be more risk tolerant. Zahra (2005) concluded that family firm managers experience different types of risk as they lead their organization and one of the most common is business risk that results from the variability in a firm's performance. The results showed that higher involvement of family in the business can promote investing in new technologies and radical innovation but not in venturing. March and Shapira (1987) explored the relation between decision theoretic conception of risk and the conceptions held by executives and concluded that managers take risks and exhibit risk preferences. They also stressed the importance of attention to factors of risk taking and found that managers' decisions are particularly affected by their attention on critical performance targets. Sauner-Leroy (2004) identified that the managers' behavior with regard to risk is an important and even crucial parameter in the explanation of actual risk taking. Their study revealed that there is a negative relationship between the managers' aversion to risk and the firms' level of productive investment. They explained this relationship by exploring the conflicting objectives of managers and shareholders. Compared with the managers, who give priority to actions aimed at limiting the "personal costs and anxieties", shareholders are more favorable to a higher degree of risk, especially if they have a diversified portfolio of assets.

Xiao, Alhabeeb, Hong and Haynes (2001) explored the risk attitude and risk-taking behavior of business-owning families in the 1995 Survey of Consumer Finances. They restricted their sample to couple households, citing Winter et al. (1998), although they did not justify this restriction, which was necessary in the earlier study given its objective of analyzing family-business interactions between adults in a business owning household. Their analysis of risk tolerance was an ordered logit, and they found that family business owner-managers were more risk tolerant than nonowners and they also hold riskier portfolios of financial assets. Xiao et al. (2001) discussed their results in terms of comparisons between family business owners and family households that did not own a business, but their comparisons were between manager owners and a combined group of couple households that included both non-manager owners and non-owners.[3] Xiao et al. (2001) assumed that in their sample of family households (couples) almost all business owners were male since the household heads were defined as male by the SCF. Therefore, they did not control for the gender of the respondent in their analysis of risk tolerance. Xiao et al. (2001) also examined some business characteristics and found that except the number of employees, there was no strong relationship between the owners' risk attitude and those business characteristics.

Westhead, Cowling and Howorth (2001) suggested that the management and ownership issue differences between different types of family firms (e. g., family owned and managed compared with family owned but not family managed) remain an important topic for family business research.

Business owners' management in business and household has recently been of interest to researchers. Chua, Chrisman, and Sharma (1999) asserted that it is the pattern of ownership, governance, management and succession that makes family firms unique. Vilaseca (2002) found that the management and governance structure, the ownership structure, and the decision-making processes are critical elements in family businesses because they affect the goal and interest conflict between shareholders and management. Lee and Rogoff (1996) identified the

difference of goals and attitudes between family businesses with family participation and those without family participation. And they also pointed out in their study that the owners of businesses with family participation rate family-rated business goals higher than owners of businesses without family participation, for instance, the owners of business with family participation see the goal of building something for their families as more important than owners of business without family participation.

Optimal Portfolios

Most households who invested should hold at least some risky assets in order to obtain a higher return, and stocks might represent a high proportion of household portfolios for many households (Campbell & Viceira, 2002). Lai and Hanna (2004) discussed the efficiency of household investment portfolios, and found that efficient portfolios for most older households should include business investments (proxied by the performance of microcap public stocks). It is plausible that for a manager business owning household, its own business might be a substitute for investing in stocks in terms of its optimal household portfolio. For a non-manager business owning household, investment in one or more businesses might simply be an alternative to investing in publicly traded stocks.

Objectives of this Study

Although some researchers have stressed the effect of family's involvement in business and entrepreneurs' or managers' risk-taking, none of these studies has explored differences between manager versus non-manager business owners in terms of risk tolerance and stock ownership. Our research attempts to fill this gap by analyzing differences between manager business owners and non-manager business owners.

The primary objective of this paper is therefore to investigate risk-taking differences among households which do not own a business, households which own and manage business and households which own but do not manage a business. Financial and demographic characteristics of households associated with risk tolerance are also discussed. Another objective is to investigate differences in stock ownership between the household types, as this is a simple indicator of actual risk taking investment behavior.

This research will increase our understandings of household risk tolerance and its relationship to investment decisions. The results of this research provide important implications for agencies providing education and assistance for family businesses. Our analysis of the effect of business ownership on risk tolerance and stock ownership will also provide financial educators and planners more insight into factors related to risk tolerance for households that do not own a business.

Analysis

The Data

This study is primarily interested in examining households with the consideration of their business ownership and managerial involvement in business. In order to obtain robust estimates of differences between the two types of business-owning households while controlling for a number of demographic variables, we combine all households from the 1992, 1995, 1998, and 2001 Surveys of Consumer Finances.[4] The actual sample sizes are 3906 in 1992, 4299 in 1995, 4305 in 1998, and 4442 in 2001, with a total of 16,952 households. For descriptive analyses, the SCF population weights were used to represent the U.S. population as a whole. Unlike the Xiao et al. (2001) study, this study includes all households for the comparisons, including single head households.

Ownership of a business was measured by using responses to the survey question[5]: "Do you own or share ownership in any privately-held businesses, farms, professional practices, limited partnerships or any other types of partnerships?" If the response is "yes", the household owns a business, and if the answer is "no", the household is not an owner (nonowner). The SCF also classified privately owned business interests into those in which the family have active management role and those in which they do not (Aizcorbe, Kennickell, & Moore, 2003). Having an active management role in a business was measured by responses to this question: "Do you have an active management role in any of these businesses? Do you or anyone in your family living here have an active management role in any of these businesses?" If the answer is "yes", the household has a management role in business and is a manager-business owner; if the answer is no for a household owning a business, we define the household as a non-manager business owner. Of those 16,952 households interviewed in the four surveys from 1992 to 2001, 13.3% own businesses. Among all business owning households, 91.6% are manager owners and 8.3% are non-manager owners.

In the SCF, a household unit is divided into a "primary economic unit" (PEU)—the family and anyone else in the household who is not part of that unit. The PEU is intended to be the economically dominant single individual or couple (whether married or living together as partners) and all other persons in the household who are

financially interdependent with that person or those persons. For married couple and partner households, the SCF attempts to interview the person who is more knowledgeable about the household's finances. In opposite sex couples the "head" is designated as the male, and in same sex couples, the head is designated as the older person. The wife or female partner is the respondent in many of the couple households.

Dependent Variables

The dependent variables in this research are financial risk tolerance and stock ownership. Stock ownership is a plausible indicator of financial risk-taking behavior, and refers to owning stocks directly or indirectly, including mutual funds or retirement accounts. We test the respondents' risk attitudes by using their response to the SCF about how high much risk they are willing to take when investing. Four ranges of risk levels are provided by SCF: take substantial risk to earn substantial returns (substantial risk tolerance); take above average risk to take above average return (above average risk tolerance); take average risk to get average return (average risk tolerance), and take no risk at all (no risk tolerance).

Following the methods described in Yao et al. (2004) we use a cumulative logistic regression analysis for analysis of the levels of responses to the SCF risk tolerance question (see discussion below). Therefore in this study risk tolerance is classified into three different levels: *some risk*, *high risk* and *substantial risk* based by combining responses to the SCF questions. The dichotomous composite variable *some risk* combines the response to the *substantial*, *above average* and *average*. The dichotomous composite variable *high risk* combines the responses to the substantial and above average.

Independent Variables

Three different kinds of independent variables are used in the multivariate analysis: the year of the survey, demographic characteristics, and economic characteristics. The demographic variables include age and age squared of the respondent, education, race, and gender of the respondent, presence of related children aged under 18, homeownership, business-ownership and management status of the respondent.[6] There are also dummy variables related to household type, with one for whether the household included a married couple and one for whether the household included an unmarried partner couple, with the reference category in the multivariate analyses being married couple household.[7]

Another independent variable is whether household's financial assets exceed monthly income, because if it does not, it is unlikely that the household can make investment decisions. The other independent variables are the level of non-financial assets and household income. Because the relationships between those monetary amounts and our dependent variables are not necessarily linear, the log of income and non-financial assets are used.

In addition to the cumulative logit model for risk tolerance, a logit investigating factors related to stock ownership was conducted. For most households, directly or indirectly owning stock assets is an indicator of risk taking. For a business-owning household, investing in stocks is a decision that might be related to the decision to invest in one's own business. In the stock ownership model we also include as independent variables the levels of risk tolerance in the SCF question, relative to being unwilling to take any risk. It is not necessary to use the combined levels of risk tolerance used in the risk tolerance logits, because cumulative logit is not used in the stock ownership model, and it is less complicated to interpret the results with the original SCF risk tolerance levels.

Method of Research

Univariate analysis and frequency analysis along with means test are carried out to provide descriptive information of different household types. Logistic regression is an appropriate technique for a multivariate analysis of a dependent variable with a small number of levels, and has been used by many previous authors analyzing the SCF risk tolerance variable (Yao et al., 2004). An ordered logit is conducted with the SCF risk tolerance variable as the dependent variable, but the Score test revealed that the parallel assumption of ordered logit was not valid. Therefore, three separate cumulative logit analyses are performed to investigate the influence of business ownership and other household characteristics on three risk tolerance variables, following the method used in Yao et al. (2004).

In addition to the cumulative logit model for risk tolerance, a logit investigating factors related to stock ownership is conducted.

The models investigated in this paper are:
1. Risk tolerance= f (household types, demographic and financial characteristics)
2. Stock ownership= f (household types, risk tolerance, demographic and financial characteristics)

Both models are based on the same set of independent variables except that the stock ownership model also controls for the respondents' risk tolerance levels. As suggested by Montalto and Sung (1996), this study uses the

repeated-imputation inference (RII) method to correct for underestimation of variances due to imputation of missing data. The logits are not weighted, based on the possible bias due to the endogeneity of the SCF population weights.[8]

Hypotheses

In this study, financial risk tolerance is defined as the willingness to take financial risk. In some cases, a person's risk tolerance can be assumed as a preference for possible options of being an employee or a business owner. For instance, with similar background, a person may prefer to start and own his own business rather than to work as an employee for others if he is more willing to take some business related risk that results from the uncertainty and variability in a firm's performance. Therefore, we can expect that business owners are more willing to take risk than nonowners. But manager-owners may be less favorable to confront with those financial risks resulting from a diversified portfolio of assets in stock market since they have to take more responsibilities of maintaining and promoting the performance of their own businesses and they have already invested a large amount of their financial assets into their businesses as well. In this sense, for those business owners, it is rational for them to invest in business rather than in other risky assets to expect to gain a higher returns or lower loss probability in the long term. Based on previous literature, we can propose hypotheses as follows:

H1: Business owners will be more willing to take financial risk than nonowners;

H2: Manager-owners will be less likely to hold stocks than nonowners, controlling for financial risk tolerance.

H3: Manager-owners will be less likely to hold stocks than non-manager-owners, controlling for financial risk tolerance.

Based on theoretical discussion and empirical results in previous literature previously discussed, other factors are likely to be related to financial risk tolerance, including sex of the respondent, homeownership, income, and having financial assets greater than monthly income. Therefore, these variables are included in the multivariate analyses as control variables.

Results

Descriptive Results

Table 1 summarizes the characteristics of households by whether the household owned/managed a business. There is no clear time trend, the percent of households with owner-managers being 13.4% in 1992, 11.6% in 1995, 11.7% in 1998, and 12.3% in 2001.

Table1
Business Ownership and Management Status by the Survey Year

	Non-business owners	Manager-business owners	Non-manager business owners
1992	85.64%	13.36%	1.00%
1995	87.22%	11.57%	1.21%
1998	87.32%	11.70%	0.98%
2001	86.45%	12.30%	1.25%
Combined samples	86.68%	12.21%	1.11%

Analyses are weighted, based on 1992, 1995, 1998, and 2001 SCF datasets.

Business-owning households have higher household incomes, equity assets, financial assets, non-financial assets, debt and net worth than nonowners. Households that own a business represent 13.3% of households in the United States over the period 1992-2001, but own 45.7% of household assets. Non-manager owners have considerably higher levels of income and assets than manager owners.

Whites and those of other races (mostly Asian) represent higher proportions of business owners than of nonowners, for instance, 74.9% of nonowner households are white, 88.8% of manager owner households are white, and 88.1% of non-manager owner households are white. Blacks and Hispanics represent lower proportions of business owners than of nonowners, for instance, 13.9% of nonowner households are Black, 4.2% of manager owner households are Black, and 4.7% of non-manager owner households are Black. Non-manager business owners have higher education levels than those in the other categories, with 55.0% of non-manager owners holding bachelor

degrees, compared to 50.9% of manager owners and 30.3% of those nonowners. Manager-business owners are less likely to be in single head households than the other two groups: 19.2% of manager owner households are single headed, compared to 24.0% of non-manager business owners and 44.6% of nonowners. Non-manager owner households are the least likely to have female respondents, with 36.2%, compared to 43.5% for manager owner households and 57.2% for nonowner households.

The majority of all three types of households are willing to take some risk, and the largest proportion is from non-manager owners (85.5%), followed by manager-business owners (76.0%) and nonowners (53.6%). A similar pattern can be seen with high risk (combination of average and above average) and with substantial risk. Respondents in non-manager households are 2.6 times as likely to be willing to take substantial risk as nonowners (9.8% versus 3.7%). The means test in Table 3 shows that the three types of households are significantly different from each other in terms of willingness to take some and high risk, and both types of business owners are significantly different from nonowners in willingness to take substantial risk. The difference in substantial risk tolerance within the business-owners' group is not significant.

The descriptive results also indicate that the business-owners are more likely to hold stock directly and indirectly: 69.6% of non-manager business owners, 60.9% of manager-business owners and only 42.1% of nonowners report that they own stocks. The means test analysis also shows significant difference between business-owners and nonowners in the respect of stock ownership. This result largely corresponds to the result of the risk tolerance analysis. In summary, based on the descriptive results, business owners are significantly more likely to be willing to take risk and hold stocks than nonowners, and non-manager owners are more willing to take some and high risk than manager owners.

Logit Result

Three separate cumulative logits compare business owners' risk tolerance in each risk category (some, high and substantial) when controlling for demographic and financial variables. In each risk category, manager-business owners and non-manager-business owners are compared with nonowners. Both logit coefficients and marginal effects of each independent variable on the predicted probability of the dependent variable are presented in Table 4 and Table 5.[9]

Table 2
Financial and Demographic Characteristics by Household Type

	Non-business owners	Manager-business owners	Non-manager business owners
Mean household income	41,746	105,370	172,880
Median household income	29,000	55,000	66,000
Mean net worth	177,681	1,022,398	1,685,819
Median net worth	56,178	275,870	453,248
Mean value of assets	216,238	1124,734	1803,107
Mean value of debts	38,557	102,336	117,288
Mean value of financial assets	97,557	315,593	938,130
Mean value of non-financial assets	118,681	809,141	864,977
Mean value of equity assets	45,502	160,922	547,456
Mean age	48.1	46.6	49.5
Financial assets> 1 month income	69.44%	86.43%	90.99%
White	74.89%	88.81%	88.07%
Black	13.88%	4.17%	4.70%
Hispanic	7.69%	3.13%	3.04%
Asian and others	3.54%	3.88%	4.19%
Bachelor degree	30.27%	50.94%	54.99%
Homeowner	63.03%	83.18%	80.93%
Related child<18 at home	34.64%	43.06%	36.64%
Married couple households	49.09%	75.11%	67.98%
Partner households	6.35%	5.65%	8.08%
Single-head households	44.56%	19.25%	23.95%
Female respondents	57.19%	43.49%	36.24%
Hold stocks	42.13%	60.87%	69.65%
Take some risk	53.58%	76.03%	85.46%
Take high risk	17.73%	29.33%	38.42%
Take substantial risk	3.73%	5.97%	9.77%

All dollar amounts are adjusted to 2001 dollars. Analyses are weighted, based on 1992, 1995, 1998, and 2001 SCF datasets.

Table 3
Means Test of Different Households in Their Risk Tolerance and Stock-ownership

	means			
	Some risk	High risk	Substantial risk	Hold stocks
A. non-business owners	0.536 bc	0.177 bc	0.037 bc	0.421 bc
B. Manager-business owners	0.760 ac	0.293 ac	0.060 a	0.609 a
C. Non-manager-business owners	0.855 ab	0.384 ab	0.098 a	0.696 a

a. Significantly different at 0.05 level from Group A.
b. Significantly different at 0.05 level from Group B.
c. Significantly different at 0.05 level from Group C.

When controlling for everything else, both manager-business owners and non-manager business owners are significantly more likely to take some, high, and substantial risk than nonowners (Figure 1), and hypothesis 1 is strongly supported. For example, non-manager business owners have a predicted probability of being willing to take substantial risk of 8.2% at the mean value of other variables, compared to 7.3% for manager owner households and 3.8% for nonowner households. The marginal effect of 4.4% for non-manager households in the substantial risk logit represents the difference of 4.4 percentage points between 8.2% for those households and 3.8% for nonowner households. Even though this effect seems small, the predicted level for non-manager owners is more than twice the predicted level for nonowners. As shown in Table 2, the actual rates of being willing to take substantial risk are 9.8% for non-manager owners and 3.7% for nonowners, a difference of 6.0 percentage points. Therefore, controlling for income and other variables, the difference between the household types in terms of being willing to take substantial risk narrows, but is still relatively large.

Figure 1
Predicted Probability of Risk That Different Types of Households Are Willing To Take, At Mean Values of Other Variables
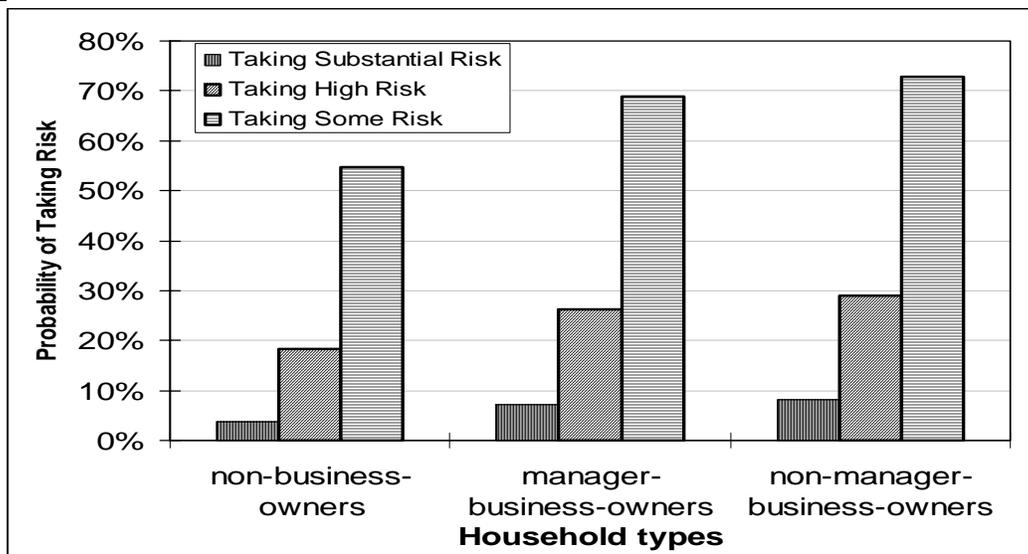
Manager owners do not significantly differ from non-manager owners in predicted willingness to take some risk, high risk, or substantial risk,[10] although non-manager owners consistently have higher predicted levels of risk tolerance.

These logits also reveal the relationship between risk tolerance and other independent variables. The combined effects of age and age squared indicate a negative relationship between age and risk tolerance for all actual ages for all three risk tolerance levels in the model. The combined effects of age and age squared are significant in all three logits. The older the person is, the less likely he or she is willing to tolerate financial risk.

If the household has financial assets exceeding monthly income, the respondent is significantly more likely to be willing to take some and high risk. Female respondents are significantly less likely than male respondents in otherwise similar households to be willing to take substantial, high, or some risk.[11] Both the log of household income and the log of non-financial assets are significantly positively correlated with risk tolerance levels, and the more income and non-financial assets the household possesses, the more likely the household will be willing to take risk.

Table 4
Cumulative Logistic Analysis of Taking Risk

Parameter	Substantial risk Coefficient	Marginal effect on predicted probability[1]	High risk Coefficient	Marginal effect on predicted probability	Some risk Coefficient	Marginal effect on predicted probability
Intercept	-3.4000***		-2.6577***		-1.2667***	
Business-ownership: reference category= non-business owners						
Manager-business owners	0.6965***	3.5%	0.4516***	7.8%	0.6083***	14.3%
Non-manager-business owners	0.8319***	4.4%	0.5948***	10.7%	0.8039***	18.3%
Race/Ethnic background: reference category = White						
Black	0.2241	0.9%	-0.0686	-1.0%	-0.2356***	-5.8%
Hispanic	0.4616**	2.1%	0.0817	1.3%	-0.5937***	-14.7%
Other race, including Asian	0.1062	0.4%	-0.1609	-2.4%	-0.5241***	-13%
Age	-0.0202	-4.5% (25 to 80)	-0.0087	-21.7% (25 to 80)	-0.0134	-44.1% (25 to 80)
Age Squared	-0.00002		-0.0002**		-0.0002*	
Education: reference category = less than high school diploma substantial						
High school diploma	0.0872	0.3%	0.2121*	2.6%	0.5167***	12.5%
Some college	0.2392	0.8%	0.5540***	7.6%	1.0445***	25.5%
Bachelor's degree and above	0.3046*	1.1%	0.9265***	14.3%	1.4993***	35.6%
Household composition: reference category = married couples						
Partner	0.2032	0.7%	0.0507	0.8%	-0.1460	-3.6%
Single-head	0.4839***	2.0%	0.2225***	3.6%	0.0319	0.8%
Presence of related children <18	-0.0158	-0.0%	-0.0497	-0.8%	-0.1301**	-3.2%
Financial assets>=mnthly inc	0.2126	0.8%	0.4859***	7.0%	0.7956***	19.6%
Log (non-financial assets)	0.0421**	1.1% ($1000 to $500,000)	0.0449***	4.4% ($1000 to $500,000)	0.0438***	6.7% ($1000 to $500,000)
Log (Annual household income)	0.0495*	0.4% ($20,000 to $120,000)	0.1103***	3.2% ($20,000 to $120,000)	0.1371***	6.0% ($20,000 to $120,000)
Homeowners: ref. cat. = renters	-0.0773	0.3%	0.0537	-0.7%	0.1048	2.6%
Year of survey: reference category = 1998						
Year 1992	-0.2163*	-0.9%	-0.5080***	-7.8%	-0.5142***	-1.1%
Year 1995	-0.1588	-0.7%	-0.2971***	-4.9%	-0.2587***	1.1%
Year 2001	-0.0714	-0.3%	-0.0650	-1.2%	-0.0831	-0.5%
Sex of respondent: reference category = male						
Female	-0.5272***	-2.1%	-0.6241***	-9.9%	-0.5908***	-14.4%
Concordance	67.2%		74.1%		81.5%	
Chi-square test, likelihood ratio	367.36	<.0001	2475.46	<.0001	5019.04	<.0001

Note: * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Analysis of 1992, 1995, 1998 and 2001 Surveys of Consumer Finances; multivariate analyses are unweighted, using RII technique.
1. Marginal effects calculated at the mean values of all other variables, and represent percentage point differences in the predicted probability of being willing to take risk.

Table 5
Logistic Analysis of the Stock Ownership

| Parameters	Coefficient	Marginal effect on predicted probability[1]
Intercept	-7.7476	
Business-ownership: reference category = non-business owners		
Manager-business owners	-0.2271***	-5.5%
Non-manager-business owners	0.4046**	10.1%
Risk tolerance level of respondent: reference category = not taking risks		
Average risk	0.9842***	23.4%
Above average risk	1.4295***	34.2%
Substantial risk	1.0172***	24.2%
Age	0.0287***	3.8%
Age squared	-0.0003***	(25 to 48)
Racial/ethnic group of respondent: reference category = White		
Black	-0.3752***	-9.2%
Hispanic	-0.5262***	-12.6%
Other race, including Asian	-0.4364***	-10.6%
Education of respondent: reference category = less than high school diploma		
High school diploma	0.5855***	13%
Some college	0.9097***	21%
Bachelor degree or above	1.2423***	29.2%
Household composition: reference category = married couples		
Partners	-0.0901	-2.2%
Single-head	-0.2681***	-6.6%
Presence of related child under age 18	-0.0134	-0.4%
Financial assets >= monthly income	2.3512***	48.1%
Log (non-financial assets)	0.0580***	8.9% ($1000 to $500,000)
Log (Annual household income)	0.3121***	13.9% ($20,000 to $120,000)
Homeowners: reference category=renters	0.3141***	7.7%
Year of survey: reference category = 1998		
Year 1992	-0.4646***	-11.3%
Year 1995	-0.3046***	-7.5%
Year 2001	0.1726**	4.3%
Sex of respondent: reference category = male		
Female	-0.0183	-0.5%
Concordance Ratio	88.8%	
Chi-square test of the likelihood ratio	9072.76	<0.0001

Note: * $p<0.05$, ** $p<0.01$, *** $p<0.001$. Multivariate analyses are unweighted, using RII.
Estimated by authors based on analysis of 1992, 1995, 1998, and 2001 Surveys of Consumer Finances.
1. Marginal effects calculated at the mean values of all other variables, and represent percentage point differences in the predicted probability of holding stocks.

Based on the result of the stock ownership model (Table 5), non-manager-business owner households are significantly more likely to hold stocks than the other two types of households, after controlling for other variables in the logit (Figure 2). Manager owners are significantly less likely to hold stocks than non-manager owners and nonowner households, and hypothesis 2 and 3 are supported as well.

Figure 2
Predicted Probability that Different Types of Households Hold Stocks, at Mean Values of other Variables
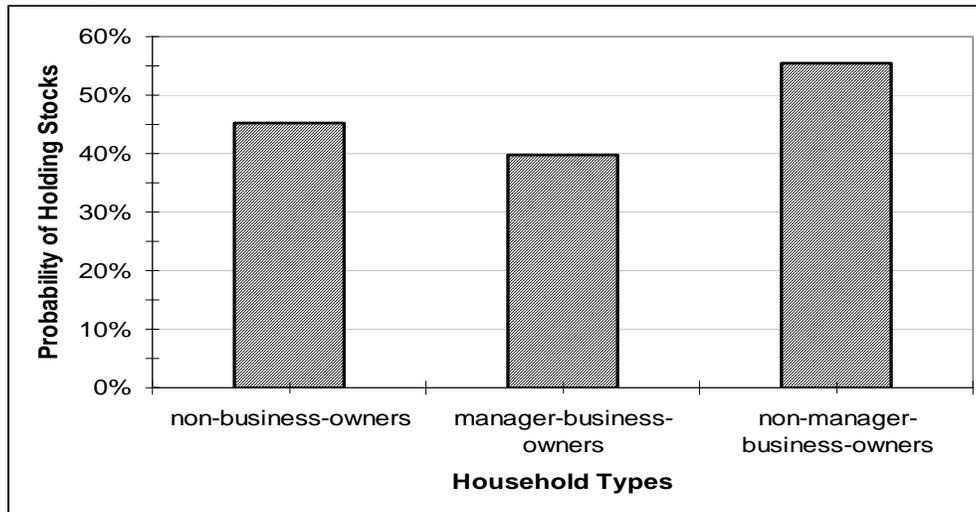
There is not a monotonic relationship between level of risk tolerance and stock ownership, but households willing to take some level of risk are significantly more likely to hold stocks than households unwilling to take any risk. Households willing to take above average risk are significantly more likely to hold stocks than the others, but households willing to take substantial risk are not significantly different from households willing to take average risk in terms of stock ownership.

Both age and age squared are significant factors in this model, with age positively related and age squared negatively related to stock ownership. The combined effect of the age effects is that at the mean values of other variables, predicted stock ownership increases from 40.9% at age 25 to 44.7% at 48, then decreases to 37.2% by age 80. Controlling other variables, in the year 1992, compared with the year 1995, 1998, 2001, people were the least likely to hold stocks, and after the year 1992, people became increasingly more likely to hold stocks.

Discussion

The result shows that business owners differ from nonowners in risk taking and holding stocks, and they also vary considerably in stock ownership when their managerial roles in businesses are considered. Business owners are significantly more risk tolerant than non-business owners. Non-manager business owners are significantly more likely to hold stocks than nonowners with similar levels of assets and risk tolerance. Business owners' managerial role in business makes a difference in holding stocks, as manager owners are less likely to own stocks than otherwise similar nonowners. This result makes sense, in that the manager business owners may be simply replacing stocks with the equity in their own business as the risky part of their total household portfolio. The greater likelihood of non-manager business owners to own stocks than nonowners with the same risk tolerance and wealth/income might be due to a different interpretation of the SCF risk tolerance question by non-manager owners.

Business owning households are less likely than nonowner households to have a female respondent, but there are substantial numbers of business owning households with female respondents. Given the effort by the SCF to have the more financially knowledgeable spouse/partner be the respondent, this result suggests that for many business owning households, the wife/female partner may be the more knowledgeable one. There are also some manager business owning households with a single head.

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Implication

Implications for Future Research

The effect of gender on family business decisions should be studied in more depth, as many business owning households had female respondents. The lower risk tolerance of female respondents, even after controlling for other factors, suggests that the choice of business might be related to gender. We could not determine which partner in couple households was the owner or primary manager of the business, so another dataset would be needed for future research on this issue.

Research on single head households would provide insights for public policy and financial education, even though they were not considered by some previous research on business owning households (e.g., Xiao et al. 2001). All other things equal, single head households were more likely to be willing to take substantial and high risk than married couple households, but were less likely to own stocks.

The lack of a consistent relationship between stock ownership and risk tolerance levels, even after controlling for other factors, should be studied in more depth. Xiao et al. (2001) did report a more consistent relationship between risky asset proportion and risk tolerance levels, though their definition of risky assets was rather broad. Given the substantial differences between business owners and nonowners, it might be appropriate for some future research to analyze the nonowner households separately, as more appropriate implications for nonowners might be developed.

Implications for Financial Planners and Educators

Our study raises a number of implications for financial planners and educators as well as agencies providing financial support for family businesses. Business owners have higher risk tolerance levels, so in order to help households who want to start a business, it is important to understand their risk tolerance levels and related household characteristics. The involvement of business owners in their business management is an important factor of their investment behavior. Financial planners and educators should consider the managerial role of the household of any businesses owned into account. Manager owners are distinctive in that they are involved in the management of both households and businesses. The risks they are confronted with are highly associated with business performance and family issues, so they are more concerned about meeting their financial goals within their own families and businesses as suggested by previous researchers. Therefore, for manager owners, comprehensive financial planning advice may be more useful than specific advice about investment alternatives. In contrast, non-manager owners may be interested in investment advice from financial planners, though given their wealth levels, a high degree of expertise may be needed to serve these households well.

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Endnotes

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3. It is not clear from Xiao et al. (2001) exactly how they defined business owning families. Xiao (personal communication to authors, 2005) stated that they had defined a business owning household as one that both owned and managed a business. Therefore, a household that owned a business but did not manage that business would be included with households that did not own a business.

4. Combining the four datasets enabled us to obtain more robust estimates of the effects of some small groups, such as non-manager business owners. The multivariate analyses (logits) reported in this paper (Tables 4 and 5) are similar to logits performed for the 2001 dataset only for the major variables of interests, business ownership, gender of the respondent, income, and other financial resources, except that in the stock logit, non-manager business owners are not significantly different from otherwise similar non-business owners in the probability of owning stocks. The logit results for the 2001 dataset are available from the authors.

5. We follow the definition of family business in Heck and Trent (1999) but do not restrict the owner-manager's work intensity or the years in business. And we also include households which own but do not manage business into the sample.

6. Largely consistent with the result of Xiao et al (2001), our study, when including business characteristics, shows that only the number of employees has significantly positive impact on the high and substantial risk tolerance; whereas, only the business number and the log of gross sale of business have significantly positive relationship with the some risk tolerance; only the sole proprietorship has the negative relationship with the stock-ownership. In order to focus more on the characteristics of households, this study didn't include business characteristics into the models.

7. The household type variables were defined by the respondent's description of other household members. If the actual respondent is the head (variable x8000=5) then the relationships are based on variable x8023. If the

actual respondent is the spouse or partner of the head (variable x8000=1), the relationship is based on variable x105. If the respondent identified somebody else in the household as his/her spouse, and that person was of the opposite sex, we designated that household as a married couple household. If the respondent identified somebody else in the household as a partner, we designated that household as a partner household. All other households were designated as single head households.

8. Deaton (1997) suggested that the use of population weights in multivariate analyses when the weights were endogenous might result in biases affecting hypothesis testing. He also suggested that use of weights for descriptive analyses might be reasonable. All of the major results of weighted logits are similar to those shown in Tables 4 and 5.

9. The predicted probability for a particular combination of independent variables in a logit can be calculated by the following formula:

$$P = e^{BX}/(1+e^{BX})$$

Where B is a vector of coefficients from the logit, and X is a vector of values of the independent variables. For the marginal effect of a particular variable, e.g., female respondent, the marginal effect of being a female respondent represents the difference in the predicted probability for female respondents and the predicted probability for male respondents, at the mean values of other variables. We adjust the predicted probability so that at the mean value of all independent variables, the predicted probability equals the mean probability.

For continuous variables such as age and the log of income, the "marginal" effects shown are really the effect of a change in a range of each variable, as a one unit change would not be very informative.

10. In the logits, the significance levels shown for the two business ownership categories are for comparison with the nonowner households. In order to test the significance of differences between the business owner groups, we ran each of the logits with everything the same as the logits presented in Tables 4 and 5, except that the reference category for business ownership status was manager owners rather than nonowner.

11. The lower risk tolerance for females respondents shown in the three logits in Table 4 persists even if the same logits are run for manager business owners only, and the magnitude of the effects are similar. (Logit results are available from authors.)