

FINANCIAL PLANNING AND HOUSEHOLD PORTFOLIO PERFORMANCE:
EVIDENCE FROM THE 1998-2013 SURVEY OF CONSUMER FINANCES

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by
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SHAN LEI

ABSTRACT

This dissertation used datasets from the 1998, 2001, 2004, 2007, 2010 and 2013 Survey of Consumer Finances (SCF) to evaluate the effect of using financial planning services on households' portfolio performance.

In this dissertation, portfolio performance was measured by portfolio Sharpe Ratio. The higher the Sharpe Ratio, the better the portfolio performance. Portfolio Sharpe Ratio was obtained based on rate of return, standard deviation, and asset weights. Asset's rate of return and standard deviation were calculated based on historical data, while each asset's weight in a portfolio was calculated using the data of assets' value in the SCF. In addition, as a dependent variable in the empirical model, Sharpe Ratio displayed a distribution, which departed significantly from normality. As a result the Sharpe Ratios

were organized into quintiles (1=lowest and 5=highest) based on simulated values. In this dissertation, financial planning services were considered to be the professional services provided by lawyers, accountant and financial planners.

After controlling other factors, the findings lend empirical support to the belief that financial planning services delivered by professional benefit households in higher possibility of reaching better portfolio performance, which was consistent with the descriptive analysis. This dissertation also provides insight into other determinants of portfolio performance. Results indicate that investment horizon positively affected portfolio performance. It was also found in this dissertation that compared to the respondents who were not willing to take any risk, the probability of achieving higher Sharpe Ratios was more likely for the respondents who were willing to take risks. Further analysis including interactions terms of using financial planning services and other sample characteristics showed statistically significant effect of using financial planning services on portfolio performance among different income groups, business owners and non-business owners and respondents with different investment horizons.

Findings in this dissertation suggest that financial planning service professionals should devote more time and effort to helping those with a lower risk tolerance and a shorter investment horizon to construct portfolios that can achieve better portfolio performance. It is financial planning professionals' responsibility to not only understand their clients' financial situations, but also know their clients preferences and expectations. In addition, financial planning service professionals have a responsibility to educate their

clients, to help them better understand themselves and to make better choices, which can maximize their utility.

Future research needs to examine methods to evaluate other aspects of the value that the financial planning industry provides, such as adoption of tax strategies to enhance clients' financial well-being or methods to avoid behavioral biases or at least, reduce the effect of such biases.

CHAPTER 1

INTRODUCTION

1.1 Background

Nowadays, individual investors are increasingly responsible for their own portfolio allocation and wealth accumulation while financial markets are growing more complex. A number of financial trends, such as the shift from defined benefit plans to defined contribution plans (U.S. Department of Labor, 2013), the negative future prospects of Social Security benefits, the continually changing terms in tax laws (U.S. Department of the Treasury, 2005), and a large array of broad and complex financial products (Ho, Palacios, & Stoll, 2012) all exacerbate the already precarious situation in which individual investors find themselves, given that responsibility for their own financial well-being requires a solid financial literacy that many simply do not have.

Since 1978, with the introduction of the 401(k) plan to the market, defined contribution plans have replaced defined benefit plans as the primary retirement plan for the majority of employees in the U.S. (U.S. Department of Labor, 2013). According to the form 5500 report released by U.S Department of Labor, defined contribution plans comprised over 90% of the total pension plans market in 2012 (U.S. Department of Labor, 2015).

The shift from defined benefit plans to defined contribution plans has not only occurred in the private sector, but in the public sector as well, such as in government entities. According to Sanford and Franzel (2012), “defined contribution participation levels have almost doubled from 9 percent for all state and local government workers since the early-to-mid 1990s” (p. 4). They predict that this trend will continue with the federal government facing additional pressures stemming from financial constraints and an aging workforce.

While defined contribution plans allow individual investors more discretion over their financial management, such plans also require that individual investors shoulder a greater responsibility for their portfolio allocation decisions and, ultimately, portfolio performance.

Portfolio allocation decisions of individual investors are also relevant to the current situation of U.S. Social Security system. According to the report released by Social Security Administration (2015), approximately 63.2 million people in 2013 received Social Security benefits. In addition, 65% of aged beneficiaries received at least half of their income from Social Security in 2012. However, according to the trustee report, Social Security reserves have been diminishing and are projected to be reach full depletion by 2033 (Social Security Administration, 2014). Although Social Security benefits should not be relied on as a sole source for retirement income, the negative prospects for the future of such benefits increases the importance of wise portfolio allocation.

In addition, innovations in the financial market have provided individual investors with a large array of broad but complex financial products (Ho, Palacios, & Stoll, 2012). Subsequently, it has become increasingly difficult for common individual investors to make appropriate decisions for their portfolio or even understand these products (Lumpkin, 2010).

Empirical studies have also found that most individual investors lack adequate financial knowledge and skills to make appropriate savings and investment decisions in a complex financial market (Lusardi & Mitchell, 2007, 2011). Lusardi (2008) states that “A large percentage of workers have not thought about retirement, even when retirement is only five to ten years away... half of older workers know little about their pensions and the rules governing Social Security benefits... Financial illiteracy is widespread among the general population and particularly acute among specific demographic groups, such as women, African-Americans, Hispanics, and those with low education” (p. 2).

To ensure personal wealth accumulation and preservation, individual investors may choose to rely on their own financial literacy or seek assistance from those who are financially knowledgeable, such as financial planning professionals. When confronted with such decisions, economic theory indicates that individual investors are utility maximizers and will make the trade-off between the costs and benefits in making the decision that will help them best realize their financial goals.

As stated earlier, solid financial literacy is crucial to an investor's ability to choose among complex financial products and ensure optimal portfolio performance. However, Lumpkin (2010) pointed out that for some financial products, such as products with embedded option, "even a slight tweaking of the terms can greatly alter the risk characteristics" (p. 3). Furthermore, empirical findings have cast doubt on the effectiveness of financial literacy education. Willis (2008) argues that the mismatch between the ever-evolving financial market and individual investors' slow build-up of the financial knowledge makes financial literacy education less effective. In addition, financial literacy education leads to individual investors feeling overconfident about their financial skills when, in actuality, they should not. According to previous research, such overconfidence leads to investment mistakes, including excessive trading or under diversified portfolios. Such mistakes contribute to poorer portfolio performance (Park et al., 2010; Trinugroho & Sembel, 2011). Willis (2008) provides a useful analogy, arguing that individual investors would never attempt to teach themselves medical skills in order to cure diseases by themselves, nor would they attempt to serve as their own lawyers or accountants, so why should they train themselves to be financial experts? Moreover, individual investors who understand that the opportunity costs of not obtaining professional assistance are far too great to do without are more likely to seek assistance and enjoy better portfolio performance as a result.

Financial planning services also provide benefits that many do not realize. First, financial planning services not only provide monetary benefits, but also mental and psychological benefits. Individual investors' self-reported appraisals about professional services corroborate the benefits of using financial planning services (CFP Board, 2012). According to the results of the 2012 Household Financial Planning Survey released by the Consumer Federation of America and Certified Financial Planner Board of Standards (CFP Board), households with a personal financial plan felt more confident about their future economic situations and reported more financial success, such as saving more money. They were also more satisfied with their current financial status and progress towards accumulating wealth (CFP Board, 2012). The Financial Planning Association (FPA) and Ameriprise's Value of Financial Planning Study in 2008 found that individual investors with a planner and a plan more frequently reported confidence in their financial futures and felt significantly better informed about their financial decision-making, better prepared for emergencies, and better equipped to make timely decisions as market conditions warrant (FPA & Ameriprise, 2008).

Despite the reported benefits, few individual investors turn to financial planning service professionals for assistance. The 2009 National Consumer Survey conducted by CFP Board found that two-thirds survey respondents did not have a financial plan, and only 38% involved financial planning service professionals in their financial plan (CFP Board, 2009). This situation did not improve much in subsequent

years. According to the findings of the 2012 Household Financial Planning Survey by CFP Board, only 31% of respondents reported having their own or professional financial plans. The report also pointed out that the numbers actually had not change much compared to 15 years ago (CFP Board, 2012).

Understanding the effect of financial planning on household portfolios highlights the benefit of financial planning and the need for financial planning professionals. In order to demonstrate the relationship between financial planning services and portfolio performance, the current study uses data from the 1998-2013 Survey of Consumer Finances (SCF) to investigate whether using financial planning services has a significant positive effect on households' risk-adjusted portfolio performance. This dissertation compares portfolio performance between households that used financial planning services and those that did not. Other factors affecting the household portfolio performance also are examined. In particular, the effect of using services provided by financial planning service professionals on such portfolio performance is tested for statistical significance. Does the use of financial planning services increase the probability of better risk-adjusted portfolio performance? The results of the current study have far-reaching implications not only for investors, but for everyone related to the financial planning industry in general.

1.2. Household Portfolio Components

Modern portfolio theory is based in Markowitz's mean-variance model, which refers to the choice between risk-free financial assets and risky financial assets (Guiso, Haliassos, & Jappelli, 2002). In the model, Markowitz (1952) took only financial assets into consideration.

Both in empirical study and in practice, the definitions of household portfolio have been broadened from financial assets to a wider range of assets, including financial assets and non-financial assets, with different degrees of classification for risky assets. From the perspective of financial planning practice, Grable, Klock, and Lytton (2008) established two broad categories of household assets: financial assets that could be invested and spent, and non-financial assets that exist for the purpose of supporting a household's daily existence. They also pointed out that some non-financial assets, such as artwork and collectibles, could be treated as financial assets if they are used to invest.

The Survey of Consumer Finances (SCF), the dataset employed in this dissertation, is relied upon for data related to portfolio components from a broader view. The SCF collects the information about households' financial assets, such as checking accounts, saving accounts, certificates of deposits, bonds, stocks, and mutual funds, as well as non-financial assets, such as residences, non-residential real estate, business interests, and so on. Table 1 presents the components of household portfolio in the SCF dataset.

Table 1 Asset Categories in Survey of Consumer Finances

Asset Categories	Sub Categories
Financial Assets	Checking Accounts
	Savings Accounts
	Money Market Deposit Accounts
	Money Market Mutual Funds
	Call Accounts at Brokerages
	Certificates of Deposit
	Stock Mutual Funds
	Tax-Free Bond Mutual Funds
	Government Bond Mutual Funds
	Other Bond Mutual Funds
	Combination and Other Mutual Funds
	Other Mutual Funds
	Saving Bonds
	State and Local Bonds
	Mortgage-backed Bonds
	US Government and Government Agency Bonds and Bills
	Corporate and Foreign Bonds
	Stocks
	Individual Retirement Accounts/Keoghs
	Account-type Pension Plans
	Cash Value of Whole Life Insurance
	Annuities
	Trusts
Other Financial Assets	
Non-Financial Assets	All Vehicles
	Primary Residence
	Real Estate for Investment Purpose
	Business Interests
	Other Nonfinancial Assets

When using the asset information from the SCF dataset, previous literature usually reclassified assets based on their return and risk characteristics. Lai and Hanna (2004) used the 2001 SCF dataset to study portfolio efficiency of older investors. They reclassified assets into five categories: (1) money market-related assets, including checking, saving, certificates of deposit, money market mutual fund, money market deposit accounts, and cash or call money accounts with the brokers; (2) stock-related assets, including stock-related assets in publicly traded stocks, stock investment in combined mutual funds, IRA, account type pension plans, annuities, trust and managed investment accounts. It's assumed in her study that mutual funds were invested half in stocks and half in bonds since the SCF did not provide information regarding the specific investment channels; (3) bond-related assets, including bond mutual funds, saving bonds, bond investment in combined mutual funds, account type pension plans, IRAs, annuities, trust and managed investment accounts; (4) real estate-related assets. Primary residence was not considered as an investment; (5) business ownership-related assets, including business interest and business interest investment in account type pension plans, IRAs, annuities, trust and managed investment accounts. Similarly, using the 1992-2004 SCF datasets, Huang (2007) categorized financial assets into four categories when studying the race differences in portfolio allocation: (1) cash accounts, including cash, CDs, checking accounts, savings accounts, money market deposit accounts, money market mutual funds and margin accounts at brokerages; (2) equities, including directly-held stocks, mutual funds invested in stocks, stock investment in IRAs/Keoghs, thrift-type

retirement accounts and other managed assets; (3) bonds, including savings bonds, state and local bonds, mortgage-backed bonds, government bonds and corporate and foreign bonds, bonds investment in mutual funds, IRAs/Keoghs, thrift-type retirement accounts and other managed assets; (4) other financial assets, such as loans to someone else, royalties, non-public stocks and so on.

The components of a portfolio may vary from different angles and perspectives. Previous two studies both considered major assets, such as cash or cash equivalents assets, stocks and stocks related assets, and bonds and bond related assets. They also reclassified assets in IRAs, retirement accounts and other managed accounts into their major asset categories since the assets information in these accounts provided by the SCF was mixed. However, they included different other asset categories based on their understanding about what should be included in a household portfolio. For example, Lai and Hanna (2004) examined real estate assets and business interest assets while Huang (2007) included other financial assets in her study. In this dissertation, I take into consideration all investable financial and non-financial assets when assessing household portfolio performance. Given the complexity (Ho, Palacios, & Stoll, 2012) of today's investment market and a broader product line (Guiso, Haliassos, & Jappelli, 2002), including both financial and non-financial assets can provide a better reflection of the household portfolio's broader diversification and performance. Some non-financial assets, such as real estate, are not only a good anti-inflation investment but also less correlated with financial assets, such as bonds and stocks (Conover,

Friday, & Sirmans, 2002). Some non-financial assets, such as business interests, affect investors' decisions regarding risky assets due to their high risk (Cervellati et al., 2013; Faig & Shum, 2002; Gentry & Hubbard, 2000). Therefore, including both financial and non-financial assets can lead to a better evaluation of household performance overall. Detailed information regarding assets categories in a portfolio will be discussed and presented in Chapter 3.

1.3 Contributions of this Dissertation

Many prior studies (Bluethgen et al., 2008; Gerhardt & Hackethal, 2009; Kramer, 2012; Lusardi & Mitchell, 2011) have focused on the effect of financial planning on wealth accumulation and portfolio allocation. This dissertation utilizes an objective and quantitative measure, the household portfolio Sharpe Ratio, which considers both risks and returns, in order to evaluate the benefits of financial planning services.

Second, instead of limiting the components of the portfolio to only financial assets as previous research has done, this dissertation includes a broader range of assets in the household portfolio, considering both financial and non-financial assets, which better reflects the complexity of financial markets.

Third, this dissertation uses nationally representative data to analyze the benefit of financial planning services. This approach is advantageous over convenience samples or small samples that have been used by many previous studies

(Bluethgen et al., 2008; Gerhardt & Hackethal, 2009; Kramer, 2012; Marsden, Zick, & Mayer, 2011). The external validity of this dissertation is increased due to the more representative national sample.

Fourth, instead of limiting consideration of those providing financial planning services to only the professionals with the precise working title of “financial planner,” this dissertation incorporates financial planners, accountants and lawyers as the main financial planning service providers during their clients’ financial planning process. In many cases, these three kinds of professionals work as a team to provide services for the clients.

Finally, this dissertation uses the recommended weight (X42001) and 999 bootstrap replicate weights provided by the Survey of Consumer Finances (SCF) to estimate the correct total standard error considering sample variance. Very few studies (Yao, Ying, & Micheas, 2013) examining the SCF dataset used these weights.

1.4 Organization

This dissertation is organized as follows. Chapter 2 reviews the theoretical and empirical literature related to the portfolio allocation/performance. Chapter 3 introduces the conceptual model of this dissertation: expected utility theory, mean-variance model, and information search. In this chapter, I also propose hypotheses based on the conceptual model. Chapter 4 introduces the dataset and variables used for the analysis, and also justifies the empirical methodologies adopted in examining

the factors related to household portfolio performance. Chapter 5 discusses the empirical results, including descriptions of the sample characteristics, Wilcoxon test results from a comparison between investors using financial planning services and those who do not, and results from the logistic analysis. The final chapter summarizes the findings and discusses implications for investors, financial professionals, and future research.

1.5 Definitions

Most definitions used in this study were consistent with the ones in the SCF.

Account-type pension plans: included 401k, 403b, thrift, savings, SRA, or if participant has option to borrow or withdraw

Cash and cash equivalent assets include: checking accounts, money market deposit accounts, money market mutual funds, call accounts at brokerages, CDs, and savings bonds.

Call accounts at brokerages: A brokerage account in which investor can borrow cash from a broker to purchase securities.

CDs: certificates of deposit. Interest bearing investment products issued by commercial banks and are insured by the FDIC.

Household head: the man in a mixed-sex couple or the older in a same-sex couple.

IRAs: individual retirement account. Individual investors used it to manage the funds to prepare for retirement funds and the funds in it can be invested in stocks, bonds and other investment products.

Money market deposit accounts: An interest bearing account which gives the clients advantage of both checking and traditional savings accounts.

Money market mutual funds: a low risk, low return mutual fund

Mutual funds: funds collected from many investors are invested by mutual funds managers. Based on the securities they invested, mutual funds can be classified into different kinds, such as stock mutual funds, bond mutual funds,

Primary residence: a principle home where respondents and their families live, including a house, a town house, a mobile room and other types of home.

Savings accounts: in the SCF, including traditional savings account, 529 education plans and other savings accounts that can be invested in stocks, bonds and other financial products.

Savings bonds: interest-bearing investment products issued by the U.S. Department of the Treasury and backed by full credit of U.S government to help pay for the borrowing of the government.

Other managed assets: include trusts, annuities and other managed investment accounts.

CHAPTER 2

LITERATURE REVIEW

Given that portfolio performance is directly related to wealth accumulation (Yao, Gutter, & Hanna, 2005), it is therefore critical to better understand the factors that affect portfolio performance. Studying the effect of financial planning on portfolio performance will shed light on the importance of quantifying the value of financial planning.

Past research has found a positive relationship between portfolio performance and portfolio allocation. According to Brinson, Hood, and Beebower (1986), portfolio performance accounted for over 90% of the portfolio outperformance. In addition, portfolio diversification, which refers to the diversity in portfolio allocation, usually leads to larger probability of better performance, as proven by previous empirical studies (Bucher-Koenen & Ziegelmeier, 2011; Calvet, Campbell, & Sodini, 2006, 2008). Moreover, non-participation in risky asset markets may lead to lower returns and an overall loss of wealth (Calvet et al., 2006, 2008; Cocco, 2005).

Therefore, it can be deduced from past research that factors affecting portfolio allocation will impact portfolio performance as well. A review of the literature on theoretical background of portfolio allocation, typical portfolio performance measures, and factors affecting portfolio performance/allocation is therefore relevant to this dissertation.

2.1 Theories Related to Portfolio Allocation

2.1.1 Expected utility theory and mean-variance portfolio theory.

Decision-making theory is rooted in expected utility theory. Von Neumann (1947) pointed out that decision makers are likely to select the option that maximizes their expected utility under risk, which is the weighted sum of their utilities of choice multiplied by the corresponding probabilities. The degree of the concavity of the utility function is determined by risk aversion, as defined and explained by Pratt (1964).

One decision of which individual investors are confronted is that of portfolio allocation: they must decide how to best allocate their assets in order to maximize portfolio performance. Modern portfolio theory dates back to the mean-variance model developed by Markowitz (1952). In the model, Markowitz (1952) rejected the rule of portfolio choice as the maximization of expected future return, but instead suggested that “the expected return-variance of return rule” (p. 79) be used as the individual investors’ decision-making guide. To be specific, individual investors are likely to choose the portfolio with the highest expected return, given the same variance and the assumption that individual investors are risk-averse in their investment decisions. In other words, when faced with the same expected return, individual investors should select the portfolio with the lowest variance. Markowitz (1952) also emphasized the “superiority of diversification” of the “right kind” for the “right reason” (p. 89). As implied by this rule, diversification does not simply depend on the sheer number of the assets held, but also the covariance among the assets.

Tobin (1958) introduced the concept of risk-free asset as part of the individual investors’ decision-making process. He suggested that individual investors should choose

not only one risky asset, but a combination of diverse risky assets over risk-free assets. The theory was known as “Separation Theorem” and became a very important guiding rule in individual investors’ portfolio choice, both in academia and in practice.

Sharpe (1964) calibrated the asset-pricing model to examine the relationship between the rate of return of the asset and its risk in market equilibrium, known as the “Capital Asset Pricing Model.” His model suggests that individual investors will seek higher expected rates of return due to the compensation from the “pure interest rate” (risk-free rate) and “prick of risk” (risk premium). Similarly to Markowitz’s (1952) mean-variance model, Sharpe (1964) assumed that all risky assets could be tradable to all investors, that information is readily available to all investors, and that all investors are risk-averse. In addition, it is assumed that all investors are provided with a risk-free asset with no borrowing or lending constraints. Thus, every investor is confronted with the same market portfolio on Markowitz’s efficient frontier, and the portfolio optimization problem for rational investors is simplified into how to choose a combination of a risk-free asset and market portfolio based on risk tolerance.

2.1.2 Measures of Portfolio Performance

Portfolio performance can be measured in multiple ways.

Expected Rate of Return. Expected rate of return of a portfolio is an application of expected utility theory in finance and economics. It refers to the weighted average of the rate of return of each asset (Eeckhoudt, Gollier, & Schlesinger, 2005).

$$E(R) = \sum_{i=1}^n p_i r_i, \text{ where}$$

p_i = weight of each asset in a portfolio,

r_i = rate of return for each asset, and

n = number of assets in a portfolio.

However, evaluating returns overlooks households' tolerance for risks. Markowitz (1952) pointed out that a maximized expected rate of return did not mean that the portfolio had the lowest risk. Since it is insufficient to focus on return alone when evaluating portfolio performance, the following three measurement tools consider both return and risk.

2.1.2.1 Treynor Ratio

Given that the measure of return can be biased and does not adequately explain the realities that investment managers face, Treynor (1965) devised a new way to measure portfolio performance. By heavily assigning large amounts of common stock, returns can fluctuate heavily. Subsequently, Treynor (1965) divided the risk into two categories: “general market fluctuation” and “fluctuations peculiar to the particular securities held by the fund”, otherwise known as “unsystematic risk”. In doing so, Treynor (1965) attempted to create a measurement tool that could be applied to all individual investors, despite their risk preferences:

$$\text{Treynor Ratio} = \frac{r_p - r_f}{\beta_p}, \text{ where}$$

r_p = portfolio rate of return,

r_f = risk-free rate of return, and

β_p = portfolio beta.

2.1.2.2 Jensen Index

Based on the model of CAPM, Jensen (1968) developed a measure to assess the excess return a portfolio manager will earn over the expected return, given a certain level of risk. In other words, the Jensen measure, also known as Alpha, was, in effect, a measurement tool to quantify portfolio managers' ability to predict the portfolio performance.

$$\text{Jensen Index} = \bar{r}_p - [r_f + \beta_p (\bar{r}_m - r_f)], \text{ where}$$

\bar{r}_p = expected portfolio rate of return,

r_f = risk-free rate of return,

β_p = beta of the portfolio, and

\bar{r}_m = expected market return.

2.1.2.3 Sharpe Ratio

Sharpe (1994) created the ratio that considers both average return and risk in one measure, as based on Markowitz's mean-variance theory. The Sharpe Ratio is the measure of return per unit of risk, which is calculated by the standard deviation of the portfolio. The risk measure included in the Sharpe Ratio not only considers systematic risk, but also unsystematic risk. The higher the Sharpe Ratio, the better the portfolio performance.

$$\text{Sharpe Ratio} = \frac{r_p - r_f}{\sigma_p}, \text{ where}$$

r_p = portfolio rate of return,

r_f = risk-free rate of return, and

σ_p = portfolio standard deviation.

The Sharpe Ratio is considered to be a superior performance measure compared to other measures because it uses standard deviation as a measure of risk, meaning it is independent from any benchmarks (Eling, 2008; Morningstar, Inc., 2010; Pedersen & Rudholm-Alfvin, 2003). In contrast, the Treynor Ratio and the Jensen Index both use the portfolio beta to measure portfolio risk, which is limited by the fact that it only accounts for systematic risk, but also because it assumes that the that portfolio is well-diversified and appropriate for all who choose the same benchmark portfolio (Sharpe, 1964). This assumption is not true in the practical world (Sharpe, 1964). The Sharpe Ratio, on the other hand, is independent from any benchmarks and enables us to identify how asset allocation plays a role in portfolio diversification. Given the central role of asset allocation in portfolio performance, the current study employs the Sharpe Ratio as the primary measure of performance.

2.2 Factors Affecting Portfolio Allocation/Performance

A large body of research has been conducted regarding the determinants of portfolio allocation/performance, including engagement in financial planning, wealth, income, demographic variables, risk tolerance, and investment horizon. This section of literature review includes four main parts: a description of the effect of financial planning, a review of literature on the effect of households' economic characteristics, a discussion of the effect of demographic characteristics, and an introduction of literatures on the effect of individual investors' expectations/preferences.

2.2.1 The Effect of Financial Planning

The value of financial planning as a topic has received widespread attention, but empirical studies have shown much less consensus regarding its impact.

Research has demonstrated mixed findings when it comes to examining the effect of financial planning on portfolio performance. Bergstersser, Chalmers, and Tufano (2009) and Chalmers and Reuter (2012) concluded that financial planning did not benefit clients. Furthermore, Bergstersser, Chalmers, and Tufano (2009) contended that because of conflict of interest between clients and advisors, advisors worked in the interest of themselves rather than their clients, thus providing little help in improving the risk-adjusted return. Individual investors who used financial planning services even performed worse than market index. Chalmers and Reuter (2012) found that investors who engaged in financial planning were more sensitive to recent returns and were more likely to adjust their portfolio allocation due to recent return changes, which led to the unnecessary transaction cost, thus jeopardizing their portfolio return.

On the contrary, Kramer (2012) and Bluethgen et al. (2008) confirmed the value of financial planning as it may lead to a more diversified portfolio. Using the data collected from a national operated relationship bank from April 2003 to August 2007 in the Netherlands, Kramer (2012) compared the risk, return and portfolio composition between advised investors and self-directed investors. In this study, “advised investors” included clients who received advisory services from the bank, while “self-directed investors” referred to the clients that only received execution services from the bank. In addition, the study also made a comparison between the portfolio risk, return and composition pre- and post- advice so that the study could identify the interventional

effect of the advice. Kramer (2012) found that clients receiving financial planning services held more diversified portfolios with less risk. Kramer (2012) also found the clients with professional assistance had better returns, in general. Furthermore, this study confirmed the added value of financial planning services, as indicated by a more diversified portfolio when comparing the portfolio of the same clients before and after using financial planning services.

By examining the data from the 2010 National Longitudinal Survey of Youth, which surveyed respondents of 50 years or older, Grable and Chatterjee (2014) studied the value of financial planning services. The data used in this study was collected before and after the Great Recession, and a measure named “zeta” was used to gauge wealth volatility. Zeta was developed from the concept of gamma which calculated “the certainty-equivalent utility-adjusted retirement income across different scenarios.” (Blanchett & Kaplan, 2013. P.3). Thus, it can help to quantify the value of financial planning by comparing different financial planning strategies with the base strategy. Zeta was considered to be an appropriate measure to quantify the value of financial planning services in volatile financial times. Based on the finding that investors seeking help from financial advisors showed less wealth volatility during the turbulent economic situations than their counterparts, Grable and Chatterjee (2014) were able to confirm the value of financial planning.

In a similar vein, Gerhardt and Hackethal (2009) utilized detailed transaction data provided by a large bank in Germany to compare the portfolio characteristics of investors before and after they received financial planning services. They reached the same conclusion that after individual investors took the financial planning services, they traded

less speculatively and had more diversified portfolios. Lusardi and Mitchell (2011) also found that individual investors with financial planning tended to have more wealth and invest in higher-return assets.

In addition, several studies found that financial planning services helped individual investors choose more appropriate investments. Gerhardt and Hackethal (2009) found that individual investors using financial planning are involved in less speculative activities. Using data gathered from employees of a large university, Marsden, Zick, and Mayer (2011) studied the effect of financial planning services on retirement outcomes. They found that use of financial planning services was related to better retirement planning outcomes, such as goal setting, established emergency funds, and use of supplemental retirement accounts. They also found more rational investment behavior, such as “buy low,” rather than “fleeing equities and other high risk investments” in a down market.

Financial planning services have proven to offer non-monetary benefits as well. For example, according to research conducted by Marsden, Zick, and Mayer (2011), use of financial planning services enhanced investors’ retirement confidence. The Financial Planning Association and Ameriprise (2010) found similar results in terms of confidence. In their 2008 national survey with data from 3,000 respondents, they divided investors into three groups: self-directed, advice supported and comprehensive planning participants. Individual investors who did not use financial planning services provided by financial planning services were referred to as “self-directed,” while those who paid for financial planning services—but not those comprehensive in nature—were referred to as “advice supported.” Last, individual investors were considered “comprehensive” if they

received at least three planning modules from the following financial planning services: tax planning, estate planning, retirement planning, insurance planning, education planning, and financial management. The study revealed that households that engaged in comprehensive financial planning exhibited twice as much confidence towards their future financial situation relative to others who did not use such services. Results also showed that comprehensive households, in comparison to the other two types of households, were more active in their portfolio management.

In summary, past research has reached diverse conclusions regarding the effect of financial planning services on portfolio allocation and performance. One of the reasons may be that past research has been undertaken with varied understandings of what constitutes financial planning and who exactly provides financial planning services. Inconsistent definitions of what personal financial planning entails may lead to the selection of different variables as proxy of using financial planning services.

The owner of international CERTIFIED FINANCIAL PLANNER certification program-Financial Planning Standards Board Ltd., and the owner of the CERTIFIED FINANCIAL PLANNER certification program in the United States-CFP Board defined "financial planning" as the process of developing the strategies to help with individual investors' finances in order to meet their life goals (CFP Board, 2008, p.1; FPSB, 2011, p.1). This definition suggests that the financial planning services should be provided by professionals. The contents of financial planning include financial management, asset management, risk management, tax planning, retirement planning and estate planning (FPSB, 2009). In practice, financial planning service professionals provide services in

either a comprehensive set or as only one or several of the six modules. This also indicates that the financial planning services should be provided by professionals.

Though the above definition of financial planning is well accepted among practitioners, different researchers may still approach the concept differently. When referring to “financial planning”, some authors have included “self-directed” financial planning into their considerations as well (Ameriks, Caplin, & Leahy 2003; Lusardi & Mitchell 2007, 2011).

Within the research on financial planning services provided by professionals, the scope of professionals varies. There are broader definitions of financial planning service professionals that include accountants, bankers, brokers, or financial planners (Dow, 2009). Others may use a relatively narrow definition of financial planning service professionals that includes only those who have the exact title of “financial planner” (Finke, Huston, & Danielle 2011; Hanna 2011). Additionally, some researchers defined financial planning service professionals as brokers in their papers (Bergstresser, Chalmers, & Tufano, 2009; Chalmers & Reuter, 2012).

Definition of financial planning service professionals in this dissertation encompasses services from financial planners, accountants, and lawyers, all who act as the main financial planning service provider during their clients’ financial planning process. Significantly, financial planners, accountants and lawyers usually work as a team to provide financial planning services to the clients (Roth, 2012). Accountants provide advice for tax planning and lawyers provide advice for estate planning. Tax planning and estate planning are both major components of financial planning. In addition, investment planning usually has tax consequences which requires assistance from accountants and

has estate planning consequences which needs to involve lawyers (Financial Industry Regulatory Authority, 2015). Further, considering the main income resource of financial planners, lawyers and accountants is from fees by advising people rather than product sales, such as brokers, it is reasonable to group these three kind of professionals together as the financial planning services providers.

2.2.2 The Effect of Households' Economic Characteristics

Economic characteristics, such as household wealth and income, serve as primary factors affecting portfolio allocation and performance. Homeownership and business ownership are found to be important relevant economic characteristics in past literature as well.

2.2.2.1 The Effect of Wealth and Income

The effect of income and wealth on portfolio allocation has been well studied. By studying 7,000 retirement accounts from a large firm, Agnew, Balduzzi, and Sundén (2003) identified a positive relationship between income and stock ownership. Hinz et al. (1997) employed the 1990 U.S. Federal Government's Thrift Savings Plan Survey, and also found that income had a positive relationship with stock investment in retirement plans. Goetzmann and Kumar (2008) examined the relationship between portfolio allocation and income using a large dataset collected in a U. S. large discount brokerage firm from 1991 to 1996. They found that the diversification level increased with income. Other studies have also confirmed the positive effect of income on portfolio diversification (Anderson 2013, Roche, Tompaidis, & Yang 2013).

Empirical studies have demonstrated that higher wealth is associated with more diversified portfolios (Calvet, Campbell, & Sodini, 2006; Goetzmann & Kumar, 2008; Roche, Tompaidis, & Yang, 2013). Calvet, Campbell, and Sodini (2006) employed the 1999 to 2002 panel data covering all Swedish households and found a positive effect of wealth on holding a diversified portfolio and a higher Sharpe Ratio, which was estimated using historic return of each asset in the portfolio. They also found that household income also possessed better performing portfolios. Peress (2004) found wealth has a positive effect on holding risky assets due to the decreasing risk aversion as wealth grows.

Last, by examining the dataset from the 1989 to 2004 Survey of Consumer Finances, Becker and Shabani (2010) found that household debt also affected investors' portfolio allocation. Results showed that carrying debt decreased the probability of households participating in equity markets.

2.2.2.2 The Effect of Homeownership

Homeownership also had an effect on investors' portfolio allocation decisions. Using data from the Panel Study of Income Dynamics, Cocco (2005) studied household portfolio allocation when taking self-owned housing into consideration. This study found that the crowd-out effect of self-owned housing resulted in investors holding less stock in their portfolios, especially for the young and low-income investors.

Fratantoni (1998) employed the 1989 Survey of Consumer Finances data to study the effect of home ownership on stock investment. The author concluded that homeowners with a mortgage balance were more likely to hold a undiversified portfolio and less likely to invest in risky assets, such as stocks. The author also found that relative

to homeowners with a mortgage commitment, renters were more likely to have a more diversified portfolio.

Similarly, using the 1998 Panel Study of Income Dynamics dataset, Flavin and Yamashita (1999) argued that considering mortgages may be considered a constraint for homeowners, homeowners are compelled to invest in less risky assets. However, homeowners without mortgage constraints were more likely to invest in risky assets, such as stocks. The above conclusions were also confirmed by Cauley, Pavlov, and Schwartz (2007).

2.2.2.3 The Effect of Business Ownership

Business ownership was also a factor affecting investors' portfolio allocation. Using data from the 1995 Survey of Consumer Finances, Xiao et al. (2001) found that family business owners were more risk tolerant and more likely to invest riskier assets in their portfolios than non-business owners. However, using 1995 Survey of Consumer Finances, Faig and Shum (2002) found that financial portfolios that did not include business owners' private business consisted of safer assets. Similarly, Heaton and Lucas (2002) found that business owners with unstable business income held fewer stocks.

Cervellati et al. (2013) theoretically proved that business owners tended to have an underdiversified portfolios if their business comprised a larger portion of their overall portfolio. This conclusion was confirmed by empirical models as well.

Gentry and Hubbard (2000) employed the 1983 and 1989 versions of the Survey of Consumer Finances to study the relationship between business ownership and household portfolio. They found that household portfolios of business owners were

underdiversified, although the degree of underdiversification did not diminish as their businesses grew. Furthermore, wealthier business owners did not allocate adequate liquidity assets to mitigate the potential risk of their business on their non-business assets, but instead concentrated the investment in relative risky assets.

In short, previous research has found that income and wealth positively affect individual investors, leading to a more diversified portfolio and better performance in general. Home ownership, however, has a largely negative effect on risky asset investment. Given that primary residence comprises a large portion of wealth for the majority of individual investors, homeownership can reduce the amount of risky asset investment, especially for homeowners with a mortgage. Moreover, considering the large portion of active business held in the business owners' portfolio, their portfolio may be under diversified, but no further analysis was conducted regarding its effect on portfolio performance.

2.2.3 The Effect of Demographic Characteristics

Previous studies found demographic characteristics, such as age, marital status, gender, education, race, having children and employment status to be factors affecting individual investors' portfolio allocation decision-making.

2.2.3.1 The Effect of Age

Studies on the effect of age on portfolio allocation are inconsistent. Dow (2009) found that age has a positive effect on holding risky assets, such as stocks. Similarly, Flavin and Yamashita (2011) also found that older households held larger ownership of

stocks. Last, Yogo (2009) showed that the share of stock in retirement portfolios increased over time for a total of 2% for every 10 years. Yogo (2009) also pointed out a cohort effect on stock investment in the retirement accounts.

These findings, however, seem contrary to common advice that dictates individual investors should decrease their risk assets holding as they grow older. Coile and Milligan (2009) analyzed the data from the Health and Retirement Study (HRS), and found that liquidity assets were increased for individual investors and households' portfolios as they aged. Using the 1996-1997 survey data from the MacroMonitor database, Waggle and Englis (2000) found that as investors aged, they allocated fewer stocks in their individual retirement accounts. Similarly, by employing the 1992 National Longitudinal Survey (NLS) of Mature Women, Papke (1998) found that stock investment in DC plans decreased as investors aged. McCarthy and Turner (2000) also found a negative relationship between age and stock investment by studying the retirement portfolio accounts data collected from a large firm in Midwestern United States.

So far, the findings regarding the effect of age on portfolio allocation have not proven consistent. One of the reasons of the divergent findings on the effect of age may be that age is not an adequate proxy for investment horizons, thus leading to biased conclusions. Dow (2009) contended in his research that younger individual investors and households might have short investment horizons due to a myopic perspective regarding their financial needs.

2.2.3.2 The Effect of Marital Status

Ulker (2009) used the first and second wave of HRS data to examine the role of marital history in wealth accumulation and portfolio allocation. Ulker discovered that unpleasant marital history had a negative effect on wealth accumulation. In addition, individual investors who had marriage shock tended to allocate their assets into non-housing assets. McCarthy and Turner (2000) found married couples held a smaller portion of stocks in their retirement plans compared to single investors. Arano, Parker and Terry (2010) reached a similar conclusion by studying the Kansas Regents university's faculty retirement portfolio allocation.

2.2.3.3 The Effect of Education

Research has shown that education can impact household portfolio allocation and performance. Calvet, Campbell, and Sodini (2006) contended that individual investors and households with more education tended to have more diversified portfolios and higher Sharpe Ratios. Abreu and Mendes (2010) asserted that individual investors' educational levels and financial knowledge had a significantly positive influence on the number of different assets included in their portfolios. Prior research showed that individual investors with higher education were more likely to hold equity assets (Lai, 2006). In similar vein, Christiansen, Joensen, and Rangvid (2008) found that economists were more likely to hold stocks than otherwise identical investors by analyzing a sample of 400,000 individual investors in Denmark over the period of 1997-2001. Further, Muller (2003) employed the 1992 Health and Retirement Study to identify the effect of retirement class on portfolio allocation in defined contribution plans. Muller (2003) found

that, for investors with high risk aversion, the percentage of stock investment increased after attending a class on retirement.

2.2.3.4 The Effect of Race/Ethnicity

Generally speaking, disparity exists in portfolio allocation among different races. Using data from 1999 SCF, Badu, Daniels and Salandro (1999) studied racial differences among assets holdings. They found that White individual investors held more financial assets than Black investors, while the latter group was more conservative in investing their assets. On average, White households are wealthier and hold more risky assets than households (Gutter, Fox, & Montalto, 1999; Gutter & Fontes, 2006; Hanna, Wang, & Yuh, 2010). As Gutter, Fox, and Montalto (1999) have explained, there were significant differences in financial, social and attitude characteristics between black individual investors and households and White individual investors and households. These differences, however, had more to do with the ownership of risky assets, and not so much race itself. Hanna, Wang, and Yuh (2010) used the Blinder-Oaxaca decomposition method to analyze the combination dataset of 2004 and 2007 versions of the Survey of Consumer Finances and reached a similar conclusion that Hispanic and Black individual investors and households both have a tendency towards high-return assets ownership, controlling for risk tolerance, income and other characteristics. Further evidence was provided by Gutter and Fontes (2006), who found that information exposure and investment barriers among different races could explain differences in investment behavior.

2.2.3.5 The Effect of Gender

Compared with men, women held less risky assets (Frijns, Koellen, and Lehnert 2008; Olivares, Diaz, & Besser 2008) and undiversified portfolios (Austen, Jefferson, and Ong 2010). These findings were consistent with research showing that women were more risk averse than men (Barber and Odean, 2001; Charness & Gneezy, 2012). Sunden and Surette (1998) examined gender differences in defined contribution plans using the pooled data sets of 1992 and 1995 versions of the Survey of Consumer Finances. They found that compared to men, women were less likely to invest in stocks for their retirement accounts. They further combined gender and marital status into one variable and concluded that married women were less likely to allocate assets into stocks for their retirement accounts than men (or single women). Following a similar pattern, Rickman, Parker, and Terry (2002) found that female faculty invested less in stocks in their retirement accounts by studying 1996 Survey of Kansas Regents University faculty.

2.2.3.6 Other Demographic Characteristics

Some literature has found that other demographic characteristics, such as employment status or having children, have an effect on portfolio allocation, therefore they were included in the current analysis as control variables. By examining the 1989 Survey of Consumer Finances, Xiao (1996) studied the factors related to holding certain financial assets. The results showed that, in comparison to unemployed investors, employed investors were less likely to hold bonds. By using the 1995 Survey of Consumer Finances, Gutter, Fox and Montalto (1999) also found that having children increased the probability of investing in risky assets for Black households, in particular.

2.2.4 Individual Investors' expectations/preferences

Individual investors' expectations/preferences, such as expecting an inheritance, self-reported risk tolerance, and self-reported health status can help explain their portfolio allocation decisions.

2.2.4.1 The Effect of Received or Expecting an Inheritance

Previous research has found that inheritance expectations positively affected investors' investment in portfolio choice. Using 1995 Survey of Consumer Finances, Embrey and Fox (1997) determined that women expecting an inheritance were more likely to invest in stocks. Gutter & Fontes (2006) examined the 2004 Survey of Consumer Finances data and found that investors, including women and men alike, expecting an inheritance were more likely to invest in stocks. No statistically significant effect was found for the variable "received an inheritance." Harness, Finke, and Chatterjee (2009) employed National Longitudinal Survey of Youth 1979 cohort (NLSY79) to study the effect of capital accumulation ratio, which is commonly used as the measure for portfolio quality. They found that expecting an inheritance appeared to contribute to having a higher capital accumulation ratio. Their findings corroborated the findings of another study, which was conducted by DeVaney (1995). DeVaney (1995) employed the 1989 Survey of Consumer Finances data to study the relationship between expecting an inheritance and meeting the guideline of adequate retirement preparedness, which was defined as having investment assets greater than 25% of net worth. The study

found that expecting an inheritance positively affected the probability of reaching retirement preparedness.

2.2.4.2 The Effect of Self-reported Health Status

Most studies revealed that poor health may lead to investors favoring less risky assets over riskier ones (Berkowitz & Qiu, 2006; Edwards, 2008; Fan & Zhao, 2009; Goldman & Maestas, 2005; Love & Smith, 2010; Rosen & Wu, 2004). Further analysis on the reallocation of the assets, however, has revealed inconsistent conclusions among the various studies.

Research has also shown that poor health status can negatively affect the shares of stock holdings in retirement portfolios (Yog, 2009). According to Feinstein (2006), elder investors with poor health tended to invest less in risky assets in their portfolios, compared to those in good health. Using the data from the Study of Assets and Health Dynamics. Among the Oldest Old, Edwards (2008) presented the same findings that investors with poor health tended to hold less risky assets, however, holding life insurance was not found to have any significant effect on holding risky assets. Similarly, Coile and Milligan (2009) found that health shock had an effect on retirees' portfolio choice. They pointed out that retirees with poor health invested less in risky assets. Berkowitz & Qiu (2006) showed health shock may lead to a greater decrease in financial assets than in non-financial assets.

However, Fan and Zhao (2009) contended that health shock would not have any impact on the holding of total financial assets, but only on reallocation among financial assets. The mechanism of health effect is not quite clear. Analyzing the HRS data, Rosen and Wu (2004) tested four possible mechanisms of health status affecting portfolio choice

(i.e., risk aversion, planning horizon, bequest motives and health insurance) yet they were unable to reach a definite conclusion. Using the 1992-2006 waves of HRS, Love and Smith (2010) ran two models based on marital status, and found little evidence to support that health impacted portfolio choice among single investors, finding only a minor effect on married households. They pointed out that even if there existed the health effect on portfolio choice, the effect could not be treated as a causal relationship.

2.2.4.3 The Effect of Risk Tolerance

Risk tolerance, an inverse concept of risk aversion, can be defined as the maximum amount of variability of return that individual investors are willing to take during the investment decision making process (Grable, 2000). However, Malkiel (2007) suggests that risk tolerance can be broken down into subjective risk tolerance, which is individual investors' willingness to take risk, and objective risk tolerance, which refers to the ability to take risk.

Many studies have reached similar conclusions that individual investors with higher risk tolerance tend to invest more in risky assets (Coleman 2003; Corter & Chen 2006). Corter and Chen (2006) found that investors with higher risk tolerance were more likely to have a higher-risk portfolio. Coleman (2003) investigated the effect of risk tolerance on portfolio allocation between Hispanic and Black investors. Controlling for other factors, Hispanic investors demonstrated a higher risk tolerance and held a higher percentage of risky assets in their portfolio. Bernasek and Shwiff (2001) studied the interaction effect of gender and risk tolerance on pension investments and found that “men who have spouses or partners who are willing to take at least average risk for

average return take greater risk in the allocation of their defined contribution pensions than men whose spouses or partners are unwilling to take any risks” (p. 355).

Research has also been conducted on the retirement investment/saving behavior of retirees or individual investors near retirement. According to Sunden and Surette (1998), investors with above-average risk tolerance had a higher probability of investing mostly in stock for their retirement portfolio. This finding was consistent with other research. Dulebohn (2002) argued that investors willing to take the highest risks tended to also invest in risky investments, such as stocks. As an exception, Hariharan, Chapman, and Domian (2000) found that the risk tolerance of retirees did not have an effect on the asset allocation, while they noted that increased risk tolerance led to a decline in risk-free assets.

2.2.4.4 The Effect of Investment Horizon

Much prior research has affirmed the influence of investment horizons on portfolio performance (Hodges, Taylor, & Yoder, 1997) and allocation (Butler & Domian, 1991; Gunthorpe & Levy, 1994; Veld-Merkoulova, 2011). Butler and Domian (1991) stated in their research that investment horizon played a vital role in asset allocation. It is therefore important for individual investors and financial planning service professionals to account for investment horizon during portfolio management, and adjust portfolio composition accordingly as the investment horizon changes. They also pointed out that the effect of “time diversification” lessened the risk of reaching investment objectives for the long-term investment horizon. Hodges, Taylor, and Yoder (1997) affirmed the relationship between the investment horizon and portfolio performance by

comparing the Sharpe Ratio for different assets, such as small stocks, bonds and large stocks over different investment horizons from one year to sixty years. They acknowledged that the Sharpe Ratio was dependent on the investment horizon. The Sharpe Ratio increased and then declined as the investment horizon grew longer, because the increased rate of standard deviation was faster than the rate of return for all individual assets. Ang and Kjaer (2011) suggested that investments with longer investment horizons performed better because they have “the ability to ride out short-term fluctuations in returns, are able to profit from periods of elevated risk aversion or short-term mispricing ,” and can take “advantage of illiquid investment opportunities” (p. 2).

So far, past research has found that individual investors with longer expected investment horizons generally enjoy a better portfolio performance. Some research, however, has contradicted these findings. For instance, Kim and Park (2011) used monthly returns from the Center for Research in Security Prices (CRSP) mutual fund daily database with a total of 5,281 mutual funds to calculate the different performance measures for three different investment horizons: quarterly, monthly and semi-annual. The results implied that there was no need to use different investment horizons to evaluate mutual funds’ performance. Given that their research only focused on investment horizons with a period of one year or less, their results may be inadequate to explain the effect of longer investment horizons.

In summary, researchers have endeavored to study the factors related to portfolio allocation and performance, including the use of financial planning services, economic characteristics (e.g., wealth, income, homeownership, business ownership), demographic characteristics (e.g., age, education, gender, marital status, race) and individuals’

expectation or preference (e.g., self-reported risk tolerance, self-reported investment horizon). Most research has reached consistent conclusions regarding the effect of the above factors. For example, wealth and income were found to be positively related to portfolio performance, while individuals who were more risk tolerant tended to have riskier portfolios. Past research, however, is not in full agreement regarding the effects of other factors on portfolio performance and allocation, such as age and financial planning. It is likely that different interpretations and definitions of these variables or data used have resulted in these inconsistencies. It is therefore worthwhile to use a large national representative data and pursue a new interpretation in order to examine these factors more closely.

CHAPTER 3

CONCEPTUAL FRAMEWORK AND HYPOTHESES

3.1 A Conceptual Framework

In this section, a conceptual framework is presented to explain how rational individual investors should make investment decisions in their best interest. First, the relationship between the mean-variance model and expected utility theory is discussed. Then, information search theory is presented to justify how individual investors should negotiate the trade-off between increasing financial literacy and using financial planning services.

3.1.1 Expected Utility Theory and Mean-Variance Model

According to the expected utility theory, decision makers select the situation that maximizes their expected utility under risk, which is calculated as the weighted sum of their utilities of choice multiplied by the corresponding probabilities (Von Neumann, 1947).

$$U(x_1, p_1, \dots, x_n, p_n) = p_1 u(x_1) + \dots + p_n u(x_n), \text{ where}$$

U: utility function;

x_i : individual's choice;

p_i : probability of a choice.

This rule can also be applied to individual investors and a household's decision-making process with regards to portfolio allocation. Assume expected value of wealth and its volatility are two parameters of investors' utility function:

$$U = f(E_w, \sigma_w)$$

U: utility function;

E_w : expected value of wealth;

σ_w : standard deviation of wealth.

It is assumed that investors prefer more wealth than less and, therefore, more wealth leads to greater utility. Further, it is assumed that investors are risk averse, which means they prefer less volatility than more, given a certain expected level of wealth value. Moreover, it is assumed that wealth is an increasing function of portfolio rate of return. Subsequently, the problem of expected utility maximizer over wealth can further be transferred to the expected utility maximizer in terms of portfolio rate of return (Sharpe, 1964).

$$U = f(E_r, \sigma_r)$$

U: utility function;

E_r : expected portfolio rate of return;

σ_r : portfolio standard deviation.

Markowitz (1952) contended that the portfolio rate of return used to maximize the expected utility should consider both return and risk (as measured by variance). The problem of utility maximization is equal to return maximization under certain variance or variance minimization under certain return. Thus, he concluded that rational individual investors who are risk-averse would always choose the portfolio with the highest

expected return, given the same variance and assuming they are risk averse. In other words, when faced with the same expected return, individual investors will choose the portfolio with the lowest variance. The efficient frontier can then be obtained by plotting the expected returns for different portfolio allocations, given the various weights for each asset in a portfolio and the rule described previously.

By extending Markowitz's mean-variance model, Sharpe (1964) pointed out that the expected performance of a portfolio should be determined by the expected rate of return and its risk, as expressed by standard deviation. "All the efficient portfolios will fall on the line: $E_i = p + b\sigma_i$."

$$E_i = p + b\sigma_i, \text{ where}$$

p = risk-free rate of return,

b = risk premium, and

σ_i = portfolio standard deviation.

After rearranging the formula, the risk premium b can be expressed by $\frac{E_i - p}{\sigma_i}$.

Thus, from this formula, it can be concluded that the higher the b , the better the portfolio performance. Sharpe (1964) also stated that for portfolios that are inadequately diversified, it can be expected a "poor combination of return and variance, thus will have lower b ". This " b " would later become well known as the Sharpe Ratio, which can be used as the performance measurement of the portfolio (Sharpe, 1994).

3.1.2 Information Search Theory

As Bacon (1597) stated, "Knowledge itself is power." (p. 79). One of the most important information sources for consumers today is information relayed to them by

professionals. Financial planning professionals, in particular, provide information to help individual investors in investment decision-making.

Information economics has shown that consumers will continue to actively search for information as long as the expected marginal benefit is greater than the marginal cost (Stigler, 1961). The benefit of using financial planning is that of an increase to individual investors' expected utility, whether in the form of improved portfolio performance or non-monetary benefits as well. The explicit cost comes from the fees paid in exchange for financial planning services. In contrast, an individual may also be confronted with multiple opportunity costs associated with not obtaining financial planning services. For the majority of individual investors, gaining financial literacy in an ever more complex financial market is a huge challenge (Lumpkin, 2010; Willis, 2008). To forego the help of knowledgeable financial service professionals, those who possess more expertise in investment decision-making (Finke, Huston, & Winchester, 2011), may leave an investor vulnerable to opportunity costs. Other opportunity costs may exist in terms of a potential loss of earnings from alternative opportunities, as investors are unable to make complicated investment decisions by themselves. Therefore, as long as the marginal benefit of using financial planning as an information source is larger than the marginal cost, a rational individual investor should choose to use financial planning services.

3.2 Hypotheses

Combining expected utility theory, mean-variance model, and information economics, it can be concluded that rational individual investors will choose to use financial planning services as an information source if they believe it contributes to the

maximization of expected utility in form of higher portfolio risk-adjusted expected rate of return. Therefore, it is hypothesized in this dissertation that:

Using financial planning services has a positive effect on households' portfolio performance, thus higher Sharpe Ratio.

CHAPTER 4

RESEARCH METHODS

4.1 Data

4.1.1 The Survey of Consumer Finances

The 1998, 2001, 2004, 2007, 2010 and 2013 versions of the Survey of Consumer Finances (SCF) datasets will be used in this dissertation to examine the determinants of households' portfolio performance, especially the effect of using financial planning services. The sample size was 4,305 in the 1998 SCF, 4,442 in the 2001 SCF, 4,519 in the 2004 SCF, 4,418 in the 2007 SCF, 6,482 in the 2010 SCF and 6,015 in the 2013 SCF with five imputates in each dataset.

The SCF is a cross sectional survey conducted triennially and supported by the Board of Governors of the Federal Reserve System in cooperation with the Statistics of Income Division of the Internal Revenue Service. The sample is independent in each survey year. The SCF provides a large array of information on individuals' economic characteristics, such as income, asset, debts, business ownership, home ownership, and other relevant financial information. The SCF also includes information about individuals' expectations and preferences, such as self-reported risk tolerance, self-reported health status and expected investment horizon. Information regarding

demographic characteristics, such as age, gender, races, education, marital status and so on, are also collected in this survey.

The SCF data is collected using “computer-assisted personal interviewing (CAPI),” which was administered in-person or by telephone. The SCF uses a “dual-frame sample design” in which a portion of the data is collected from “a standard multi-stage area probability design,” while the other portion is collected from the Individual Research Tax File. The component collected from the Individual Research Tax File oversampled wealthy individuals or families. In order to address the issue of oversampling, a weighted variable has been added to correct the point estimate and make the results generalizable to the overall U. S population (The Federal Reserve, 2013).

The SCF uses multiple imputation methods to address the issue of missing values. Under this method, the missing data is imputed five times, resulting in a complete dataset equal to five times the original observations. For example, the 2013 SCF dataset included 6,026 respondents, so the full dataset with five successive replicates will equal a total of 31,130 observations in the end (Kennickell, 1998; The Federal Reserve, 2013).

4.1.2 Asset Categories

The measurement of assets within the SCF dataset is not quite clear, and some types of investment accounts include a mix of stock-related, bond-related, real estate-related and other assets. Thus, it is necessary to reclassify these assets in the SCF datasets into asset categories based on their characteristics and the properties of their return and risk to make it clear.

For example, in an IRA account, the SCF provided the respondents with the choice of: all in stocks, all in interest earning assets/bonds, split, real estate, hedge fund, annuities, mineral rights, GIC/guaranteed income contract, business investment, life insurance, non-publicly traded business or other such investment, mutual fund, and other. For respondents who had accounts of annuities, trust, account type pension plans, and saving accounts, the same options are provided. The SCF also inquired as to the specific amount invested in stocks within the "split" and "mutual fund" categories. In the case respondents reported that they invested in annuities, the SCF did not provide information about the specific amount and types. Considering a majority of annuities selling on the market are variable annuities (LIMRA, 2014), which can be invested in fixed income or stock related accounts, it is assumed an equal investment in stocks and bonds for the purposes of this dissertation. The SCF combined real estate, hedge fund, annuities, mineral rights, business investment, life insurance, non-publicly traded business and other such investments into one category in its public dataset. When respondents selected this category, it is assumed that they invested equally in each of these assets. Considering that the primary purpose of life insurance is risk management rather than investment, it was excluded from portfolio for this dissertation.

In this dissertation, the household portfolio includes all investable financial and non-financial assets. The primary residence has been excluded from the portfolio) since its primary purpose is related more to fulfilling current consumption needs, rather than investment needs (Lai & Hanna, 2004). Based on the different characteristics of assets, their risk and return patterns, and their role in a household portfolio, this dissertation

grouped investable financial and non-financial assets in the SCF into fifteen different asset categories.

As table 2 shows, cash and cash equivalent assets include: checking accounts, money market deposit accounts, money market mutual funds, call accounts at brokerages, CDs, and savings bonds.

Stock-related assets include: publicly traded stocks, stock mutual funds, combination and other mutual funds invested in stocks, IRA invested in stocks, annuities invested in stocks, trusts accounts invested in stocks, account type pension plans invested in stocks, and savings accounts invested in stocks. The SCF did not provide information of specific percentage of stocks and bonds invested in combination and other mutual funds. It is assumed these mutual funds invested half in stocks and half in bonds (Lai and Hanna, 2004).

Bond-related assets include: tax-free bond mutual funds, government bond mutual funds, other bond mutual funds, combination and other mutual funds invested in bonds, state and local bonds, mortgage-backed bonds, U.S. government and government agency bonds and bills, corporate and foreign bonds, IRA invested in bonds, annuities invested in bonds, trusts accounts invested in bonds, account type pension plans invested in bonds, and savings accounts invested in bonds.

Real estate-related assets include: real estate for investment purpose, IRA invested in real estate, annuities invested in real estate, trusts accounts invested in real estate, account type pension plans invested in real estate, and savings accounts invested in real estate.

Hedge fund-related assets include: IRA invested in hedge funds, annuities invested in hedge funds, trusts accounts invested in hedge funds, account type pension plans invested in hedge funds, and savings accounts invested in hedge funds.

Private equity-related assets include: IRA invested in private equity, annuities invested in private equity, trusts accounts invested in private equity, account type pension plans invested in private equity, and savings accounts invested in private equity.

Real Estate Investment Trusts (REITS)-related assets include: IRA invested in REITS, annuities invested in REITS, trusts accounts invested in REITS, account type pension plans invested in REITS, and savings accounts invested in REITS.

Business interest-related assets include: business interest, IRA invested in business interest, annuities invested in business interest, trusts accounts invested in business interest, account type pension plans invested in business interest, and savings accounts invested in business interest.

Other financial assets and non-financial assets in the SCF include: loans to friends, commodities, gold, silver, other metal, livestock, and collectibles.

4.1.3 Return Series of Each Asset

Since the SCF does not provide the return distribution of each asset, historical rate of return or simulated rate of return was used to calculate the expected rate of return of each asset. The earliest data of rate of return, for example, U.S Treasury bill, stocks and bonds can date back to 1926. In order to make all rates of return across fifteen assets comparable and reflect various economic situations, SAS 9.4 programming was used to randomly generate rates of return based on the parameters of the assets (mean, standard

deviation, and covariance) (Ibbotson Associates, 2005). In addition, this method can provide a much richer sample pool than relying on only historic data, but maintained risk and return characteristics and correlation of all the assets. Annualized 5-year rate, 10-year, 20 year of return was calculated by rolling a data window of a fixed length of five, ten and twenty year respectively.

In this dissertation, the U.S Treasury bill return provided by Ibbotson Associates, now acquired by Morningstar, Inc., was used to calculate the expected rate of return and standard deviation of cash and cash equivalent assets, which are considered to be a risk-free rate.

The SCF does not provide detailed information about whether stock-related assets are invested in small, medium or large company stocks, therefore an average rate of return of the three categories of stock, provided by Ibbotson Associates was used to calculate the expected rate of return and standard deviation of the stock-related assets.

Similarly, the SCF does not provide detailed information about whether bond related assets were invested in which particular kind of bond. An average rate of return for the following categories of bond, provided by Ibbotson Associates was used to calculate the expected rate of return and standard deviation of the bond related assets: long-term corporate bonds, intermediate government bonds and long-term government bonds.

Table 2 Assets Reclassification

	Asset Categories in SCF	Reclassified to
Financial Assets	Checking Accounts ¹	Cash and Cash Equivalents
	Savings Accounts ⁴	Based on its investment choices, be reclassified to corresponding asset categories
	Money Market Deposit Accounts ¹	Cash and Cash Equivalents
	Money Market Mutual Funds ¹	Cash and Cash Equivalents
	Call Accounts at Brokerages ¹	Cash and Cash Equivalents
	Certificates of Deposit ¹	Cash and Cash Equivalents
	Stock Mutual Funds ²	Stock
	Tax-Free Bond Mutual Funds ³	Bond
	Government Bond Mutual Funds ³	Bond
	Other Bond Mutual Funds ³	Bond
	Combination and Other Mutual Funds	Half bond, half stock
	Savings Bonds ¹	Cash and Cash Equivalents
	State and Local Bonds	Bond
	Mortgage-backed Bonds	Bond
	US Government and Government Agency Bonds and Bills	Bond
	Corporate and Foreign Bonds	Bond
	Stocks	Stock
	Individual Retirement Accounts/Keoghs ⁴	Based on its investment choices, be reclassified to corresponding asset categories
Account-type Pension Plans ⁴	Based on its investment choices, be reclassified to corresponding asset categories	
Annuities ⁴	Based on its investment choices, be reclassified	

Asset Categories in SCF		Reclassified to
	Trusts ⁴	to corresponding asset categories Based on its investment choices, be reclassified to corresponding asset categories
	Other Financial Assets	Include loans to friends, commodities, gold, silver, and other metals
Non Financial Assets	Real Estate for Investment Purpose	Real estate
	Business interests	Business interest
	Other nonfinancial assets	Include livestock and collectibles

Note: 1. These assets have no or very minimum return with little risk, definition of each asset can be found in section 1.3; 2. The investment products of stock mutual funds are stocks, so they have the same return and risk as stocks; 3. The investment products of these kinds of mutual funds are bonds, so they have the same return and risk as bonds; 4. The detailed explanation about reclassification of these assets can be found in section 4.1.2.

To capture real estate-related assets for investment purposes, the NCREIF return series provided by the National Council of Real Estate Investment Fiduciaries was used to calculate the expected rate of return and standard deviation. The NCREIF return index provides composite return series data about the individual real estate properties for investment purpose for the U.S. and covers four different types of properties, including apartment, industrial, retail and office.

The private equity index provided by Cambridge Associates was used to calculate the expected rate of return and standard deviation of private equity assets. Cambridge Associates database provides data regarding a variety of private investments, tracking the records of over 6,000 funds.

The CISDM Equal Weighted Hedge Fund Index provided by The Center for International Securities and Derivatives Markets (CISDM) was used to calculate the expected rate of return and standard deviation of hedge funds. The CISDM database is considered to be the first database to provide hedge fund information, and provides data information on many kinds of hedge funds.

The U.S. REITs Index provided by FTSE was used to calculate the expected rate of return and standard deviation of REITs. FTSE provides a wide range of indices in niche market and categories.

An average rate of return of Micro-cap stocks provided by Ibbotson Associates was used to as a proxy for the rate of return on business interest.

The SCF provides no information regarding the interest for loans to friends, so it is assumed in this dissertation that no interest or interest below average market loan has been charged. Thus, according to regulations published by Internal Revenue Service (IRS) publication 535, it has been assumed that any loans to friends would have had the applicable federal rate applied for the interest. The applicable federal rate released by IRS is used to calculate the expected rate of return and standard deviation of the assets as loans to friends.

The price index provided by Commodity Research Bureau (CRB) was used to calculate the expected rate of return and standard deviation of commodities, gold, silver, other metal, and livestock. The Luxury Investment Index provided by Knight Frank Associates was used to calculate the expected rate of return and standard deviation of the collectible assets. The Luxury Investment Index provides weighted average rate of return of the following collectible assets: fine art, Chinese ceramics, classic cars, coins, furniture, jewelry, stamps, watches, and fine wine, which includes a majority of collectible assets listed in the SCF.

4.1.4 Procedures to Calculate Portfolio Expected Rate of Return and Standard Deviation Based on Individual Investors' Expected Investment Time Horizons

In this dissertation, it is assumed that the individual investors follow the “buy and hold strategy, meaning that they will continue to buy and hold their portfolio until the end of their investment horizon. This strategy is considered appropriate for a

variety of investors, ranging from “do-it-yourself” investors to those utilizing professional investment advisors, regardless of the portfolio size (Merriman & Buck, 2014).

In order to calculate the portfolio expected rate of return and standard deviation, expected rate of return, standard deviation, and weights of each asset in the portfolio were needed. The geometric mean of rate of return for each asset from 1926 to each survey year was calculated as a proxy for rate of return each individual is expected to earn for holding each asset. For example, for investor surveyed in 1998, the geometric mean of rate of return for each asset from 1926 to 1998 was calculated. The similar procedure was applied to calculate the standard deviation for each asset as a proxy for standard deviation each individual investor is expected to bear for holding each asset. Based on each individual investor’s expected investment horizon provided by the SCF, annual, 5-year, 10-year and 20-year rate of return and standard deviation of each asset was assigned for each individual investor’s portfolio. To be specific, if the respondents reported their investment horizon to be within next few months or year, the annual rate of return and standard deviation was used. If respondents reported their investment horizon to be next few years, the 5-year rate of return and standard deviation was used. If respondents reported their investment horizon to be within the next five to ten years, the 10-year rate of return and standard deviation was used. Finally, if respondents reported their investment horizon to be longer than ten years, the 20-year rate of return and standard deviation was used.

Since the asset classification has been defined in section 4.1.2, it was easy to calculate the weight of each asset in a portfolio, which is equal to the percentage of each asset holding in the portfolio.

4.2 Variables

Table 3 summarizes the attributes of the dependent variable and independent variables used in this dissertation and each will be explained after the table.

Table 3 Summary of the Variables Used in the Empirical Model in This Dissertation

Variable Number	Variable Name	Variable Type	Measure type in SCF	Measure type in this dissertation	Variable description
1	Portfolio Sharpe Ratio	Dependent Variable	Continuous-like	5-level Ordinal	transferred into 5 categories: 1- lowest Sharpe Ratio; 5- highest Sharpe Ratio
2	Survey year	Independent Variable	Discrete	Discrete	6 observations: 1998,2001,2004,2007,2010,2013
57 3	Use of financial planning services	Independent Variable	Dichotomous	Dichotomous	Yes=1;No=0
4	Household income	Independent Variable	Continuous-like	4-level Ordinal	Categorized into quartiles
5	Household total assets	Independent Variable	Continuous-like	4-level Ordinal	Categorized into quartiles

Variable Number	Variable Name	Variable Type	Measure type in SCF	Measure type in this dissertation	Variable description
6	Household total debts	Independent Variable	Continuous-like	4-level Ordinal	Categorized into quartiles
7	Homeownership	Independent Variable	Categorical	Categorical	Renter; homeowner with a mortgage balance; homeowner without a mortgage balance
8	Business ownership	Independent Variable	Dichotomous	Dichotomous	Yes=1;No=0
9	Having cash value of life insurance	Independent Variable	Dichotomous	Dichotomous	Yes=1;No=0
10	Age	Independent Variable	Continuous-like	6-level Ordinal	less than 35[reference], 35-44, 45-54, 55-64, 65-75, >75

Variable Number	Variable Name	Variable Type	Measure type in SCF	Measure type in this dissertation	Variable description
11	Gender	Independent Variable	Dichotomous	Dichotomous	female=1;male=0
12	Race	Independent Variable	Categorical	3-level Categorical	non-Hispanic white[reference], black/African-American, Asian, Hispanic and other
13	Education	Independent Variable	Categorical	5-level Categorical	no high school/GED[reference], high school/GED, some college, Bachelor's degree, Graduate and Professional degree
14	Marital Status	Independent Variable	Dichotomous	Dichotomous	married/living with partners=1; not married=0
15	Having children or not	Independent Variable	Dichotomous	Dichotomous	Yes=1;No=0
16	Employment status	Independent Variable	Categorical	4-level Categorical	not working[reference] employee; self-employed; retired;

Variable Number	Variable Name	Variable Type	Measure type in SCF	Measure type in this dissertation	Variable description
17	Self-perceived health	Independent Variable	Categorical	4-level Ordinal	poor[reference], fair, good, excellent
18	Risk attitude	Independent Variable	Categorical	4-level Ordinal	no risk[reference], average risk, above average risk, substantial risk
19	Investment horizon	Independent Variable	Categorical	4-level Ordinal	within a year[reference], next few years, next 5-10 years, longer than 10 years
20	Expecting inheritance/gift	Independent Variable	Dichotomous	Dichotomous	Yes=1;No=0

4.2.1 Dependent Variable

In this dissertation, portfolio performance served as the dependent variable, which is measured by the Sharpe Ratio of the portfolio. In this respect, the higher the Sharpe Ratio, the better the portfolio performance.

Sharpe Ratio of the portfolio can be calculated by the following formula:

$$\text{Sharpe Ratio} = \frac{r_p - r_f}{\sigma_p}, \text{ where}$$

r_p = portfolio rate of return,

r_f = risk-free rate of return, and

σ_p = portfolio standard deviation.

Portfolio rate of return was the weighted average of rate of return of each asset in the portfolio.

$$r_p = \sum_{i=1}^n w_i r_i, \text{ where}$$

w_i = weight of each asset in a portfolio,

r_i = rate of return for each asset, and

n = number of assets in a portfolio

Portfolio standard deviation is the square root of portfolio variance, which can be calculated using the following formula in matrix:

$$\text{portfolio variance} = [w_1 \dots w_n] * \begin{bmatrix} \sigma_1^2 & \dots & \sigma_{1n} \\ \vdots & \ddots & \vdots \\ \sigma_{n1} & \dots & \sigma_n^2 \end{bmatrix} * \begin{bmatrix} w_1 \\ \vdots \\ w_n \end{bmatrix}, \text{ where}$$

w_i = weight of each asset in a portfolio,

σ_i^2 = variance for each asset,

σ_{ii} = covariance for two assets in a portfolio, and

n = number of assets in a portfolio

4.2.2 Independent Variables

Independent variables were selected based on the conceptual model and previous literature. The independent variables were grouped into five categories: 1) survey years; 2) use of financial planning services; 3) economic characteristics at the household level; and 4) demographic characteristics of the respondent; and 5) respondents' expectations and preferences.

4.2.2.1 Survey Years

In this dissertation, datasets from six years, 1998 to 2013, were included for analysis, thus the variable "survey year" included year 1998, 2001, 2004, 2007, 2010 and 2013. The year 1998 was used as the reference category in the regression analysis.

4.2.2.2 Use of Financial Planning Services

Use of financial planning services was used as a dummy variable equal to "1" for respondents using financial planning services and "0" otherwise. The SCF asks

about the information sources used in investments. The question asks, "How do you (and your [spouse/partner]) make decisions about savings and investments? Do you call around, read newspapers, read material you get in the mail, use information from television, radio, an online service or advertisements? Do you get advice from a friend, relative, lawyer, accountant, banker, broker or financial planner? Or do you do something else?" During the data collection, the respondents are shown a list of options regarding which information source they will choose when they are confronted with investment decisions. Lawyers, accountants and financial planners are all listed as one of the options. In this dissertation, I grouped them together as financial planning service professionals who provided financial planning services. As mentioned earlier in Chapter 2, financial planners, accountants and lawyers usually work as a team to provide financial planning services to the clients (Roth, 2012). Accountants provide advice for tax planning and lawyers provide advice for estate planning. Tax planning and estate planning are both major components of financial planning. In addition, investment planning usually has tax consequences which requires assistance from accountants and has estate planning consequences which needs to involve lawyers (Financial Industry Regulatory Authority, 2015). Further, considering the main income resource of financial planners, lawyers and accountants is from fees by advising people rather than product sales, such as brokers, it is reasonable to group these three kind of professionals together as the financial planning services providers.

4.2.2.3 Economic Characteristics

For economic characteristics, this dissertation included the following variables in the analysis: income at household level, total assets at household level, total debts at household level, homeownership, business ownership, and cash value of life insurance. In order to make the dollar amounts over the years comparable, household income, assets, and debts were all adjusted to year 2013 dollars using the CPI index (Sabelhaus, Thompson, & Windle, 2014).

Household income was categorized into quartiles. The first quartile represented the lowest income while the fourth quartile represented the highest income. The first quartile was treated as the reference group in the regression analysis. In the SCF, household income was collected as discrete numbers rounded to the nearest dollar. In this dissertation, however, income showed a non-linear relationship with the dependent variable, so discretization of income was used to compare the different income groups and capture relationship between them (Pasta, 2009). Under the same logic, household total assets, total debts, and age were also converted into categorical variables.

Drawing on a similar pattern, household total assets were categorized into quartiles. The first quartile represented the lowest total assets while the fourth quartile included the highest total assets. The first quartile was treated as the reference group in the regression analysis. Household total debts were categorized into quartiles. The first quartile represented the lowest total debts while the fourth quartile represented the highest total debts. The first quartile was treated as the reference group in the regression analysis.

Homeownership was categorized into three groups: 1) renter; 2) homeowner with a mortgage balance; and 3) homeowner without a mortgage balance. Homeowner with a mortgage balance was treated as reference group in the regression analysis.

Business ownership served as a dummy variable equal to “1” for respondents owning business and “0” otherwise. Cash value of life insurance was a dummy variable equal to “0” for respondents with balance of cash value of life insurance and “0” otherwise.

4.2.2.4 Demographic Characteristics

For demographic characteristics, this dissertation included the following variables in the analysis: age, gender, race, education, marital status and having children or not.

As stated before, age showed non-linear relationship with dependent variable. More importantly, previous literature showed the investment behavior was different among different age groups. Categorizing age into several groups can help understand portfolio performance differences among them. Following previous literature (Elmerick et al., 2002; Finke, Huston, & Danielle, 2011; Yao et al., 2013) , age was coded at 10-year increments and was categorized into six groups: 1) less than 35 years old; 2) 35-44; 3) 45-54; 4) 55-64; 5) 65-75; and 6) more than 75 years old. Respondents within the youngest group (the group with age less than 35 years old) were treated as the reference group in the regression analysis.

Race/ethnicity of the respondent was categorized into four groups: 1) non-Hispanic White; 2) Black or African American; 3) Hispanic/Latino; and 4) other race, including Asian, American Indian/Alaska Native, Native Hawaiian/Pacific Islander, etc. SCF's public dataset does not provide detailed information regarding the sub-groups in the "other" category. Non-Hispanic White respondents were treated as the reference group in the regression analysis.

Education of the respondent was categorized into four groups: 1) less than high school; 2) high school/GED; 3) some college; and 4) Bachelor's degree; and 5) Graduate and Professional degree. Respondents with less than high school education were treated as the reference group in the regression analysis.

Employment status of the respondent was categorized into four categories: 1) employees (referred to the respondents who were working for someone else); 2) self-employed (referred to the respondents who were mainly self-employed or mainly involved in some partnership); 3) retired (mainly including those who were retired, disabled, students, homemakers, or those who were age 65 or older and not currently working); and 4) not working (including mainly those under 65 and out of the labor force). Employees were treated as the reference group in the regression analysis.

Gender was a dummy variable equal to "1" for female respondents and "0" for male respondents. Male respondents were considered the reference group in the regression analysis. Likewise, in this dissertation, marital status was a dummy variable equal to "1" for respondents being married or living with partners and "0" otherwise. Unmarried respondents were treated as the reference group in the regression analysis. In

the SCF, options for single respondents included: separated, widowed, divorced, and never married. Further regression analysis showed no significant difference between different kinds of single status, thus I grouped them together as one variable: “not married”. Having children was a dummy variable equal to “1” for respondents having children living with them and “0” otherwise.

4.2.2.5 Respondents’ Expectations and Preferences

This dissertation included the following variables regarding respondents’ expectations and preferences in the analysis: self-perceived health, subjective risk-tolerance, investment horizons, and inheritance expectation.

Respondent’s self-perceived health status was divided into four categories: poor, fair, good, and excellent. Poor health status was treated as the reference in the regression analysis.

In the SCF, the respondents were asked about the amount of financial risks they would be willing to take for investments. Four choices were given: 1) willing to take substantial financial risks expecting to earn substantial returns; 2) willing to take above average financial risks; 3) willing to take average financial risks; and 4) not willing to take any financial risk. The respondents who were not willing to take any financial risks were treated as the reference group in the regression analysis.

In the SCF, the respondents were asked about their expected investment horizon. Five choices were given: the next few months, the next year, the next few years, the next 5 to 10 years, or longer than 10 years. The next few months and the next year were

grouped into one category of “within a year” which was treated as the reference group in the regression analysis.

Expecting an inheritance or gift in the future was a dummy variable equal to “1” for respondents with such expectation and “0” otherwise.

4.3 Method of Analysis

In this section, the sample selection criteria, weight application, “repeated-imputation inference” (RII) method, Wilcoxon test, and ordered logistic regression analysis applied in this dissertation are discussed.

4.3.1 Sample Selection

Since the purpose of this dissertation is to investigate factors affecting the household portfolio performance measured by the Sharpe Ratio, households with no investable assets were excluded. In addition, the SCF did not provide information to allow me to separate the individual investor’s current portfolio from inherited assets. Since individual investors typically adjust their portfolios after major life events, such as receiving an inheritance, their consumption patterns and financial goals often change (Certified Financial Planner Board of Standards, Inc., 2002; Tokat & Wicas, 2007). In general, even if portfolios are not adjusted immediately after receiving an inheritance or gift, at least, annual portfolio review has to be conducted to reflect the investor’s updated financial status and risk tolerance (Tokat & Wicas, 2007). Thus, inheritance or gifts received within a year are excluded from this dissertation. After eliminating

households with no investable assets and households receiving an inheritance or gift within a year, the final sample size for year 1998 was 4,051, for year 2001 was 3,924, for year 2004 was 4,139, for year 2007 was 4,202, for year 2010 was 5,867, for year 2013 was 5,639, with a total sample size was 27,821. Since the choice of financial planning service professionals had been given since 1998, this dissertation included datasets from that year forward.

4.3.2 Matching Individual Response with the Respondent

When collecting and documenting the responses, the SCF designated the man in a mixed-sex couple or the older in a same-sex couple as the head of the household, no matter who responded to the questions. If data were collected from someone other than the designated head, then “all data for the two members of the couple were systematically swapped” (The Federal Reserve, 2013). Thus, in order to make the responses consistent with their respondents, in this dissertation, I switched the two individuals back as needed.

4.3.3 Missing data and Repeated-imputation Inference Technique

This dissertation used weights (X42001) provided and recommended by the SCF to adjust for differential nonresponses and an oversampling of wealthy people (Ackerman, Fries, & Windle, 2012; Bricker et al., 2014) in descriptive analysis. As stated in SCF codebook, using weights in regression analysis can be questionable, especially when using SCF datasets, because the weighted estimates will be less

efficient than non-weighted ones. In addition, past research using the SCF dataset generally did not use weights in multivariate analysis. Thus, this dissertation has followed in the steps of prior research practice by only using weights in the descriptive analysis.

The SCF also addressed the issue of missing values by using a multiple imputation method. Instead of imputing the data once, each dataset was imputed five times for a total of five imputates for each dataset. As Montalto and Sung (1996) pointed out, although imputation techniques help to fill in the missing values, extra variability within the missing values was not removed. Thus, “repeated-imputation inference” techniques should be incorporated to mitigate some of this variability, and create a more valid inference and tests of significance. In the multivariate analysis, this dissertation used the “repeated-imputation inference” method. Since the measures in the SCF were based on a sample rather than the whole population, sampling variance had to be taken into consideration when estimating the total standard error (The Federal Reserve, 2013). Due to the confidentiality and disclosure concerns, however, sampling error could not be computed without access to sensitive information of the basic sample, so the SCF provided the 999 bootstrap replicate weights to help estimate the total standard error (The Federal Reserve, 2013). The X42001 weight and the 999 bootstrap replicate weights were used in this dissertation to compute estimates of sampling variance.

4.3.4 Wilcoxon Test

In this dissertation, the sample was first divided into two groups with regard to whether or not respondents used financial planning services. I then calculated and compared the Sharpe Ratios of the two groups to test whether the Sharp Ratio of those using financial planning services was significantly higher than those who did not use such services. The distribution of Sharpe Ratios failed the normality test, therefore an independent *t*-test was not appropriate. Instead, a Wilcoxon test was conducted in order to determine the significance of differences between the two groups.

4.3.5 Descriptive Analysis and Ordered Logistic Regression Analysis

A descriptive analysis was conducted to show the sample characteristics of using financial planning services and the portfolio performance by sample characteristics. A multivariate analysis was also conducted to examine the factors affecting the portfolio performance, especially the effect of using financial planning services. The Sharpe Ratio served as the dependent variable of this dissertation. Since the Sharpe Ratio was a continuous variable, the first regression model to be considered was the ordinary linear regression model. However, the distribution of the Sharpe Ratio, which is the dependent variable, violated the normality assumption for the ordinary linear regression model. The dependent variable displayed a distribution, which departed significantly from normality ($D=0.147$, $p<.001$). As a result, the Sharpe Ratios were organized into quintiles (1=lowest and 5=highest) based on simulated values. Categorizing Sharpe Ratios, which followed a sequential order into several groups was

a typical method of dealing with such kind of data to conduct ordered logistic regression analysis (Yao et al., 2013).

A subsequent model was run with all interactions of using financial planning services and other independent variables to examine the different effect of using financial planning services on portfolio performance within certain sample characteristic. Only statistically significant interactions terms were kept in the model.

CHAPTER 5

RESULTS

5.1 Sample Characteristics

5.1.1 Sample Characteristics in Each Survey Year

Sample characteristics for each survey year are reported in Table 4. In the combined sample including all survey years, the mean and median projected Sharpe Ratio was 0.8 and 0.5, respectively. The Sharpe Ratios across all survey years in this dissertation changed little with the lowest in 2010 (0.7). An overall average of one-third (29.3%) of total respondents stated that they used financial planning services. In general, this percentage was lower in earlier survey years (e.g., 26.9% in 1998, 24.5% in 2001) and higher in later years (e.g., 31.8% in 2010, 32.8% in 2013).

In the combined sample including all survey years, the mean and median income was \$89,011.1 and \$52,755.6, respectively. The mean household income was \$80,558.1 in 1998, \$94,537.6 in 2001, \$90,637.3 in 2004, \$99,605.0 in 2007, \$81,473.7 in 2010, and \$90,102.6 in 2013. Households in 2007 reported the highest median income (\$57,501.5) while households in 2010 (\$48,792.4) presented the lowest. The mean and median total assets at household level was \$642,321.4 and \$206,306.3 respectively in the combined sample including all survey years. The mean total assets started at

\$508,465.3 in 1998, increased to \$615,365.6 in 2001, \$684,635.8 in 2004, \$783,503.7 in 2007, dropped to \$618,307.4 in 2010 and increased to \$646,317.1 in 2013. The median total assets peaked at 2007 with \$265,934.1 and reached the lowest in 1998 with \$186,266.7. Similarly, for the household total debts, the mean debt levels started at \$71,948.2 in 1998, reached the highest in 2007 (\$116,042.9), dropped to \$102,753.6 in 2010 and reached the lowest in \$95,320.6 in 2013. The median debt level was highest in 2007(\$40,420.6) and lowest in 2013 (\$22,014.6).

The overall percentage of respondents who rented a house for their primary residence accounted for one-third (30.0%) of the combined sample including all survey years. This percentage was similar across all individual years, with the lowest in 2007 (28.1%) and highest in 1998 (30.4%). About 22.1% of respondents reported owning a house without a mortgage balance. This percentage was similar across all individual years, with the lowest in 2007 and 2010 (20.5%) and highest in 1998 (23.8%). Nearly half of respondents (47.9%) stated that they own a house with a mortgage balance. The percentage started at 45.8% in 1998, reached 46.6% in 2001, 50.2% in 2004, and 51.4% in 2007, and declined to 49.2% in 2010 and 44.7% in 2013. In the combined sample and in samples from all individual years, the percentage of the respondents who owned a house with a mortgage balance was the largest, followed by renters. Respondents who owned a house with no mortgage balance made up the lowest percentage.

Table 4 Sample Characteristics in each survey year

<i>Sample Characteristics (%)</i>	All years	1998	2001	2004	2007	2010	2013
<i>Projected Sharpe Ratio</i>							
Mean	0.8	0.9	0.9	0.8	0.9	0.7	0.8
Median	0.5	0.5	0.6	0.5	0.6	0.4	0.4
<i>Use of Financial Planning Services</i>							
Yes	29.3	26.9	24.5	26.2	30.7	31.8	32.8
No	70.7	73.1	75.5	73.8	69.3	68.2	67.2
<i>Economic situations</i>							
Household income							
Mean	\$89,011.1	\$80,558.1	\$94,537.6	\$90,637.3	\$99,605.0	\$81,473.7	\$90,102.6
Median	\$52,755.6	\$52,181.2	\$55,353.4	\$56,991.2	\$57,501.5	\$48,792.4	\$49,712.0
Household total assets							
Mean	\$642,321.4	\$508,465.3	\$615,365.6	\$684,635.8	\$783,503.7	\$618,307.4	\$646,317.1
Median	\$206,306.3	\$186,266.7	\$196,916.8	\$229,611.1	\$265,934.1	\$193,480.0	\$187,000.0
Household total debts							
Mean	\$94,776.5	\$71,948.2	\$74,347.2	\$102,672.7	\$116,042.9	\$102,753.6	\$95,320.6
Median	\$28,400.0	\$22,014.6	\$23,112.6	\$34,528.0	\$40,420.6	\$30,100.0	\$25,200.0
Home ownership							
Renter	30.0	30.4	29.9	28.2	28.1	30.3	32.3
homeowner without a mortgage balance	22.1	23.8	23.5	21.6	20.5	20.5	23.0
homeowner with a mortgage balance	47.9	45.8	46.6	50.2	51.4	49.2	44.7
Business ownership							

<i>Sample Characteristics (%)</i>	All years	1998	2001	2004	2007	2010	2013
Yes	13.7	13.7	14.2	14.0	14.5	13.9	12.3
No	86.3	86.3	85.8	86.0	85.5	86.1	87.7
Having cash value of life insurance							
Yes	24.4	31.2	29.2	25.0	24.2	20.6	20.0
No	75.6	68.9	70.8	75.0	75.8	79.4	80.0
<i>Demographic characteristics</i>							
Age							
Less than 35 years old	23.9	25.8	25.0	23.7	23.5	23.1	23.2
35-44 years old	18.3	21.4	20.9	19.3	18.2	16.6	15.6
45-54 years old	20.3	19.3	20.6	21.1	20.4	21.2	19.4
55-64 years old	16.0	12.6	12.7	15.1	17.6	17.3	18.6
65-75 years old	11.4	11.4	11.0	10.3	10.2	11.5	13.3
More than 75 years old	10.1	9.4	9.9	10.5	10.1	10.3	10.0
Gender							
Male	46.6	46.7	46.5	45.6	44.7	47.2	47.9
Female	53.4	53.3	53.5	54.4	55.3	52.8	52.1
Race/Ethnicity							
White non-Hispanic	75.5	80.9	78.3	75.9	76.2	72.7	71.9
Black/African-American	12.1	10.0	12.1	12.4	11.3	12.6	13.5
Hispanic	8.4	6.0	6.8	7.9	8.2	10.0	9.9
Other	4.0	3.1	2.8	3.8	4.3	4.8	4.7
Education							
No high school diploma/GED	10.2	11.3	12.2	11.2	10.1	8.9	8.6
High school diploma or GED	29.9	32.0	31.4	28.8	29.8	30.3	27.6

<i>Sample Characteristics (%)</i>	All years	1998	2001	2004	2007	2010	2013
Some college	27.1	27.3	25.4	27.7	27.6	26.6	27.8
Bachelor's degree	20.1	17.3	19.4	19.8	19.8	21.1	21.8
Graduate and Professional degree	12.8	12.2	11.7	12.6	12.7	13.1	14.2
Marital status							
Married/living with partner	59.7	60.4	61.8	59.0	60.3	59.0	58.3
Not married	40.4	39.7	38.2	41.0	39.7	41.1	41.7
Having children							
Yes	57.2	56.4	58.4	56.6	56.9	56.6	58.0
No	42.8	43.6	41.6	43.4	43.1	43.4	42.0
Employment Status							
Employees	59.5	60.8	61.7	60.5	60.2	57.5	57.8
Self-employed	11.4	11.8	12.3	12.1	11.0	11.7	9.9
Retired	24.6	23.3	22.8	23.7	24.8	24.8	26.9
Not working	4.6	4.1	3.3	3.7	4.0	6.1	5.5
<i>Respondents' Expectations and Preferences</i>							
Self-perceived health							
Poor	5.0	4.3	5.3	5.8	4.7	5.0	5.1
Fair	18.3	16.9	17.6	17.0	17.2	19.0	20.7
Good	48.6	49.2	47.8	47.5	49.1	48.7	49.1
Excellent	28.1	29.7	29.4	29.8	29.0	27.3	25.1
Risk attitude							
No risk	41.3	35.8	37.7	40.2	39.3	45.9	45.1
Average risks	38.6	40.5	38.5	40.0	39.8	36.7	37.5
Above average risks	16.4	18.8	19.3	16.2	17.7	13.8	14.4

<i>Sample Characteristics (%)</i>	All years	1998	2001	2004	2007	2010	2013
Substantial risks	3.7	5.0	4.5	3.6	3.3	3.6	2.9
Investment horizon							
Within a year	35.6	31.9	28.3	31.8	32.4	42.0	41.8
Next few years	27.5	28.9	29.4	28.3	27.5	25.8	26.3
Next 5-10 years	23.4	23.6	25.0	26.3	25.9	21.3	20.5
Longer than 10 years	13.5	15.7	17.3	13.6	14.3	10.9	11.4
Expecting Inheritance/gift							
Yes	13.1	14.0	12.6	14.2	13.6	11.4	13.4
No	86.9	86.0	87.4	85.8	86.4	88.6	86.6

Note: Analysis of the 1998-2013 Survey of Consumer Finances; weighted results; numbers in percentages; sample size (1998) = 4,051; sample size (2001) = 3,924; sample size (2004) = 4,139; sample size (2007) = 4,202; sample size (2010) = 5,867; sample size (2013) = 5,639; sample size (all years) = 27,821.

In the combined sample including all survey years, an average of 13.7% of respondents reported owning a business. On the contrary, about 86.3% of respondents stated that they did not own business. The percentage of respondents owning a business was about 14% in 1998, 2001 and 2004, increased to the highest point in 2007 (14.5%), and decreased to 13.9% in 2010 and further to 12.3% in 2013.

In the combined sample, about one-fifth (24.4%) of respondents reported to have cash value of life insurance in the combined sample. On the contrary, the percentage of respondents with no cash value of life insurance accounted for 75.6% in the combined sample. The percentage of respondents with cash value of life insurance started at 31.2% in 1998 and continued to decline to 20% in 2013.

For the combined sample including all survey years, an average of 24% of the respondents were younger than 35 years old (23.9%). The youngest age category was comprised a higher during the first two survey years (25.8% in 1998, 25% in 2001) and was lower in later survey years (23.1% in 2010 and 23.2% in 2013). On average, about 18.3% of respondents reported to be between the ages of 35 years old and 44 years old overall. The percentage was highest in 1998 (21.4%) and lowest in 2013 (15.6%). For the age category of 45 to 54 years old, about 20.3% of respondents fell into this category in the combined sample. The category percentage for all individual samples was about the same, with the highest in 2010 (21.2%) and lowest in 1998 (19.3%). An overall average of 16.0% of the respondents stated that they were 55 to 64 years old. The percentage started at 12.6% in 1998, increased to 17.6% in 2007, decreased slightly to 17.3% in 2010, and increased to 18.6% in 2013. The number of respondents that were 65 to 75

years old accounted for 11.4% of the overall sample, with 11.4% in 1998, 11.0% in 2001, 10.3% in 2004, 10.2% in 2007, 11.5% in 2010, and 13.3% in 2013. Around 10% (10.1%) of the respondents comprised the oldest age category in the combined sample including all survey years. The category percentage for each individual sample was about the same, with the highest in 2004 (10.5%) and lowest in 1998 (9.4%). In the combined sample samples from all individual years, the percentage of the youngest respondents was the most and least for oldest respondents.

Male respondents accounted for 46.6% of the combined sample including all survey years, while female respondents comprised 53.4%. The percentage of male respondents started at 46.7% in 1998, dropped to 46.5% in 2001, 45.6% in 2004, and 44.7% in 2007, and then increased to 47.2% in 2010 and 47.9% in 2013. In the combined sample and all individual samples, the percentage of male respondents was larger than that of female respondents.

In the combined sample, an overall average of over three-quarters (75.5%) of total respondents reported to be White, followed by 12.1% reporting to be Black, and 8.4% reporting to be Hispanic. The “Other” category, including Asian respondents, comprised the lowest (4.0 %) percentage of respondents. The percentage of White respondents was highest in 1998 (80.9%) and lowest in 2013 (71.9%). For Black respondents, the percentage started at 10% in 1998, reached 12.1% in 2001, 12.4% in 2004, decreased to 11.3% in 2007, and increased to 12.6% in 2010, and 13.5% in 2013. For Hispanic respondents, in general, the percentage was lower for earlier survey years (e.g., 6.0% in 1998, 6.8% in 2001) and higher for later survey years (e.g., 10.0% in 2010, 9.9% in

2013). In the sample for all individual years, White respondents accounted for the highest percentages, followed by Black respondents, Hispanic respondents, and those from other races.

For the combined sample including all survey years, an overall average of 10.2% of respondents had not completed high school, 29.9% obtained a high school diploma, 27.1% had some college education, 20.1% had earned a bachelor's degree, and 12.8% had earned a graduate or professional degree. The percentage who did not complete a high school diploma was the highest in 2001(12.2%) and lowest in 2013 (8.6%). For the respondents with a high school diploma, the percentage was 32.0% in 1998, 31.4% in 2001, 28.8% in 2004, 29.8% in 2007, 30.3% in 2010, and 27.6% in 2013. For the respondents having completed some college education, the percentage was about the same for individual samples with the highest percentage in 2013 (27.8%) and lowest in 2001 (25.4%). For respondents who obtained a bachelor's degree, the percentage was the lowest in 1998 (20.1%) and highest in 2013 (21.8%). Similarly, the percentage of respondents with a graduate or professional degree was lower in earlier survey years (e.g. 12.2 % in 1998, 11.7% in 2001) and higher in later survey years (e.g.13.1% in 2010, 14.2% in 2013). In the combined sample and individual samples in all survey years, most respondents had completed a high school education.

In the combined sample including all survey years, respondents who were married or living with partners accounted for nearly 60% (59.7%) of the total. The percentage was about the same in individual samples with the highest percentage in 2001 (61.8%) and lowest in 2013 (58.3%).

Overall, more than half of the respondents reported having children at home in the combined sample (57.2%). This percentage of respondents with children fluctuated only slightly over the years, with 56.4% in 1998, 58.4% in 2001, 56.6% in 2004, 56.9% in 2007, 56.6% in 2010, and 58.0% in 2013.

For the combined sample including all survey years, a majority of respondents (59.5%) stated that they worked for someone else. This percentage was about the same in all individual samples (60.8% in 1998, 61.7% in 2001, 60.5% in 2004, 60.2% in 2007, 57.5% in 2010, and 57.8% in 2013). On average, an overall of 11.4% of the respondents reported being self-employed. The percentage started at 11.8% in 1998 and reached 12.3% in 2001; however, the percentage was lower in later survey years (e.g. 11.0% in 2007, 11.7% in 2010, and 9.9% in 2013). Around one-quarter (24.6%) of respondents in the combined sample reported to be retired. The percentage in this category was highest in 2013 with 26.9% and was lowest in 2001 (22.8%). Overall, respondents who reported to be not working accounted for nearly 5% of the overall sample (4.6%). The percentage started at 4.1% in 1998, decreased to 3.3% in 2001, and increased in 2004 (3.7%), 2007 (4.0%) and 2010 (6.1%). The percentage in 2013 (5.5%), however, was lower than that in 2010. The respondents who worked for someone else accounted for the majority of the sample, followed by retired respondents and the self-employed. Unemployed individuals comprised the smallest category of total respondents.

In the combined sample including all survey years, an overall average of 5.0% of respondents reported to be in poor health. This percentage was the lowest in 1998 (4.3%) and highest in 2004 (5.8%). On average, an overall of 18.3% of the respondents described

their health status as “fair. “The percentage started at 16.9% in 1998, reached 17.6% in 2001, decreased to 17.0% in 2004, and increased to 17.2% in 2007, 19.0% in 2010, and 20.7%, its highest, in 2013. Overall, nearly half of respondents reported having good health (48.6%). The percentage of respondents with good health was 49.2% in 1998, 47.8% in 2001, 47.5% in 2004, 49.1% in 2007, 48.7% in 2010, and 49.1% in 2013. In the combined sample, an overall average of 28.1% of total respondents described their health status as excellent. This percentage was the lowest in 2013 (25.1%) and highest in 2004 (29.8%). Nearly half of respondents reported to be in good health, with a smaller percentage of respondents claimed to have excellent health. Respondents with poor health comprised the smallest percentage of total respondents.

In the combined sample including all survey years, an average of 41.3% of the respondents stated a willingness to take no risk. On average, an overall of 38.6% of respondents reported a willingness to take average financial risks. An average of 16.4% of the respondents were willing to take above average risks in the combined sample. Less than 4% of the respondents reported a willingness to take substantial financial risks. The percentage of the respondents who were willing to take no financial risks was lower in earlier survey years (e.g., 35.8% in 1998, 37.7% in 2001) but higher in later survey years (e.g., 45.9% in 2010, 45.1% in 2013). To the contrary, the percentage of the respondents who were willing to take average financial risks was higher in earlier survey years (e.g., 40.5% in 1998, 38.5% in 2001) and lower in later survey years (36.7% in 2010 and 37.5% in 2013). The trend for the percentage of respondents who were willing to take above average financial risks was similar: higher in earlier survey years (e.g., 18.8% in

1998, 19.3% in 2001) and lower in later survey years (13.8% in 2010 and 14.4% in 2013). Similarly, the percentage of respondents who were willing to take substantial financial risks was higher in earlier survey years (e.g. 5.0% in 1998, 4.5% in 2001) and lower in later survey years (3.6% in 2010 and 2.9% in 2013). Respondents reported to be willing to take average risks accounted for the most while the percentage of the respondents who reported to be willing to take substantial risks was the lowest.

An overall average of 35.6% of the respondents in the total combined sample expected to have an investment horizon within one year or less. The percentage was the lowest in 2001 (28.3%) and highest in 2010 (42.0%). Respondents who expected to invest for a few years made up 27.5% of the overall sample. The percentage was higher in earlier survey years (e.g. 28.9% in 1998, 29.4% in 2001) and lower in later survey years (e.g. 25.8% in 2010, 26.3% in 2013). Respondents with expected investment horizons of five to ten years accounted for 23.4% of the combined sample including all survey years. This percentage started at 23.6% in 1998 and increased to 25% in 2001 and 26.3% in 2004. This percentage was slightly lower in 2007 (25.9%), and reached its lowest in 2013 (20.5%). An overall average of 13.5% of the respondents in the total combined sample expected to have an investment horizon of longer than 10 years. This percentage was the highest in 2001 (17.3%) and lowest in 2010 (10.9%). In the combined sample and individual samples, the respondents who reported to have an investment horizon within one year or less accounted for the largest percentage, followed by those with investment horizons of a few years. The percentage of respondents who reported to have an investment horizon of longer than 10 years was the lowest among the categories.

Overall, an average of 13.1% of respondents reported expecting an inheritance or gift in the combined sample. The percentage started at 14.0% in 1998 and fell to 12.6% in 2001. This percentage was again higher in 2004 with 14.2%, followed by a decrease to 13.6% in 2007 and 11.4% in 2010. The percentage increased to 13.4% in 2013.

5.1.2 Use of Financial Planning Services by Sample Characteristics in each Survey Year

Table 5 shows the sample characteristics of those who used financial planning services and of those who did not. In the combined sample, the percentage of households using financial planning services increased with respondents' level of income, wealth, risk tolerance, and education. These findings were consistent with previous research (Chang, 2005; DeVaney et al., 2007; Elmerick et al., 2002; Grable & Joo, 1999). Chi-square tests were used to identify the association between using financial planning services and sample characteristics. All the results were statistically significant, indicating association between using financial planning services and sample characteristics without other factors controlled, except for gender.

In the combined sample, the percentage using financial planning services increased with household income level. For the lowest income category in the combined sample, 18.9% of the respondents used financial planning services. The percentage was 27.6% for the respondents who had an income in the second quartile, 37.7% for the respondents who had an income in the third quartile, and 50.2% for the respondents who had income in the fourth quartile. For each of the income categories, the percentage of

respondents using financial planning services showed a similar trend. For instance, for the lowest income category, the percentage of respondents using financial planning services started at 15.9 % in 1998 and reached its lowest point in 2001 (15.3%). The percentage increased continuously from 16.0% in 2004, 19.1% in 2007, 21.4% in 2010, and 22.3% in 2013.

Similarly, in the combined sample, the percentage using financial planning services increased with household total assets. For the lowest asset category in the combined sample, 17.1% of the respondents reported using financial planning services. The percentage was 25.7% for respondents who had assets in the second quartile, 41.5% for respondents who had assets in the third quartile, and over half (53.7%) for respondents who had assets in the fourth quartile. For each of the asset categories, the percentage of respondents using financial planning services showed a similar trend over the years. For instance, for the highest asset category (the fourth quartile), the percentage of respondents using financial planning services showed an overall increasing trend, starting from 52.3% in 1998 with a drop in 2001 (42.7%). The percentage returned to 50.5% in 2004, 59.0% in 2007, 54.6% in 2010, and 55.1% in 2013.

Table 5 Use of Financial Planning Services by Sample Characteristics

<i>Sample Characteristics (%)</i>	All Survey Years		1998		2001		2004	
	<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
	Yes	No	Yes	No	Yes	No	Yes	No
<i>Economic situations</i>								
Household income***								
1 st quartile	18.9	81.1	15.9	84.1	15.3	84.7	16.0	84.0
2 nd quartile	27.6	72.4	26.2	73.8	23.9	76.2	25.5	74.5
3 rd quartile	37.7	62.3	37.8	62.2	32.4	67.6	35.9	64.1
4 th quartile	50.2	49.8	45.8	54.2	45.5	54.5	47.7	52.3
Household total assets***								
1 st quartile	17.1	82.9	16.4	83.6	14.2	85.8	13.9	86.2
2 nd quartile	25.7	74.3	23.6	76.4	22.7	77.3	24.3	75.7
3 rd quartile	41.5	58.5	41.5	58.5	35.7	64.3	39.4	60.6
4 th quartile	53.7	46.3	52.3	47.8	42.7	57.3	50.5	49.5
Household total debts***								
1 st quartile	25.4	74.6	21.5	78.6	21.2	78.9	22.0	78.0
2 nd quartile	23.1	76.9	20.9	79.1	19.9	80.1	19.1	80.9
3 rd quartile	31.3	68.7	30.4	69.6	25.9	74.1	29.7	70.3
4 th quartile	41.2	58.8	40.9	59.1	35.0	65.0	38.8	61.2

(continued on next page)

<i>Sample Characteristics (%)</i>	2007		2010		2013	
	<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
	Yes	No	Yes	No	Yes	No
<i>Economic situations</i>						
Household income						
1 st quartile	19.1	80.9	21.4	78.6	22.3	77.8
2 nd quartile	31.2	68.9	29.0	71.0	29.3	70.7
3 rd quartile	41.6	58.4	37.2	62.8	40.9	59.1
4 th quartile	58.6	41.4	49.4	50.6	51.1	49.0
Household total assets						
1 st quartile	17.6	82.4	18.9	81.1	20.2	79.8
2 nd quartile	29.9	70.1	26.9	73.1	26.6	73.4
3 rd quartile	46.2	53.8	39.8	60.2	45.1	55.0
4 th quartile	59.0	41.0	54.6	45.4	55.1	44.9
Household total debts						
1 st quartile	25.8	74.2	29.3	70.7	28.8	71.2
2 nd quartile	24.2	75.8	25.5	74.5	26.5	73.5
3 rd quartile	34.0	66.0	34.5	65.5	33.9	66.1
4 th quartile	45.4	54.6	39.1	60.9	44.7	55.3

<i>Sample Characteristics (%)</i>	All Survey Years		1998		2001		2004	
	<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
	Yes	No	Yes	No	Yes	No	Yes	No
Home ownership***								
Renter	21.0	79.0	20.2	79.8	17.6	82.4	17.4	82.6
Homeowner without a mortgage	29.5	70.5	24.7	75.3	24.7	75.3	26.2	73.8
balance								
Homeowner with a mortgage	34.3	65.7	32.6	67.5	28.8	71.2	31.1	69.0
balance								
Business ownership***								
Yes	42.2	72.8	36.2	63.8	40.2	59.8	36.3	63.7
No	27.2	57.8	25.5	74.5	21.9	78.1	24.5	75.5
Having cash value of life insurance***								
Yes	37.7	73.5	32.4	67.6	30.7	69.3	38.1	62.0
No	26.6	62.3	24.5	75.5	21.9	78.1	22.2	77.8
<i>Demographic characteristics</i>								
Age***								
Less than 35 years old	24.4	75.6	24.4	75.6	22.1	77.9	22.9	77.1
35-44 years old	29.8	70.2	27.7	72.3	25.9	74.1	27.1	72.9
45-54 years old	32.3	67.7	34.4	65.6	28.6	71.4	27.8	72.3
55-64 years old	34.1	65.9	28.1	71.9	25.7	74.3	31.8	68.2
65-75 years old	30.7	69.3	24.9	75.1	25.4	74.6	24.8	75.2
More than 75 years old	24.5	75.5	17.9	82.2	16.2	83.8	21.8	78.2

		2007		2010		2013	
<i>Sample Characteristics (%)</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
		Yes	No	Yes	No	Yes	No
Home ownership							
	Renter	20.8	79.2	22.7	77.3	24.4	75.6
	Homeowner without a mortgage balance	31.7	68.3	33.7	66.3	33.2	66.8
	Homeowner with a mortgage balance	35.7	64.3	36.6	63.4	38.6	61.4
Business ownership							
	Yes	44.9	55.1	44.3	55.7	48.7	51.3
	No	28.3	71.7	29.8	70.2	30.5	69.5
Having cash value of life insurance							
	Yes	40.1	59.9	41.8	58.3	43.6	56.4
	No	27.7	72.3	29.2	70.8	30.1	69.9
<i>Demographic characteristics</i>							
Age							
	Less than 35 years old	23.6	76.4	25.2	74.8	26.9	73.1
	35-44 years old	35.9	64.2	30.0	70.0	32.6	67.4
	45-54 years old	33.4	66.6	32.4	67.6	35.9	64.1
	55-64 years old	34.5	65.5	39.2	60.8	37.0	63.0
	65-75 years old	28.1	71.9	35.3	64.7	37.9	62.1
	More than 75 years old	28.6	71.4	31.7	68.3	25.7	74.3

<i>Sample Characteristics (%)</i>	All Survey Years		1998		2001		2004		
	<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		
	Yes	No	Yes	No	Yes	No	Yes	No	
Gender									
Male	29.6	70.4	26.1	73.9	25.7	74.3	25.7	74.3	
Female	29.0	71.0	27.7	72.3	23.4	76.6	26.5	73.5	
Race***									
White non-Hispanic	31.0	69.0	27.7	72.3	26.1	73.9	28.2	71.8	
Black/African-American	27.3	72.7	28.8	71.2	22.5	77.5	21.1	78.9	
Hispanic	17.8	82.2	13.2	86.8	13.3	86.7	16.5	83.5	
Other	26.2	73.8	27.5	72.5	13.9	86.1	21.6	78.4	
Education***									
No high school diploma/GED	13.2	86.9	12.7	87.3	10.5	89.5	11.7	88.3	
High school diploma or GED	22.5	77.6	21.4	78.6	18.6	81.4	18.8	81.2	
Some college	30.2	69.8	29.2	70.8	28.1	71.9	26.7	73.3	
Bachelor's degree	37.6	62.4	33.2	66.8	28.3	71.7	35.2	64.8	
Graduate and Professional degree	42.9	57.1	40.8	59.2	40.6	59.5	40.5	59.5	
Marital status***									
Married/living with partner	31.5	74.1	28.8	71.2	26.4	73.6	29.1	70.9	
Not married	25.9	68.5	24.1	75.9	21.5	78.6	22.0	78.0	

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<i>Sample Characteristics (%)</i>		2007		2010		2013	
		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
		Yes	No	Yes	No	Yes	No
Gender							
	Male	31.9	68.1	32.6	67.4	32.6	67.4
	Female	29.7	70.3	31.0	69.0	33.0	67.1
Race							
	White non-Hispanic	32.6	67.4	33.9	66.1	35.2	64.8
	Black/African-American	27.9	72.1	30.4	69.6	30.1	70.0
	Hispanic	21.9	78.1	18.5	81.5	19.2	80.9
	Other	20.9	79.2	31.2	68.8	31.8	68.3
Education							
	No high school diploma/GED	14.0	86.0	15.7	84.3	14.1	85.9
	High school diploma or GED	23.3	76.8	26.1	73.9	24.2	75.8
	Some college	32.8	67.2	30.5	69.5	32.4	67.6
	Bachelor's degree	41.2	58.8	40.9	59.1	41.7	58.4
	Graduate and Professional degree	40.6	59.4	43.7	56.3	47.8	52.2
Marital status							
	Married/living with partner	33.3	66.7	34.5	65.5	34.5	65.5
	Not married	26.7	73.3	27.8	72.2	30.3	69.7

<i>Sample Characteristics (%)</i>	All Survey Years		1998		2001		2004	
	<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
	Yes	No	Yes	No	Yes	No	Yes	No
Having children*								
Yes	29.9	71.5	26.4	73.6	25.4	74.6	25.7	74.3
No	28.5	70.1	27.6	72.4	23.2	76.8	26.7	73.3
Employment status***								
Employees	28.9	71.1	27.3	72.7	24.4	75.6	25.3	74.7
Self-employed	38.9	61.1	33.0	67.0	34.1	65.9	37.6	62.4
Retired	26.7	73.3	23.1	77.0	20.1	79.9	23.3	76.7
Not working	23.6	76.4	25.7	74.4	21.2	78.8	21.5	78.5
<i>Respondents' Expectations and Preferences</i>								
Self-perceived health***v								
Poor	18.1	82.0	16.1	83.9	14.6	85.5	12.8	87.2
Fair	23.1	77.0	19.4	80.7	16.8	83.2	21.8	78.3
Good	29.1	70.9	25.9	74.2	24.6	75.4	25.3	74.7
Excellent	35.6	64.4	34.6	65.4	30.8	69.3	32.6	67.4

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<i>Sample Characteristics (%)</i>	2007		2010		2013	
	<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
	Yes	No	Yes	No	Yes	No
<i>Having children</i>						
Yes	30.9	69.2	34.2	65.8	33.2	66.9
No	30.5	69.5	28.6	71.4	32.2	67.8
<i>Employment status</i>						
Employees	30.8	69.3	31.1	68.9	32.6	67.4
Self-employed	42.8	57.2	40.9	59.1	43.3	56.7
Retired	25.8	74.2	32.3	67.7	30.1	70.0
Not working	27.1	72.9	18.7	81.3	28.4	71.7
<i>Respondents' Expectations and Preferences</i>						
<i>Self-perceived health</i>						
Poor	17.9	82.1	22.0	78.0	22.0	78.0
Fair	24.6	75.4	25.4	74.6	26.5	73.5
Good	30.9	69.1	32.3	67.8	32.5	67.5
Excellent	36.0	64.0	37.2	62.8	40.7	59.4

<i>Sample Characteristics (%)</i>	All Survey Years		1998		2001		2004	
	<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
	Yes	No	Yes	No	Yes	No	Yes	No
Risk attitude***								
No risk	17.0	83.0	13.4	86.6	12.6	87.4	13.7	86.3
Average risks	36.7	63.3	32.5	67.5	30.4	69.6	34.7	65.3
Above average risks	41.5	58.5	38.1	62.0	35.6	64.4	35.9	64.1
Substantial risks	34.6	65.4	36.5	63.5	26.1	73.9	26.8	73.2
Investment horizon***								
Within a year	22.1	77.9	21.7	78.3	16.4	83.6	18.5	81.5
Next few years	28.0	72.0	23.3	76.7	24.5	75.5	26.2	73.9
Next 5-10 years	35.7	64.3	31.8	68.2	30.7	69.3	29.5	70.5
Longer than 10 years	39.6	60.4	36.9	63.1	28.7	71.3	37.6	62.4
Expecting inheritance/gift***								
Yes	37.3	71.9	35.3	64.8	30.3	69.7	34.8	65.3
No	28.1	62.8	25.6	74.4	23.6	76.4	24.7	75.3

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<i>Sample Characteristics (%)</i>	2007		2010		2013	
	<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>		<i>Use of Financial Planning Services</i>	
	Yes	No	Yes	No	Yes	No
Risk attitude						
No risk	17.5	82.5	20.3	79.7	19.7	80.3
Average risks	37.7	62.3	39.5	60.5	42.3	57.7
Above average risks	43.0	57.0	47.4	52.6	47.7	52.3
Substantial risks	37.5	62.6	39.7	60.3	39.3	60.8
Investment horizon						
Within a year	21.8	78.2	24.5	75.5	24.6	75.5
Next few years	29.0	71.0	30.3	69.7	32.6	67.4
Next 5-10 years	38.4	61.6	40.0	60.0	41.7	58.3
Longer than 10 years	40.2	59.8	47.3	52.7	47.3	52.7
Expecting inheritance/gift						
Yes	40.1	59.9	38.8	61.2	41.7	58.4
No	29.2	70.8	30.9	69.1	31.4	68.6

Note: Analysis of the 1998-2013 Survey of Consumer Finances; weighted results; numbers in percentages; sample size (1998) = 4,051; sample size (2001) = 3,924; sample size (2004) = 4,139; sample size (2007) = 4,202; sample size (2010) = 5,867; sample size (2013) = 5,639; sample size (all years) = 27,821.

***p<0.0001 ** p<0.01; * p<0.05

In a similar vein, the percentage of respondents using financial planning services generally increased with household total debts level in the combined sample. For the respondents in the first quartile in the combined sample, 25.4% of the respondents reported using financial planning services. The percentage slightly dropped to 23.1% for the respondents in the second quartile of debt levels, 31.3 % for the respondents in the third quartile of debt levels, and 41.2% for the respondents with debt in the highest debt level. For each of the debts categories, the percentage of respondents using financial planning services showed a similar trend over years. For instance, for the respondents with debts levels in the third quartile, the percentage of respondents using financial planning services lower in earlier survey years (e.g., 29.7% in 2004 and 25.9% in 2001), and higher in later survey years (33.9% in 2013, 34.5% in 2010). However, the percentage in 1998 (30.4%) was higher than 2001.

In the combined sample including all survey years, 34.3% of homeowners with a mortgage balance stated that they used financial planning services, followed by 29.5% of homeowners without a mortgage balance. For renters, only 21.0% used financial planning services. For each category of home ownership, the percentage showed an increasing trend. For instance, a lower percentage of renters reported using financial planning services in earlier survey years (e.g., 17.6% in 2001, 17.4 in 2004). By contrast, a larger percentage of renters stated that they used financial planning services (e.g., 22.7% in 2010, 24.4% in 2013).

More than 40% (42.2%) of business owners in the combined sample stated that they used financial planning services. The number of business owners that used financial

planning services showed an increasing trend for all survey years, with its lowest percentage in 1998 (36.2%) and highest in 2013 (48.7%).

For respondents who had a cash value of life insurance, nearly 40% (37.7%) of the respondents reported using financial planning services in the combined sample. In the combined sample, the percentage of respondents who had cash value of life insurance was larger for those using financial planning services than those who did not. The percentage of using financial planning services for the respondents who had cash value of life insurance showed an increasing trend, increasing more in later survey years. For instance, 32.4% of the respondents who had cash value of life insurance reported using financial planning services in 1998, with a slightly decrease in 2001 (30.7%). This percentage continued to increase to 43.6% in 2013.

In the combined sample, the percentage using financial planning services generally increased with respondents' age. For respondents who were less than 35 years old in the combined sample, 24.4% reported using financial planning services. This percentage was nearly one-third (29.8%) for the respondents who were 35 to 44 years old, 32.3% for the respondents aged between 45 and 54 years old, and 34.1% for the respondents aged between 54 and 64 years old. The percentage dropped to 30.7% for respondents aged between 65 and 75 years old, and 24.5% for the oldest age group (more than 75 years old). For each age category, the percentage of respondents using financial planning services showed a similar trend over the years. For instance, for the youngest group, the percentage of respondents using financial planning services was higher in later survey years (e.g. ,26.9% in 2013, 25.2% in 2010) and lower in earlier survey years

(22.9% in 2004 and 22.1% in 2001). However, the percentage in 1998 (24.4%) was higher than that in 2001.

For both male and female respondents, nearly one-third (29.6% for male respondents, 29.0% for female respondents) of the combined sample stated that they used financial planning services. In the combined sample, the percentage using financial planning services for male and female respondents was quite close. In some survey years, the percentage of male respondents using financial planning services was a little bit higher (e.g., 32.6% for male and 31.0% for female in 2010), while the percentage of using financial planning services for female respondents was a little bit higher (e.g., 26.1% for male and 27.7% for female in 1998) in other years.

In the combined sample, the percentage using financial planning services was highest for White respondents and lowest for Hispanic respondents. More than one-third (31.0%) of White respondents in the total sample stated that they used financial planning services, followed by 27.3% of Black respondents, and 26.2% of all other respondents. The percentage of Hispanic respondents who used financial planning services was the lowest (17.8%). For each racial category, the percentage of respondents using financial planning services was higher in later survey years (e.g., for White respondents, 35.2% in 2013, 33.9% in 2010) and lower in earlier survey years (28.2% in 2004 and 26.1% in 2001). However, the percentage in 1998 (27.7%) was generally higher than in 2001 (26.1%).

The percentage of respondents using financial planning services increased with respondents' education level in the combined sample. For respondents in the combined

sample who did not complete high school, 13.2% of them reported using financial planning services. The percentage was 22.5% for respondents who obtained a high school diploma, 30.2% for the respondents who had some college education, 37.6% for the respondents who achieved a bachelor's degree, and 42.9% for respondents with graduate or professional degrees. For each level of education, the percentage of respondents using financial planning services showed a similar trend over the years. For instance, for the highest level of education, the percentage of respondents using financial planning services was higher in later survey years (e.g., 47.8% in 2013, 43.7% in 2010) and lower in earlier survey years (e.g., 40.5% in 2004, 40.6% in 2001). However, the percentage in 1998 (40.8%) was higher than that in 2001.

In the combined sample, more respondents who were married or living with partners used financial planning services. In the combined sample, 31.5% of the married respondents reported using financial planning services. The percentage of respondents using financial planning services showed a similar trend over the years. For instance, for respondents who are married or living with partners, the percentage of respondents using financial planning services was lower in earlier survey years (e.g., 26.4% in 2001, 29.1% in 2004) and higher in later survey years (e.g., 33.3% in 2007, 34.5% in 2010) in general. However, the percentage in 1998 (28.8%) was higher than that in 2001.

In general, more respondents who had children used financial planning services in the combined sample, compared to respondents without children living together.. Nearly one-third (29.9%) of married respondents in the combined sample reported using financial planning services. The percentage of respondents using financial planning

services showed a similar trend over the years. For instance, for the respondents who had children, the percentage using financial planning services was lower in earlier survey years (e.g. ,25.4% in 2001, 25.7% in 2004) and higher in later survey years (e.g. ,34.2% in 2010, 33.2% in 2010) in general. However, the percentage in 1998 (26.4%) was higher than that in 2001.

In the combined sample, the percentage using financial planning services were highest for respondents who were self-employed, followed by respondents who worked for someone else. In the total sample, nearly 40% (38.9%) of self-employed respondents stated that they used financial planning services, followed by 28.9% in respondents who worked for someone else. For each category of employment status, the percentage of respondents using financial planning services was higher in later survey years (e.g., for self-employed respondents, 43.3% in 2013, 40.9% in 2010) and lower in earlier survey years (34.1% in 2001, 33.0% in 1998).

The percentage using financial planning services increased with respondents' self-perceived health status in the combined sample. In the combined sample, for the respondents who reported to be in poor health, 18.1% of them reported using financial planning services. The percentage was 23.1% for the respondents who were in fair health, 29.1% for respondents who stated that their health was good, and 35.6% for the respondents who reported to have excellent health. For each self-perceived health status group, the percentage of respondents using financial planning services showed a consistent increasing trend over the years, with the exception of a dip in 2001. For instance, for the excellent health status group, the percentage of respondents using

financial planning services was higher in later survey years (e.g. ,40.7% in 2013, 37.2% in 2010) and lower in earlier survey years (e.g. , 32.6% in 2004, 30.8% in 2001).

However, the percentage in 1998 (34.6%) was higher than that in 2001.

In the combined sample, the percentage of respondents using financial planning services were highest for respondents who were willing to take above average financial risks, followed by respondents who were willing to take average financial risks. The percentage of respondents using financial planning services was lowest for those not willing to take risk. In the total sample, a little more than 40% (41.5%) of respondents willing to take above average financial risks stated that they used financial planning services, followed by 36.7% of those willing to take average financial risks. The percentage of respondents who were not willing to take any risk, but used financial planning services was 17.0%. In general, for each of the group with different attitudes towards risk, the percentage of respondents using financial planning services was higher in later survey years (e.g., for respondents who were willing to take above average financial risks, 47.7% in 2013, 47.4% in 2010) and lower in earlier survey years (35.6% in 2001, 38.1% in 1998).

Overall, the percentage of respondents using financial planning services increased with respondents' investment horizon in the combined sample. For respondents who reported having an investment horizon within one year in the combined sample, 18.1% reported using financial planning services. The percentage was 28.0% for the respondents who stated that they had an investment horizon of a few years, 35.7 % for the respondents who expected to invest for the next 5 to 10 years, and nearly 40% (39.6%) for the

respondents who reported having an investment horizon of longer than 10 years. For each investment horizon group, the percentage of respondents using financial planning services showed a similar trend over the years, with the exception of a dip in 2001. For instance, in the group with the longest investment horizon, the percentage of respondents using financial planning services was higher in later survey years (e.g., 47.3% in 2013 and in 2010, 40.2% in 2007) and lower in earlier survey years (e.g., 37.6% in 2004, 28.7% in 2001). However, the percentage in 1998 (36.9%) was higher than that in 2001.

In general, the majority of respondents who expected an inheritance or gift used financial planning services in the combined sample. An overall average of 37.3% of the respondents in the combined sample expecting an inheritance or gift reported using financial planning services. The percentage of respondents using financial planning services was highest in 2013 (41.7%) and lowest in 2001 (30.3%).

5.1.3 Portfolio Sharpe Ratio by Sample Characteristics

Table 6 shows the distribution of expected portfolio Sharpe Ratios by sample characteristics from the combined sample. Chi-square tests were used to identify the association between expected Sharpe Ratio and sample characteristics. All the results were statistically significant, indicating association between expected Sharpe Ratios and sample characteristics without other factors controlled. Sharpe Ratios were organized into quintiles (1=lowest and 5=highest) based on the simulated values. For example, the portfolios with negative Sharpe Ratios fell into group 1, showing that the portfolios

performed worse than risk-free assets, while group 5 comprised portfolios with the highest Sharpe Ratios.

Table 7 shows the distribution of expected portfolio Sharpe Ratios by use of financial planning services in each survey year. Overall, respondents who reported using financial planning services were more likely to have a higher Sharpe Ratios than those who did not. In the combined sample including all survey years, among those who reported using financial planning services, 16.8% fell into group 1, the quintile with the lowest Sharpe Ratios, while 26.4% fell into group 5, the quintile with the highest Sharpe Ratios. In contrast, among those who did not use planning services, 31.3% were in group 1 and 17.1% were in group 5, respectively. As shown in Table 7, the distribution of portfolio performance by use of financial planning services presented about the same pattern in each survey year. Among those who reported to use financial planning services, the percentage of respondents with the highest Sharpe Ratio was 19.6% 1998, 18.5% in 2001, 26.6% in 2004, 29.9% in 2007, 29.2% in 2010, and 29.1% in 2013.

Respondents with higher income demonstrated better portfolio performance. For instance, nearly 30% (28.8%) of respondents from the quartile with the highest income could also be categorized as group 5 in terms of their Sharpe Ratios, while only 10.1% of respondents from the quartile with the lowest income demonstrated similarly high Sharpe Ratios and could be categorized as group 5. On the contrary, 46.8% of the respondents in the lowest income quartile were found to be in the lowest Sharpe Ratio group, while only 5.5% of respondents from the highest income group showed similarly low Sharpe Ratios.

Table 6 Portfolio Sharpe Ratio by Sample Characteristics

<i>Sample Characteristics</i>	<i>Sharpe Ratio</i>					Chi-square
	1	2	3	4	5	
<i>Use of Financial Planning Services</i>						1241.2***
Yes	16.8	13.5	19.8	23.6	26.4	
No	31.3	21.8	15.2	14.6	17.1	
<i>Economic situations</i>						
Household income						5617.5***
1 st quartile	46.8	27.9	9.5	5.8	10.1	
2 nd quartile	25.4	20.4	18.2	15.8	20.4	
3 rd quartile	11.9	12.0	21.4	26.8	28.0	
4 th quartile	5.5	5.6	22.4	37.7	28.8	
Household total assets						5547.0***
1 st quartile	45.6	30.4	8.5	6.0	9.5	
2 nd quartile	27.0	19.9	17.1	15.1	20.9	
3 rd quartile	12.1	10.1	22.3	27.7	27.8	
4 th quartile	5.8	5.0	25.9	37.0	26.3	
Household total debts						1956.2***
1 st quartile	34.5	23.4	12.1	12.8	17.2	
2 nd quartile	35.1	23.7	13.6	11.8	15.8	
3 rd quartile	20.4	16.6	20.0	19.9	23.0	
4 th quartile	15.1	11.5	21.5	27.5	24.4	
Home ownership						2470.0***

<i>Sample Characteristics</i>	<i>Sharpe Ratio</i>					Chi-square
	1	2	3	4	5	
Renter	18.5	14.8	19.9	22.8	23.9	
Homeowner without a mortgage balance	27.5	18.9	15.2	17.1	21.3	
Homeowner with a mortgage balance	40.3	27.0	12.2	8.3	12.1	
Business ownership						3817.5***
Yes	4.2	8.0	44.9	30.6	12.3	
No	30.7	21.2	12.1	15.1	21.0	
Having cash value of life insurance						557.3***
Yes	19.1	15.1	19.4	22.7	23.7	
No	29.6	20.8	15.7	15.5	18.5	
<i>Demographic characteristics</i>						
Age						888.7***
Less than 35 years old	31.2	23.7	16.0	13.7	15.4	
35-44 years old	22.5	17.8	18.8	19.8	21.1	
45-54 years old	22.0	16.0	17.6	21.5	22.9	
55-64 years old	22.6	17.1	17.2	20.0	23.1	
65-75 years old	31.2	18.5	14.2	14.9	21.3	
More than 75 years old	37.9	23.6	13.5	10.5	14.5	
Gender						326.4***
Male	23.3	18.1	18.0	20.5	20.1	
Female	30.3	20.5	15.4	14.3	19.5	
Race						1067.7***
White non-Hispanic	23.7	17.9	17.8	19.5	21.2	
Black/African-American	39.1	23.6	11.8	9.6	16.1	
Hispanic	41.6	26.6	11.9	8.0	11.9	

<i>Sample Characteristics</i>		<i>Sharpe Ratio</i>					Chi-square
		1	2	3	4	5	
Education	Other	23.8	19.2	18.7	17.9	20.5	2989.4***
	No high school diploma/GED	50.2	28.6	7.7	5.1	8.5	
	High school diploma or GED	33.5	22.7	14.8	12.5	16.6	
	Some college	26.3	19.5	17.6	16.2	20.3	
	Bachelor's degree	16.1	14.7	20.8	24.9	23.6	
	Graduate and Professional degree	12.5	11.3	19.1	27.9	29.2	
Marital status							1197.4***
	Married/living with partner	21.5	16.6	18.9	21.1	21.9	
	Not married	35.2	23.5	13.2	11.5	16.7	
Having children							52.9***
	Yes	28.5	19.7	15.7	16.7	19.5	
	No	25.1	19.0	17.7	18.0	20.2	
Employment status							2693.3***
	Employees	23.5	19.2	15.0	19.0	23.3	
	Self-employed	14.0	12.3	39.1	25.0	9.6	
	Retired	38.3	21.9	11.2	11.1	17.6	
	Not working	44.5	26.0	10.5	7.8	11.2	
<i>Respondents' Expectations and Preferences</i>							
Self-perceived health							1425.9***
	Poor	52.6	24.6	7.3	5.5	10.0	
	Fair	37.7	22.3	13.1	10.5	16.4	
	Good	24.7	19.0	17.8	17.9	20.7	
	Excellent	19.6	17.2	18.4	22.5	22.2	

<i>Sample Characteristics</i>	<i>Sharpe Ratio</i>					Chi-square
	1	2	3	4	5	
Risk attitude						3488.5***
No risk	40.9	24.9	11.5	7.5	15.2	
Average risks	18.2	16.2	19.0	22.2	24.5	
Above average risks	13.6	13.5	22.5	28.7	21.8	
Substantial risks	24.3	16.9	21.4	24.0	13.3	
Investment horizon						11308.2***
Within a year	53.3	15.7	20.2	3.1	7.8	
Next few years	10.0	31.4	26.6	16.6	15.5	
Next 5-10 years	9.4	21.7	7.9	32.6	28.4	
Longer than 10 years	23.2	0.5	1.7	29.3	45.3	
Expecting inheritance/gift						277.8***
Yes	19.7	14.7	18.3	24.3	23.0	
No	28.2	20.1	16.3	16.2	19.3	

Note. Analysis of the 1998-2013 Survey of Consumer Finances; weighted results; sample size=27,821; numbers in percentages.

***P<0.0001

Table 7 Portfolio Sharpe Ratio by Using Financial Planning Services in Each Survey Year

Survey Year	Use of Financial Planning Services	Sharpe Ratio				
		1	2	3	4	5
All Survey Years	Yes	16.8	13.5	19.8	23.6	26.4
	No	31.3	21.8	15.2	14.6	17.1
1998	Yes	18.5	14.3	20.1	27.5	19.6
	No	31.1	23.3	16.3	16.5	12.9
2001	Yes	15.0	14.9	21.8	29.8	18.5
	No	28.1	23.6	16.0	20.2	12.1
2004	Yes	16.7	12.5	17.9	26.4	26.6
	No	28.9	21.8	14.3	15.3	19.8
2007	Yes	14.1	11.3	19.1	25.7	29.9
	No	30.1	20.5	15.0	14.2	20.3
2010	Yes	17.5	13.5	19.7	20.1	29.2
	No	32.5	22.1	15.2	11.6	18.6
2013	Yes	17.7	14.5	20.2	18.4	29.1
	No	35.6	20.0	14.9	11.8	17.8

Similarly, respondents with more assets showed better portfolio performance. For instance, 26.3% and 37.0% of respondents from the quartile with the highest asset could also be categorized as group 5 and group 4 in terms of their Sharpe Ratios respectively, while only 9.5% and 6.0% of respondents from the lowest asset quartile demonstrated similarly high Sharpe Ratios and could be categorized as group 5 and as group 4, respectively. By contrast, over half (45.6%) of the respondents in the quartile with the lowest asset were also in the lowest Sharpe Ratio group, while only 5.8% of respondents from the quartile with the highest asset had similarly low Sharpe Ratios.

Following the similar pattern, respondents with higher debt levels demonstrated higher Sharpe Ratios. For instance, nearly 25% (24.4%) of respondents from the quartile with the highest debts could also be categorized as group 5 in terms of their Sharpe Ratios, while only 17.1% of respondents from the quartile with the lowest debt demonstrated similarly high Sharpe Ratios and could be categorized as group 5. On the contrary, 34.5% of the respondents in the lowest debt quartile were found to be in the lowest Sharpe Ratio group, while only 15.1% of respondents from the highest debt group showed similarly low Sharpe Ratios.

Homeownership was found to have an effect on portfolio performance. For instance, a higher percentage of respondents who did not own a house (22.8% in group 4, 23.9% in group 5) were in the higher Sharpe Ratio groups when compared with respondents who owned a house with a mortgage balance (8.3% in group 4, 12.1% in group 5). By contrast, an overall average of 40.3% of the respondents who owned a house with a mortgage balance were found to be in the lowest Sharpe Ratio group, while only

18.5% of respondents who did not own a house had similarly low Sharpe Ratios. This findings was consistent with previous research that compared to respondents who owned a house, renters tended to have a more diversified portfolio, which in general indicating a higher return under given risk (Fratantoni, 1998).

In general, respondents who owned a business demonstrated better portfolio performance. For instance, more than 30% (30.6%) and 12.3% of business owners could be categorized as group 4 and group 5 in terms of their Sharpe Ratios, while less than 5% (4.2%) of the respondents who owned businesses were found to be in the lowest Sharpe Ratio group. This percentage was more than one-third (30.7%) for non-business owners. Similarly, respondents who had cash value of life insurance demonstrated better portfolio performance. For instance, 23.7% and 22.7% of respondents with cash value of life insurance could be categorized as group 4 and group 5 in terms of their Sharpe Ratios, respectively.

Demographic characteristics also seemed to impact portfolio performance. On average, the possibility of having a higher Sharpe Ratio increased with age overall. For instance, nearly 20% of respondents aged between 35 to 44 years old could be categorized in the higher Sharpe Ratio groups (19.8% in group 4, 21.1% in group 5), while only 13.7% and 15.4% of respondents from the youngest group demonstrated similarly high Sharpe Ratios and could be categorized as group 4 and as group 5, respectively. The percentage of respondents in high Sharpe Ratios group dropped for respondents older than 65 years old. For example, nearly 40% (37.9%) of the respondents

in the oldest age group were in the lowest Sharpe Ratio group, while only 14.5% of them could be categorized as group 5 in terms of their Sharpe Ratios.

White respondents showed better portfolio performance. For instance, 21.2% and 19.5% of White respondents could also be categorized as group 5 and as group 4 in terms of their Sharpe Ratios respectively, while only 16.1% and 9.6% of Black respondents demonstrated similarly high Sharpe Ratios to be categorized as group 5 and group 4, respectively. Similarly, only 11.9% and 8.0% of Hispanic respondents demonstrated high Sharpe Ratios and could be categorized as group 5 or group 4. By contrast, around 40% of Black (39.1%) and Hispanic (41.6%) respondents comprised the lowest Sharpe Ratio group, while only 20% of White respondents showed similarly low Sharpe Ratios.

Respondents with more education had better portfolio performance. For instance, nearly 30% (29.2%) of respondents from the highest education group could also be categorized as group 5 in terms of their Sharpe Ratios, while only 8.5% of respondents who did not complete high school showed similarly high Sharpe Ratios and could be categorized as group 5. On the contrary, over half (50.2%) of respondents in the lowest education group were found to be in the lowest Sharpe Ratio group, while only 12.5% of respondents with graduate or professional degrees presented similarly low Sharpe Ratios.

Married respondents were found to have higher Sharpe Ratios. For instance, 21.9% of the respondents who were married or living with partners fell into group 5 in terms of Sharpe Ratios. Respondents who worked for someone else showed better portfolio performance. For instance, 23.3% of respondents working for someone else could be categorized as group 5 in terms of their Sharpe Ratios, while only 9.6% of

respondents who were self-employed demonstrated similarly high Sharpe Ratios and could be categorized as group 5.

Respondents' expectations and preferences seemed to influence Sharpe Ratio as well. Respondents with better self-perceived health status had better performing portfolios. Only 10.0% of respondents with poor health were in group 5 in terms of their Sharpe Ratios. The percentage was 16.4% for respondents who were in fair health, 20.7% for respondents who stated they were in good health, and 22.2% for respondents who reported to be in excellent health.

Similarly, on average, respondents who were willing to take more financial risks demonstrated better portfolio performance overall. For instance, the percentage in highest Sharpe Ratio groups increased from 15.2% for respondents unwilling to take any financial risks to 24.5% for those willing to take average risks. However, only 13.3% of those substantial risk takers could be found in group 5.

In similar vein, respondents with longer investment horizons demonstrated better portfolio performance. For instance, 45.3% of respondents with an investment horizon of more than 10 years could also be categorized as group 5 in terms of their Sharpe Ratios, while only 7.8% of respondents with an investment horizon of within one year showed similarly high Sharpe Ratios and could be categorized as group 5. On the contrary, over half (53.3%) of respondents with the shortest investment horizon were found to be in the lowest Sharpe Ratio group, while only 23.2% of respondents with the longest investment horizon had similarly low Sharpe Ratios. Last, respondents expecting an inheritance or gift were found to have higher Sharpe Ratios. For instance, 23.0% and 24.3% of the

respondents who expected an inheritance or gift could be categorized as group 5 or group 4 in terms of their Sharpe Ratios.

5.2 Results from Wilcoxon Test

In this dissertation, I used Wilcoxon test to compare the Sharpe Ratios of respondents using financial planning services to those who did not use such services. Results indicated that respondents using financial planning services had portfolios with higher projected Sharpe Ratios when compared to respondents who did not ($Z=77.439$, $p<.0001$).

5.3 Results from Kruskal Wallis test

Kruskal Wallis test was used for post-hoc test to examine whether there existed differences between the effect of financial planning services on household portfolio performance provided by financial planners, lawyers and accountants. Results showed that respondents using financial planners (Mean Rank=82,867.27) had the portfolios with highest projected Sharpe Ratios, followed by accountants (Mean Rank= 75,996.60). Respondents using lawyers (Mean Rank= 69,686.20) reached the lowest Sharpe Ratio among the three financial planner service professionals ($H(3)=3,033.79$, $p<.0001$). Regression analysis was also conducted to examine the controlled effect, it showed that compared to the respondents who did not use financial planning service professionals, only respondents using financial planners showed statistically significant higher probability to have a higher Sharpe Ratio.

5.4 Ordered Logistic Results

Multicollinearity test was conducted to identify possible significant multicollinearity between independent variables. Variance inflation factor (VIF) statistics for all the independent variables are less than 10, indicating that multicollinearity was not a concern (Allison, 2012; Freund & Wilson, 1998). Table 8 displays the results of the ordered logistic regression. Controlling for other factors, it is more likely for individual investors in 2004, 2007, 2010 and 2013 to enjoy better portfolio performance relative to investors in 1998. The odds of having better portfolio performance in respective years when compared to 1998 was 1.4 times higher in 2004, 1.4 times higher in 2007, 1.6 times higher in 2010, and 1.5 times higher in 2013.

As hypothesized, using financial planning services had a positive effect on portfolio performance. It increased the odds of achieving a higher level of Sharpe Ratio by 21.5%, after controlling for other factors. This result was consistent with previous studies (Bluethgen et al., 2008; Gerhardt & Hackethal, 2009; Kramer 2012; Lusardi & Mitchell, 2011).

The findings in this dissertation were also consistent with past research finding that wealth and income had a positive effect on portfolio performance (Calvet, Campbell, & Sodini, 2006). It was found that wealth and income significantly affected the Sharpe Ratio. Compared to the lowest income group (1st quartile), the odds of owning a better performing portfolio increased by a factor of 1.9 for the second quartile, 2.5 for the third quartile, and 2.4 for the respondents with the highest income group when the other factors in the model were controlled. The effect of household total assets followed a similar

pattern. Compared to the lowest asset group (1st quartile), the odds of owning a better performing portfolio increased by a factor of 2.2 for the second quartile, 3.1 for the third quartile, and 2.8 for the respondents with the highest assets. Respondents with excessive debts were found to have worse portfolio performance. The odds of having a higher Sharpe Ratio decreased by a factor of 0.7 for the respondents with the highest debts, compared to the respondents with the lowest debts. Consistent with descriptive analysis in this dissertation, the odds of business owners enjoying better portfolio performance was 14.0% higher compared to respondents who did not own business. Compared with respondents without a cash value of life insurance, the odds of having a higher Sharpe Ratio for respondents who had cash value of life insurance was 11.8% greater.

Table 8 Ordered Logistic Analysis of Household Portfolio Sharpe Ratio

<i>Parameter</i>	<i>Coefficient</i>	<i>Odds Ratio</i>	<i>VIF</i>
Intercept for the 5 th group	-6.520***		
Intercept for the 4 th group	-5.016***		
Intercept for the 3 rd group	-3.732***		
Intercept for the 2 nd group	-2.574***		
<i>Survey Years</i>			
2001	0.025	1.026	1.695
2004	0.307***	1.359	1.735
2007	0.300***	1.350	1.755
2010	0.498***	1.646	2.008
2013	0.419***	1.520	1.985
Use financial planning services (reference category=no)	0.194***	1.215	1.140
<i>Economic situations</i>			
Household income (reference category=1 st quartile)			
2 nd quartile	0.657***	1.930	1.867
3 rd quartile	0.900***	2.459	2.800
4 th quartile	0.868***	2.381	4.906
Household total assets (reference category=1 st quartile)			
2 nd quartile	0.795***	2.214	3.269
3 rd quartile	1.115***	3.051	4.745
4 th quartile	1.042***	2.835	7.811
Household total debts (reference category=1 st quartile)			
2 nd quartile	0.037	1.038	1.882
3 rd quartile	-0.084	0.920	3.234
4 th quartile	-0.419***	0.658	3.733
Home ownership (reference category= homeowner without a mortgage balance)			
Homeowner with a mortgage balance	0.004	1.004	3.708
Renter	0.005	1.005	3.435
Business ownership (reference category=no)	0.131**	1.140	2.371
Having cash value of life insurance (reference category=no)	0.112***	1.118	1.123
<i>Demographic characteristics</i>			
Age (reference category=Less than 35 years old)			
35-44 years old	0.144***	1.155	1.759
45-54 years old	0.093*	1.098	2.070
55-64 years old	0.116*	1.123	2.337
65-75 years old	0.086	1.089	2.389

<i>Parameter</i>	<i>Coefficient</i>	<i>Odds Ratio</i>	<i>VIF</i>
More than 75 years old	0.151*	1.163	2.391
Female (reference category=Male)	0.065	1.067	1.174
Race (reference category=White non-Hispanic)			
Black/African-American	-0.186***	0.831	1.142
Hispanic	-0.341***	0.711	1.156
Other (including Asian)	-0.118*	0.889	1.037
Education (reference category=No high school diploma/GED)			
High school diploma or GED	0.278***	1.321	3.434
Some college	0.444***	1.558	3.644
Bachelor's degree	0.538***	1.760	4.069
Graduate and professional degree	0.687***	1.987	3.998
Married/living with partner (reference category=Not married)	-0.001	0.999	1.456
Having children (reference category=no)	0.037	1.038	1.405
Employment status (reference category=Not working)			
Employees	0.507***	1.660	6.811
Self-employed	-0.047	0.954	6.420
Retired	0.206*	1.229	5.746
<i>Respondents' expectations</i>			
Self-perceived health (reference category=Poor)			
Fair	0.307***	1.360	7.298
Good	0.419***	1.521	7.540
Excellent	0.404***	1.497	4.256
Risk attitude (reference category= No risk)			
Average risks	0.415***	1.515	1.728
Above average risks	0.356***	1.428	1.766
Substantial risks	0.198***	1.219	1.218
Investment horizon (reference category=Within a year)			
Next few years	1.355***	3.876	1.443
Next 5-10 years	1.970***	7.173	1.585
Longer than 10 years	2.570***	13.060	1.574
Expecting inheritance/gift (reference category=no)	0.032	1.033	1.076

Note: Analysis of 1998-2013 Survey of Consumer Finances; unweight results; using RII technique; *p<.05; **p<.01; ***p<.001.

The findings also revealed that certain demographic characteristics had an effect on Sharpe Ratio as well. Compared with the youngest age group (less than 35 years old), the odds of having a higher Sharpe Ratio increased by a factor of 1.2 for the 35-44 age group, 1.0 for the 45-54 age group, 1.1 for the 55-64 age group and 1.1 for the oldest age group. Compared with White respondents, the odds of achieving a higher level of Sharpe Ratio for Black, Hispanic and respondents of other races decreased by a factor of 0.8, 0.7 and 0.9, respectively. Respondents with a higher level of education achieved a higher level of Sharpe Ratio. Compared with respondents who did not earn a high school diploma, the odds of achieving a higher portfolio Sharpe Ratio for respondents with a high school diploma increased by a factor of 1.3, 1.6 for respondents with some college education, 1.8 for respondents with a bachelor's degree, and 2.0 for respondents with a graduate or professional degree. This result aligned with previous empirical findings that financial literacy and sophistication had a positive effect on investors' portfolio performance (Abreu & Mendes, 2010; Calvet, Campbell, & Sodini, 2006). Compared with respondents who were unemployed, the odds of having a higher portfolio Sharpe Ratio for respondents who worked for someone else increased by a factor of 1.7 and 1.2 for retired respondents.

Respondents who reported being in good health were more likely to achieve a higher level of portfolio Sharpe Ratio than those with poor health. The odds of realizing a higher Sharpe Ratio increased by a factor of 1.4 for respondents in fair health, 1.5 for respondents in good health, and 1.5 higher for respondents in excellent health. Risk attitude was also a factor. Compared with respondents who reported no tolerance of

financial risks, the odds of having a better investment performance increased by 1.5 for those who were willing to take average financial risks, 1.4 for those willing to take above average financial risks, and 1.2 for those willing to take substantial financial risks. Similar to past research (Ang & Kjaer, 2011; Hodges, Taylor, & Yoder, 1997), the investment horizon was found to positively affect portfolio performance. Compared with respondents whose investment horizon was one year or less, those with longer investment horizons were more likely to have higher Sharpe Ratios as well. The odds of achieving better portfolio performance increased by a factor of 3.9 for respondents with an investment horizon within the next few years, 8.2 for respondents with an investment horizon between 5 to 10 years, and 14.1 for respondents with an investment horizon of more than 10 years.

Running a subsequent model with all interactions of using financial planning services and other independent variables revealed no significant interactions except for income, business ownership and investment horizon, indicating the effect of using financial planning services on portfolio performance was different among different income groups, business owners and non-business owners and respondents with different investment horizons.

Table 9 shows the multivariate analysis results with interaction terms. For respondents using financial planning services, compared to the lowest income quartile, the odds of having a higher Sharpe Ratio for the respondents in the third income quartile and highest income quartile increased by a factor of 2.1 and 2.0 respectively. For respondents using financial planning services, compared to the lowest income quartile,

the odds of having a higher Sharpe Ratio decreased a factor of 0.9 for business owners, compared to the non-business owners. Among the respondents using financial planning services, compared to the respondents whose investment horizon was within a year, the odds of achieving better portfolio performance increased by a factor of 3.3 for respondents with an investment horizon within the next few years, 7.4 for respondents with an investment horizon between 5 to 10 years, and 15.5 for respondents with an investment horizon of more than 10 years.

Table 9 Ordered Logistic Analysis of Household Portfolio Sharpe Ratio with Interaction Terms

<i>Parameter</i>	<i>Coefficient</i>	<i>Odds Ratio</i>
Intercept for the 5 th group	-6.698***	
Intercept for the 4 th group	-5.187***	
Intercept for the 3 rd group	-3.897***	
Intercept for the 2 nd group	-2.733***	
<i>Survey Years</i>		
2001	0.060	1.062
2004	0.326***	1.385
2007	0.353***	1.424
2010	0.366***	1.442
2013	0.349***	1.418
Use financial planning services (reference category=no)	0.527***	1.695
<i>Economic situations</i>		
Household income (reference category=1 st quartile)		
2 nd quartile	0.641***	1.899
3 rd quartile	0.956***	2.601
4 th quartile	1.011***	2.748
Using financial planning services*household income 2 nd quartile	-0.039	0.962
Using financial planning services*household income 3 rd quartile	-0.236**	0.790
Using financial planning services*household income 4 th quartile	-0.321***	0.726
Household total assets (reference category=1 st quartile)		
2 nd quartile	0.909***	2.483
3 rd quartile	1.257***	3.516
4 th quartile	1.257***	3.514
Household total debts (reference category=1 st quartile)		
2 nd quartile	0.026	1.027
3 rd quartile	-0.113	0.893
4 th quartile	-0.438***	0.645
Home ownership (reference category= homeowner without a mortgage balance)		

<i>Parameter</i>	<i>Coefficient</i>	<i>Odds Ratio</i>
Homeowner with a mortgage balance	0.049	1.051
Renter	0.078	1.081
Business ownership (reference category=no)	0.258***	1.294
Using financial planning services*business ownership	-0.355***	0.702
Having cash value of life insurance (reference category=no)	0.099***	1.105
<i>Demographic characteristics</i>		
Age (reference category=Less than 35 years old)		
35-44 years old	0.136***	1.146
45-54 years old	0.074	1.076
55-64 years old	0.099*	1.104
65-75 years old	0.058	1.060
More than 75 years old	0.118	1.125
Female (reference category=Male)	0.066	1.069
Race (reference category=White non-Hispanic)		
Black/African-American	-0.184***	0.832
Hispanic	-0.330***	0.719
Other (including Asian)	-0.122**	0.885
Education (reference category=No high school diploma/GED)		
High school diploma or GED	0.275***	1.317
Some college	0.433***	1.542
Bachelor's degree	0.543***	1.722
Graduate and professional degree	0.657***	1.929
Married/living with partner (reference category=Not married)	-0.003	0.997
Having children (reference category=no)	0.033	1.034
Employment status (reference category=Not working)		
Employees	0.508***	1.662
Self-employed	-0.057	0.945
Retired	0.196**	1.217
<i>Respondents' expectations</i>		
Self-perceived health (reference category=Poor)		
Fair	0.276***	1.318
Good	0.382***	1.466
Excellent	0.363***	1.437
Risk attitude (reference category= No risk)		
Average risks	0.41***	1.507

<i>Parameter</i>	<i>Coefficient</i>	<i>Odds Ratio</i>
Above average risks	0.344***	1.411
Substantial risks	0.172***	1.187
Investment horizon (reference category=Within a year)		
Next few years	1.448***	4.257
Next 5-10 years	1.954***	7.056
Longer than 10 years	2.413***	11.167
Using financial planning services*next few years	-0.264***	0.768
Using financial planning services*next 5-10	0.047***	1.048
Using financial planning services*longer than 10 years	0.326***	1.386
Expecting inheritance/gift (reference category=no)	0.041	1.041

Note: Analysis of 1998-2013 Survey of Consumer Finances; unweight results; using RII technique; *p<.05; **p<.01; ***p<.001.

CHAPTER 6

SUMMARY, CONCLUSIONS AND IMPLICATIONS

6.1 Summary and Conclusions

This dissertation employed a dataset combined from the 1998-2013 Survey of Consumer Finances to investigate the effect of financial planning services on household portfolio performance.

In the combined sample of all survey years, the projected Sharpe Ratio changed little across all survey years, possibly partly due to the little change in household portfolio allocation of each sample in each survey year. An average of one-third of total respondents stated that they had used financial planning services. This percentage increased from 26.9% in 1998 to 32.8% in 2013. The consumer demand for financial planning services is driven by increasing wealth and income, more complexing financial markets, longevity, self-responsibility of wealth accumulation and preservation. According to FPSB (2009), demand for financial planning services did not decrease but increased after Great Recession which lasted from 2007 to 2009 since the consumers needed “competent and ethical financial planners who work in the client’s interest” (p.6). In addition, more and more financial institutions add financial planning services in their business module, which provides more options for consumers to choose. Further, regulation on financial planning industry becomes stricter and clearer, making consumers

feel more confident and reliable about a more disciplined industry. Generally, the respondents who used financial planning services tended to be older, wealthier, more risk tolerant, and more highly educated. As indicated by both the combined sample and individual samples from each survey year, respondents who reported using financial planning services were more likely to have higher Sharpe Ratios than those who did not. Among those reporting to use financial planning services, 16.8% fell into group 1, the quintile with the lowest Sharpe Ratios, while 26.4% fell into group 5, the quintile with the highest Sharpe Ratios. In contrast, among those respondents who did not use planning services, 31.3% were in group 1 and 17.1% were in group 5.

Compared to 1998, respondents in 2004, 2007, 2010 and 2013 were more likely to have a higher projected Sharpe Ratio. This was consistent with the overall upward trend of the financial market though the whole market experienced ups and downs. Though the stock market in 1998 experienced roaring at the beginning of the year, the market took a sharp down due to the financial crisis in 1998. Many people who lacked of professional business, operation experience and real technology skills started the technology companies and went public to raise capital. This speculative capital raising at stock market was later called “Dot-com” bubble (U.S. Bureau of Labor Statistics, 2009). It is likely the lowest possibility of reach a higher Sharpe Ratio for respondents in 1998 not only due to the negative influence from financial crisis in 1998 but also due to the over concentrated investment in ‘Dot-com’ stock which was short of the real business support. The market began to recover in 2003 from the “dot.com” bubble burst, it is possible that investors learned lesson from past and managed their portfolio more wisely, leading to an

overall improvement of projected portfolio performance. The market kept its slow growth till the end of 2007 and presented optimistic at the start of 2010. Thus, on average, respondents in 2010 and 2013 were more likely to have a higher portfolio performance.

Consistent with both the descriptive analysis and the hypotheses, the regression analysis further demonstrated that financial planning services increases the likelihood of improving portfolio performance. Using financial planning services can help investors focus on a broad view in improving their' financial situations, thus contributes to their portfolio performance. Other economic characteristics (e.g., income, total assets), demographic characteristics (e.g., education, race), and respondents' expectations and preferences (e.g., risk tolerance, self-perceived health) were also factors impacting portfolio performance. Wealth and income had a significantly positive effect on portfolio performance. It is possible due to the fact that investors with more wealth and income have more financial capability to manage their portfolio. Descriptive analysis showed renters were more likely to have higher Sharpe Ratio, which was consistent with previous research that compared to respondents who owned a house, renters tended to have a more diversified portfolio, which in general indicating a higher return under given risk (Fratantoni, 1998), but the effect of homeownership was not significant with other factors controlled.

Age was also a factor, as respondents between the ages of 35 and 44 years old, between ages 45 and 54, between ages 55 and 64 years old and more than 65 years old had a higher probability of achieving Sharpe Ratios relative to the youngest people. It is possibly because compared to younger people, in general, older people have more

experience in investing and seek assistance from financial planning professionals, thus helping achieving better portfolio performance. White respondents were more likely than respondents of other races to have better portfolio performance, while more education resulted in a higher probability of achieving better Sharpe Ratios as well. It is possible that people with more education can easily learn financial knowledge and increase their financial capability compared to the less educated, thus are more likely to have better portfolio performance.

Moreover, respondents who worked for someone else were more likely to have better portfolio performance, as opposed to those who were unemployed. Health status also impacted portfolio Sharpe Ratios. Respondents who reported being in good health were more likely to achieve higher portfolio Sharpe Ratios relative to those with poor health. Furthermore, risk-takers had a higher probability of having higher Sharpe Ratios when compared to respondents who were unwilling to take risk. However, investors who were willing to take substantial risk had the lowest possibility to achieve higher Sharpe Ratio compared to other risk takers. It indicated that willing to take too much risk may not always be beneficial. Last, investment horizon had a positive impact on the likelihood of having better portfolio performance, with longer investment horizons ultimately leading to a higher probability of better performance. This verified the common investment advice of focusing on the future and investing from a long-term view, rather than lost in a myopia bias.

Further analysis including interactions terms of using financial planning services and other sample characteristics showed statistically significant effect of using financial

planning services on portfolio performance among different income groups, business owners and non-business owners and respondents with different investment horizons. For respondents using financial planning services, respondents with higher income were more likely to have higher Sharpe Ratio. The influence of income was stronger among respondent not using financial planning services, implying income played a more crucial role for respondents who did not use financial planning services. Respondents with longer investment horizon were more likely to have higher Sharpe Ratio and the effect of investment horizon on Sharpe Ratio was stronger among financial planning services users than non-financial planning services users. It indicated the importance of financial planning in a long term view. It was interesting to note that business owners were generally more likely to have a higher Sharpe Ratio, however, among whom using financial planning services, business owners showed less probability to achieve a higher Sharpe Ratio compared to non-business owners. It was likely that business owner did not follow financial planning advice very well, which having a negative effect on their possibility to achieve better portfolio performance.

Results from Kruskal Wallis test showed that respondents using financial planners had the portfolios with the highest projected Sharpe Ratio, followed by accountants. Respondents using lawyers when confronted with investment issues had the lowest projected Sharpe Ratio. This indicated that though in general, respondents using financial planning service had a higher Sharpe Ratio, compared to the ones who did not use, the effect on portfolio performance differed among the three professionals, indicating the financial planners' superior expertise in financial planning service.

In this dissertation, portfolio performance was measured using the portfolio Sharpe Ratio. The higher the Sharpe Ratio, the better the portfolio performance. As a risk-adjusted measure, Sharpe Ratio used standard deviation as a measure of risk, including both systematic and unsystematic risk, which can be reduced by portfolio allocation. Given the central role of asset allocation in portfolio performance, this dissertation employed the Sharpe Ratio as the primary measure of performance. The distribution of the Sharpe Ratio violated the normality assumption for the ordinary linear regression model. The dependent variable displayed a distribution, which departed significantly from normality, and as a result the Sharpe Ratios were organized into quintiles (1=lowest and 5=highest) based on simulated values.

In order to calculate the portfolio Sharpe Ratio, it was necessary to obtain the rate of return, weight and standard deviation for each asset. All investable financial and non-financial assets (except for primary residence) were included in the household portfolio. Primary residence was excluded from the portfolio since the main purpose of one's primary residence is more reflective of one's consumption rather than investment needs. This dissertation created fifteen different asset categories based on the various asset characteristics, their risk and return patterns, and their role in a household portfolio. Asset weights were calculated based on the value of each asset. Since the SCF does not provide the return distribution of each asset, each asset's expected rate of return and standard deviation was calculated based on historical rates of return. Based on the expected investment horizons provided by the SCF, the 1-year, 5-year, 10-year and 20-

year rate of returns and standard deviations for each asset were determined for each individual investor's portfolio.

In this dissertation, financial planning services include professional services provided by lawyers, accountants, and financial planners. In practice, lawyers, accountants and financial planners usually work as a team to provide financial planning services to the clients and provide a range of expertise in the various domains of financial planning services, such as lawyers providing estate planning and accountants providing tax planning. Generally, financial planners serve as the coordinator of the group to ensure that the team delivers professional financial planning services of high quality to clients. In addition, during the investment decision making, investors need to seek advice from accountants about tax issues and legal and estate issues from lawyers, it is reasonable to include all three professions when analyzing the effect of financial planning services.

In this dissertation, I take into consideration all investable financial and non-financial assets when assessing household portfolio performance. Given the complexity of today's investment market, including both financial and non-financial assets can provide a better reflection of the household portfolio's broader diversification and performance. Some non-financial assets, such as real estate, are not only a good anti-inflation investment, but also as they are less correlated with financial assets, such as bonds and stocks. Some non-financial assets, such as business interest, affect investors' decisions regarding risky assets due to their high risk. Therefore, including both financial and non-financial assets provided a better evaluation of the overall household portfolio performance.

6.2 Implications for Financial Professionals

As shown in Table 5, a large percentage of respondents with fewer financial resources (e.g., 81.1% respondents fell in the lowest income quartile and 82.9% respondents in the lowest total household assets quartile) did not use financial planning services when making investment decisions. It is likely that the cost of such services exceeds the perceived monetary benefits of using them. However, after controlling for economic characteristics, the use of financial planning services still had a statistically significant positive relationship to portfolio performance. Thus, for investors with limited financial resources, those who did use financial planning services were likely to have poorer portfolio performance, which potentially exacerbated their already weak financial situation. Since wealth accumulation is directly related to portfolio performance, financial planning service professionals should explore ways to reach individual investors who have limited resources in order to help them realize the benefits of using financial planning services and ultimately improve their portfolio performance.

This dissertation found that factors affecting portfolio performance not only included household economic characteristics (such as income and wealth) and demographic characteristics (such as education and race), but also respondents' perceptions and preferences (such as risk attitude and investment horizon expectation). After controlling for the use of financial planning services, respondents with a higher risk tolerance and a longer investment horizon were more likely to have better performing portfolios, as indicated by their higher Sharpe Ratios. These results suggest that financial

planning service professionals should devote more time and effort to helping those with a lower risk tolerance and a shorter investment horizon to construct portfolios that can achieve better returns given their preferred level of financial risk.

Furthermore, the impact of risk tolerance on portfolio performance is especially important for financial planning service professionals to understand. Theoretically, there is an optimal portfolio return for each level of risk. The effect of risk tolerance on risk-adjusted portfolio returns may reflect a mismatch between the clients' risk tolerance and the level of portfolio risk undertaken. Households with more financial constraints are also more likely to have such a mismatch. This inconsistency between what investors want and what they actually have can stem from a variety of circumstances, such as a misunderstanding of the financial risks involved, inaccurate measures of risk tolerance, or emotional reactions in a down market (Park, 2013). This issue should be of concern to the financial planning industry and researchers in the field of personal financial planning as well.

It is the responsibility of financial planning service professionals to not only understand their clients' financial situation, but to also know their clients with respect to their age, risk attitude, health status, and other preferences and perceptions since these are all important factors that may have an effect on their portfolio performance. In addition, financial planning service professionals should also assist their clients in better understanding their true attitude towards risk, as well as the financial products in the market that are consistent with their objectives and level of risk.

6.3 Implications for Individual Investors

Economic theory indicates that individual investors will weigh the costs and benefits when making a decision to maximize their utility. The findings of this dissertation contribute to the list of potential benefits that an individual investor might expect when using financial planning services, including that the use of financial planning services can increase the likelihood of achieving better portfolio performance. Financial planning service professionals are typically better trained, with greater financial expertise and more financial knowledge and ability (Finke, Huston, & Danielle, 2011). Given individual investors' lower level of financial expertise (Lusardi & Mitchell, 2007, 2008, 2011) and the ineffectiveness of financial literacy education (Willis, 2008), it would be a wise decision for them to seek out the help of professions when making financial planning decisions. Other than using financial planning services, this dissertation also revealed some other factors affecting portfolio performance, such as investment horizon. It found that individual investors with longer investment horizons have a higher probability of better portfolio performance. Conversely, individual investors with shorter investment horizons are less likely to have better portfolio performance. A myopic approach to investing has led to some investors becoming involved with shorter investment horizons and frequent trading, which has resulted in lower portfolio performance, especially in a down market (Bucher-Koenen & Ziegelmeyer, 2011). By understanding how these additional factors influence portfolio performance, individual investors can be better prepared to face these potential

constraints. This allows investors to become more long-term oriented in their investment behaviors and avoid unnecessary trading.

In addition, considering the different effect on portfolio performance among the three kinds of financial planning service professionals, investors may think about choosing the professionals who were expected to provide the most benefit: financial planners.

6.4 Limitations and Implications for Future Research

This dissertation is somewhat limited by a lack of access to data regarding the exact investments in each asset category and return profiles for each individual portfolio. Due to this data limitation, historical or simulated rates of return were used. The study was also limited by the lack of information of exact investment channels and amount within certain accounts, such as IRA accounts, thus some assumptions are made in order to conduct the analysis. Considering the major role of life insurance is risk management rather than investment, this study excluded the cash value of life insurance in the portfolio. Yet, life insurance products are “sold product” which involves interaction with financial planning professionals, excluding it may lead to some bias on gauging the effect of financial planning services on portfolio performance. The study was also limited by a lack of information regarding investors’ actual investment strategies, and therefore the assumption was made that individual investors followed a “buy and hold” strategy. Although this strategy is appropriate for many investors (Merriman & Buck, 2014), it is ideal to know the investors’ exact investment strategy. Additionally, I was unable to identify how and when individual investors dealt with their inherited assets due to a lack

of data, so all respondents who had inherited assets within the year were excluded from the sample with the assumption that they had not yet adjusted their portfolios.

Researchers with access to a more comprehensive dataset, one including investors' specific rates of return for each asset, investment strategies, and major life events (i.e., inheriting an asset or gift), will be able to more accurately calculate portfolio Sharpe Ratios and, in turn, develop a more robust analysis.

Another limitation of this dissertation is that it relied on self-reported information about respondents' use of financial planning services. It is possible that some respondents were not able to distinguish between financial planning services and other financial services. In the respect, the financial planning services claimed by respondents may not have been consistent with the definitions employed in this dissertation, which included professional services provided by financial planning service professionals, such as financial planners, accountants and lawyers. Another potential issue is self-selection bias. Respondents who reported using financial planning selected to use this service by themselves, so the factors affecting their decisions to use financial planning services might affect their portfolio performance as well. Considering the ethical issues involved in conducting an experimental design approach in which participants are randomly assigned to a group with financial planning services and a group without, non-experimental study adopted can be considered as more appropriate. In order to reduce the self-selection bias, this dissertation controlled factors affecting individual use of financial planning services which were chosen based on previous research, such as wealth, income, age, gender, education, race, and expecting inheritance or gift (Chang, 2005; DeVaney et

al., 2007; Elmerick et al., 2002; Grable & Joo, 1999) in the analysis. In addition, this dissertation excluded the non-investors who do not have any investable assets, however, they occupy the demographic categories, so the results of this study could not generalize to them.

This dissertation has implications for financial planning service professionals and individual investors alike. It provides financial planning service professionals with tools to better serve their clients, while providing individual investors' with more knowledge on how to better achieve portfolio performance. In addition, this dissertation is the first step towards establishing a method to better understand the monetary value of financial planning services. Future research should explore additional methods for evaluating the potential value that the financial planning industry provides to clients, such as tax strategies to enhance financial well-being and methods to avoid behavioral biases or at least reduce the effect of such biases.

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Appendix A

Return Series of Each Asset

Annual Rate of Return									
Survey Year	Asset	cash and cash equivalent assets	Stock- related assets	Bond- related assets	Real estate- related assets	Hedge fund- related assets	Private equity- related assets	Real Estate Investment Trusts	Business interest- related assets
1998	Rate of Return	0.64%	8.9%	2.3%	4.57%	12.9%	9.31%	4.88%	14.79%
	Standard Deviation	4.17%	25.6%	9.0%	6.17%	11.5%	13.51%	20.54%	41.57%
2001	Rate of Return	0.72%	8.8%	2.3%	4.90%	13.0%	9.27%	3.93%	14.14%
	Standard Deviation	4.10%	25.2%	9.0%	6.29%	11.6%	13.26%	20.47%	41.01%
2004	Rate of Return	0.70%	8.7%	2.5%	5.01%	12.9%	9.45%	5.06%	15.08%
	Standard Deviation	4.03%	25.2%	8.9%	6.19%	11.6%	13.02%	20.20%	41.23%
2007	Rate of Return	0.67%	8.7%	2.4%	5.43%	12.8%	9.56%	6.27%	14.94%
	Standard Deviation	3.97%	24.8%	8.8%	6.49%	11.4%	12.82%	19.96%	40.47%
2010	Rate of Return	0.53%	7.9%	2.4%	5.10%	12.5%	9.61%	4.18%	14.55%
	Standard Deviation	4.00%	25.1%	8.7%	7.04%	11.8%	12.60%	21.52%	41.08%
2013	Rate of Return	0.45%	8.0%	2.6%	5.35%	12.1%	9.75%	4.93%	14.40%
	Standard Deviation	3.96%	24.8%	8.7%	7.06%	11.8%	12.40%	20.94%	40.53%

Annual Rate of Return

Asset		Loans to friends	Commodities	Gold	Silver	Other metals	Live stock	Collectibles
		Survey Year						
1998	Rate of Return	1.79%	-4.24%	-1.57%	0.59%	-3.76%	-1.86%	9.55%
	Standard Deviation	2.15%	8.28%	23.97%	24.16%	2.87%	13.29%	8.20%
2001	Rate of Return	1.86%	-4.29%	-2.35%	0.46%	-4.05%	-1.80%	9.77%
	Standard Deviation	2.13%	8.37%	22.64%	23.61%	3.39%	13.02%	8.13%
2004	Rate of Return	1.76%	-4.08%	-1.38%	0.31%	-4.05%	-1.67%	9.56%
	Standard Deviation	2.15%	8.43%	21.67%	23.09%	4.38%	12.78%	8.08%
2007	Rate of Return	1.75%	-3.52%	0.09%	1.54%	-2.82%	-1.55%	9.45%
	Standard Deviation	2.13%	8.85%	21.39%	23.71%	9.64%	12.55%	7.98%
2010	Rate of Return	1.68%	-3.48%	1.06%	1.61%	-2.96%	-1.52%	9.41%
	Standard Deviation	2.14%	9.01%	20.59%	23.19%	10.51%	12.32%	8.08%
2013	Rate of Return	1.55%	-3.07%	2.27%	2.78%	-2.43%	-1.50%	9.33%
	Standard Deviation	2.20%	9.66%	20.29%	24.48%	11.71%	12.11%	8.07%

5-year Rate of Return

		5-year Rate of Return							
		Asset	cash and cash equivalent assets	Stock-related assets	Bond-related assets	Real estate-related assets	Hedge fund-related assets	Private equity-related assets	Real Estate Investment Trusts
Survey Year									
1998	Rate of Return	0.42%	8.09%	1.97%	4.44%	12.67%	9.08%	6.07%	9.06%
	Standard Deviation	3.17%	9.46%	5.07%	4.23%	6.20%	8.15%	7.73%	17.08%
2001	Rate of Return	0.51%	8.41%	2.09%	4.74%	12.96%	9.10%	6.08%	8.71%
	Standard Deviation	3.13%	9.41%	4.94%	4.40%	6.22%	7.98%	7.24%	17.76%
2004	Rate of Return	0.56%	8.25%	2.22%	4.98%	12.96%	9.20%	5.99%	8.88%
	Standard Deviation	3.08%	9.29%	4.66%	4.47%	6.11%	7.82%	7.02%	17.42%
2007	Rate of Return	0.53%	8.15%	2.33%	5.23%	12.82%	9.36%	7.12%	9.06%
	Standard Deviation	3.02%	9.13%	4.62%	4.56%	6.03%	7.71%	7.60%	17.08%
2010	Rate of Return	0.52%	7.87%	2.35%	5.42%	12.62%	9.42%	6.55%	9.04%
	Standard Deviation	2.97%	9.17%	4.61%	4.66%	6.04%	7.57%	7.90%	16.73%
2013	Rate of Return	0.47%	7.56%	2.47%	5.32%	12.29%	9.53%	5.82%	9.22%
	Standard Deviation	2.92%	9.15%	4.64%	4.60%	6.17%	7.44%	8.00%	16.48%

5-year Rate of Return

Asset		Loans to friends	Commodities	Gold	Silver	Other metals	Live stock	Collectibles
		Survey Year						
1998	Rate of Return	1.77%	-4.39%	-0.84%	0.18%	-3.77%	-1.98%	9.34%
	Standard Deviation	0.87%	3.34%	9.07%	8.88%	1.43%	7.61%	3.09%
2001	Rate of Return	1.81%	-4.37%	-1.85%	0.11%	-3.91%	-1.95%	9.55%
	Standard Deviation	0.87%	3.28%	8.76%	8.64%	1.56%	7.45%	3.20%
2004	Rate of Return	1.81%	-4.33%	-2.07%	-0.14%	-4.13%	-1.85%	9.62%
	Standard Deviation	0.86%	3.26%	8.35%	8.48%	1.91%	7.31%	3.18%
2007	Rate of Return	1.75%	-3.94%	-0.91%	0.29%	-3.59%	-1.74%	9.47%
	Standard Deviation	0.91%	3.83%	8.67%	8.61%	3.81%	7.19%	3.21%
2010	Rate of Return	1.72%	-3.50%	0.49%	1.06%	-2.80%	-1.64%	9.45%
	Standard Deviation	0.91%	4.49%	9.34%	9.18%	6.17%	7.06%	3.15%
2013	Rate of Return	1.62%	-3.21%	1.84%	1.81%	-2.50%	-1.62%	9.40%
	Standard Deviation	1.01%	4.69%	9.99%	9.66%	6.37%	6.93%	3.14%

10-year Rate of Return

Asset		Survey Year	cash and	Stock-	Bond-	Real	Hedge	Private	Real	Business
			cash	related	related	estate-	fund-	equity-	Estate	interest-
			equivalent	assets	assets	related	related	related	Investment	related
			assets			assets	assets	assets	Trusts	assets
1998	Rate of Return		0.17%	8.49%	1.53%	4.59%	12.16%	8.45%	6.08%	8.17%
	Standard Deviation		2.49%	4.94%	3.90%	2.91%	4.49%	6.08%	4.15%	7.43%
2001	Rate of Return		0.25%	8.72%	1.73%	4.65%	12.53%	8.53%	6.18%	8.33%
	Standard Deviation		2.46%	4.94%	3.93%	2.86%	4.73%	5.95%	3.91%	7.31%
2004	Rate of Return		0.32%	8.76%	1.89%	4.84%	12.75%	8.62%	6.46%	8.51%
	Standard Deviation		2.43%	4.84%	3.91%	2.94%	4.76%	5.83%	3.72%	7.23%
2007	Rate of Return		0.36%	8.79%	2.02%	5.12%	12.79%	8.75%	7.02%	8.66%
	Standard Deviation		2.38%	4.75%	3.88%	3.21%	4.67%	5.74%	3.84%	7.12%
2010	Rate of Return		0.37%	8.51%	2.11%	5.32%	12.65%	8.87%	6.87%	8.65%
	Standard Deviation		2.34%	4.88%	3.83%	3.33%	4.64%	5.65%	3.70%	7.01%
2013	Rate of Return		0.34%	8.33%	2.20%	5.42%	12.43%	9.01%	6.85%	8.66%
	Standard Deviation		2.30%	4.88%	3.78%	3.31%	4.67%	5.58%	3.52%	6.92%

10-year Rate of Return

Asset		Loans to friends	Commodities	Gold	Silver	Other metals	Live stock	Collectibles
Survey Year								
1998	Rate of Return	1.83%	-4.48%	-2.29%	0.29%	-3.74%	-1.97%	9.27%
	Standard Deviation	0.55%	2.53%	4.19%	6.96%	1.05%	5.96%	1.96%
2001	Rate of Return	1.85%	-4.46%	-3.02%	0.05%	-3.80%	-1.87%	9.39%
	Standard Deviation	0.54%	2.48%	4.07%	6.80%	1.07%	5.84%	1.98%
2004	Rate of Return	1.86%	-4.35%	-3.11%	-0.03%	-3.92%	-1.79%	9.46%
	Standard Deviation	0.53%	2.48%	3.75%	6.60%	1.20%	5.72%	1.97%
2007	Rate of Return	1.84%	-4.16%	-2.73%	0.10%	-3.74%	-1.71%	9.49%
	Standard Deviation	0.53%	2.62%	3.67%	6.45%	1.61%	5.61%	1.93%
2010	Rate of Return	1.80%	-3.84%	-1.56%	0.47%	-3.33%	-1.62%	9.47%
	Standard Deviation	0.55%	3.04%	4.85%	6.47%	2.65%	5.51%	1.91%
2013	Rate of Return	1.73%	-3.45%	0.00%	1.22%	-2.77%	-1.55%	9.38%
	Standard Deviation	0.67%	3.62%	6.71%	7.25%	4.00%	5.42%	1.92%

20-year Rate of Return

Asset		Survey Year	cash and cash equivalent assets	Stock-related assets	Bond-related assets	Real estate-related assets	Hedge fund-related assets	Private equity-related assets	Real Estate Investment Trusts	Business interest-related assets
1998	Rate of Return		-0.15%	8.60%	0.63%	4.43%	11.88%	8.04%	6.01%	7.42%
	Standard Deviation		1.54%	3.26%	1.93%	1.41%	3.12%	4.34%	2.76%	4.20%
2001	Rate of Return		0.00%	8.75%	0.93%	4.65%	12.07%	8.16%	6.18%	7.40%
	Standard Deviation		1.64%	3.24%	2.29%	1.67%	3.15%	4.26%	2.29%	4.09%
2004	Rate of Return		0.12%	8.80%	1.25%	4.81%	12.24%	8.32%	6.26%	7.43%
	Standard Deviation		1.68%	3.17%	2.64%	1.76%	3.15%	4.20%	2.00%	4.00%
2007	Rate of Return		0.19%	8.85%	1.46%	4.96%	12.35%	8.51%	6.51%	7.55%
	Standard Deviation		1.67%	3.11%	2.76%	1.85%	3.11%	4.19%	1.87%	3.94%
2010	Rate of Return		0.24%	8.78%	1.63%	5.08%	12.44%	8.63%	6.42%	7.63%
	Standard Deviation		1.65%	3.07%	2.81%	1.91%	3.07%	4.12%	1.81%	3.91%
2013	Rate of Return		0.26%	8.72%	1.78%	5.21%	12.47%	8.75%	6.57%	7.69%
	Standard Deviation		1.62%	3.01%	2.83%	1.96%	3.01%	4.07%	1.73%	3.87%

20-year Rate of Return

Asset		Loans to friends	Commodities	Gold	Silver	Other metals	Live stock	Collectibles
		Survey Year						
1998	Rate of Return	1.89%	-4.45%	-0.28%	1.69%	-3.64%	-2.39%	9.21%
	Standard Deviation	0.31%	1.53%	0.81%	3.60%	0.67%	4.06%	1.11%
2001	Rate of Return	1.90%	-4.50%	-2.47%	0.93%	-3.74%	-2.10%	9.20%
	Standard Deviation	0.30%	1.51%	2.87%	4.31%	0.76%	4.13%	1.09%
2004	Rate of Return	1.90%	-4.47%	-3.13%	0.35%	-3.84%	-1.91%	9.21%
	Standard Deviation	0.30%	1.48%	2.54%	4.61%	0.89%	4.11%	1.07%
2007	Rate of Return	1.89%	-4.32%	-2.69%	0.20%	-3.75%	-1.79%	9.28%
	Standard Deviation	0.30%	1.61%	2.33%	4.51%	1.02%	4.04%	1.09%
2010	Rate of Return	1.87%	-4.12%	-2.09%	0.25%	-3.53%	-1.70%	9.33%
	Standard Deviation	0.30%	1.82%	2.46%	4.36%	1.42%	3.97%	1.09%
2013	Rate of Return	1.83%	-3.87%	-1.06%	0.65%	-3.27%	-1.61%	9.33%
	Standard Deviation	0.35%	2.18%	3.31%	4.55%	1.87%	3.90%	1.07%

VITA

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