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The Case for Women in Financial Services

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HOLLINS UNIVERSITY

The Case for Women in Financial Services

Senior thesis submitted to the Department of Business and Economics,
Hollins University in partial fulfillment of the requirements for the degree of
Bachelor of Arts

by
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Table of Contents

Abstract	2
Introduction.....	2
Literature Review	7
Methodology	16
Primary Database and Elimination Process	18
Cautions and Relevance of the Method.....	20
Assumptions and Procedure	22
Hypothesis, variables, definitions and measurements	22
Collecting Data and Time Period	24
Regression Model	25
Empirical Analysis and Results	27
Unsystematic Risk.....	27
Systematic Risk.....	31
Conclusion	31
Limitations and Recommendations.....	32
References	34

I. Abstract

Finance literature has been studying the gender gap and the roles of women in business and finance. Focusing on mutual fund management, this study revisits the idea by investigating the impact of gender-specific investing styles on the level of volatility involved with the funds. The initial hypothesis is that the performance of funds managed by females is less volatile compared to funds managed by males. If we have statistical evidence to show this hypothesis is valid, gender diversification should be encouraged in asset management. The empirical results show evidence that the participation of women in fund management lowers the ten year volatility of an equity fund by 0.9 on average, compared to funds managed by individual male or all-male team.

II. Introduction

This study aims to analyze the case for women as decision makers in the industry. By investigating the outcome of gender-specific investing styles, this analysis seeks to answer if the difference between male and female styles indeed has an impact on the level of volatility involved with the investments. The hypothesis of this study is that women bring distinct financial styles that lower the volatility of their investments. The empirical results suggest that women are able to make strategic financial decisions, but are less prone to non-strategic risks.

The background of this study lies in the gender gap in top financial management positions in the U.S. financial services industry. According to literature concerning the topic, women are subject to stereotypes that hurt their chance to participate and succeed in the industry. However, literature also suggests that several characteristics of female financial styles such as persistence in performance and stability in investment strategy can be valuable to the market as

they are less prone to volatility. The financial market is critical to the welfare of individuals, entrepreneurs, and the functioning of the economy as a whole. Finance is not only attributed to the money and capital markets, which facilitate the operation of the business world, but also plays a significant role in the wealth management for households and individuals. For example, Americans rely on wealth management and investment to achieve a variety of financial goals, including saving for education expenses, retirement, and mortgages. However, the financial market can be extremely volatile, making it a red button that can cause a devastating effect if poorly operated. Thus, decision making on the allocations of funds plays a crucial role in the financial market. The old saying, “Don’t put all your eggs in one basket,” is proverbial in banking and investment teaching, as we cannot emphasize less on the importance of diversity in decision making processes. However, diversity is undermined in the gender gap among portfolio managements and analysts - the key decision makers in financial services market.

Although women accounted for 54% of the work force in the financial services industry in 2013 (Bureau of Labor Statistics), men still dominate in the top management and other key decision making occupations in the industry. The Catalyst estimated that only 16% of the senior executives were female in 2013. Women are also underrepresented in other key decision-making occupations such as financial analyst, personal financial advisor, cost estimator, or actuary. Gender gaps can also be observed with the fact that women working in the industry are more likely to be laid off during economic downturns.

Although the underlying causes of the absence of women among decision makers in the financial market are unclear, there are several often-cited reasons. First, women are not favorable over male counterparts to hold management positions because women tend to be risk-averse and less confident than men and these traits do not fit in the culture of aggression in trading and

investing on Wall Street. It is reasoned that these traits can result in lack of aggressive determination in investing and failure to take advantage of high-return investments. Thus, the notion that finance is a male-driven world has become conventional. The current trend in the financial world is exacerbating this issue, as women are losing their ground on Wall Street because the industry is shifting to rely on sale and trading, and a fast-paced trading is associated with quick and sometimes aggressive decisions. Second, the process of hiring and training females for decision-making roles is viewed as irrational. This is justified by most hiring managers based on their experience that women are more likely to drop out from their positions. Third, studies have shown a gap in financial literacy between men and women (Lusardi and Mitchell, 2014). Women are much less confident about their financial knowledge and also less interested in finance topics than men. These factors lead to a glass ceiling that discourages women from entering and thriving in financial management professions.

The first problem is rooted in the conventional and male-dominated way of business in Wall Street, which seems to imply that women with their biological and psychological traits are destined to stay in subordinate roles. The aggressive environment on the trading floor is often cited as a reason that women are rare at the top. However, different studies vary in their conclusions about the level of confidence and risk tolerance of women compared to their male counterparts. For example, a massive number of studies in behavioral finance and psychology demonstrate that women have lower risk tolerance and lower confidence than men (see Olsen and Cox, 2001, and Beckmann and Menkhoff , 2008). This paper will argue that these behaviors are assets to portfolio constructions in terms of diversity and moderation. For example, in portfolio management, these traits offset the inclination of overconfidence often observed in male investing behaviors, which can make the investment highly risky (see Barber and Odean,

2001). Women tend to weigh risk more heavily in portfolio construction, while men weigh rate of return more heavily. In contrast, several studies point out that the conservative behavior of women in financial decision making is stereotypical (See Schubert, Brown, Gysler and Brachinger, 1999). Consistent with this finding, Nelson (2012) shows empirical evidence that women are reported showing similar turnover rates in their portfolio as their male counterparts. The significance of this finding is that at top management levels, women demonstrate the same determination in their investing performance as men.

The second issue is also related to the first problem. Many women choose to leave their professions to take care of their domestic business, and they also drop out because the environment within the financial institutions is more hostile to women. First, they require a certain level of aggression while aggressive and ambitious behaviors in women are still viewed by society as negative. Second, there is simply not enough mentorship and support for women in the profession because male supervisors are less interested in training women, and there are few women as role models in the industry (Sheryl Sandberg, 2013).

The final issue is a result of women internalizing what is expected of them. However, studies have shown that although women are less interested in the field, female professional investors are as able to deliver a good performance as their male counterparts, particularly in the field of wealth management (Li, Sullivan, Xu, Gao, 2013). This is because women perceive financial matters and handle money differently from men. First, regarding the gathering of information about finance, while men rely on hard data to understand the market, women learn about finance from communication with others and from extensive experience in observing the movement of the underlying markets. Second, women have different financial styles. In terms of

investment, they prefer a steady growth along with stability while men are more interested in fast growth of the assets.

The participation of women in the market can help to improve the diversity in portfolio construction. This is demonstrated by the strong case for women in wealth management and personal finance. The significance of the argument against the gender gap in the financial market lies in the value of diversity in decision making. Diversity is usually considered a good business decision because it promotes different views, innovations, and a variety of approaches. Gender diversity in wealth management lowers the volatility of investment, offering more choices to non-professional investors, especially to an increasing number of female investors and clients who prefer a steady growth of their assets, rather than a focus on fast growth. It is reported that women are more willing to enhance client relationships, and give financial advice accordingly to clients' individual financial situations (Groysberg, 2008). This is a valuable approach in the new financial market, especially in wealth management, where the traditional approach is criticized because of its formulization and dependence on hard data with little consideration of the individuals' needs.

This paper will first discuss major views across literature relevant to the gender gaps in finance as well as gender-specific financial styles. By looking at theory developed in prior studies, the author will employ a regression model to specifically examine the impact of female participation in fund management on a fund's level of volatility in the long term. The conclusions will be drawn upon the empirical results. Last but not least, the author will discuss several limitations of the study at the end of the paper.

III. Literature Review

To address the gender gap in finance industry-related high-profile professions, this paper first recognizes the evidence of the disparity in the industry workforce. According to the Bureau of Labor Statistics, in 2013, women represented 54% of the finance workforce. Historical data from the Bureau of Labor Statistics shows that women consistently account for approximately 50% of the workforce over the last decade. However, women are underrepresented among the key-decision makers, the high-paid professions, and the managerial occupations in the financial services. The Bureau of Labor Statistics reports that in 2013, women held only 32.6% of financial analyst positions and 25.7% of personal financial advisor occupations.¹ According to the 2013 Catalyst Census: Fortune 500 Women Executive Officers and Top Earners, women account for 14.6% of executive officers in the finance and insurance industries, slightly higher than in 2012 (14.3%). The report also shows that in both years, the percentage of women among the executive officer top earner slots is stagnant at 8.1%. More than 25% of the Fortune 500 companies had no female executive officers in 2012 and 2013.² Although these statistics suggest slight headway that women have achieved in climbing up the management-occupation ladder in the financial industry, the participation of women among the executive officer rank in the business world is far behind compared to the progress observed in other industries and sectors. The following charts compare the participation of women between the business/finance sector, represented by the percentage of women among the rank of top executives and top earners, and the government sector, represented by the percentage of women in Congress (Refer to Exhibit II.1 and Exhibit II.2 below). The number of females serving in the U.S. Congress increased by

¹ See <http://www.bls.gov/cps/cpsaat11.pdf>

² See <http://www.catalyst.org/knowledge/2013-catalyst-census-fortune-500-women-executive-officers-and-top-earners>

more than 50% over the past fourteen years (from 67 members in the 106th Congress to 102 members in the 113th Congress). Meanwhile, the participation of women among the executive managers fluctuates between 12 percent and 16 percent over the same period. To put this in perspective, women consistently made up approximately half of the industry labor force. Exhibit II.1 also reflects a drop in the representation of female executives in 2009, when mass layoffs occurred across industries in the aftermath of the financial crisis in 2008. The pattern is also observed after the 1987 stock market crash.³ According to another report by Catalyst, 19% of women senior leaders, compared to 6% of their male peers, lost their jobs because of their company downsizing or closure during the Great Recession. This suggests that women are relatively more susceptible to lose their jobs during the economic downturns.⁴

Although Exhibit II.1 shows that the number of women among top earners (the highest-compensation occupations) is rising, a share of less than 10% remains relatively insignificant to that of men, reflecting a rather stubborn pay gap between women and men in the industry. Many authors document the empirical evidence of both occupational segregation and gender pay gap (see Blau and Ferber, 1987, and Petersen and Morgan (1995) for example). Bertrand and Hallock (2000) did a compelling research on gender pay gap and the dearth of women among highest-paid executives. Their study used the ExecuComp data set, which contains information on compensation for the top five executives for all firms in the S&P 1500 over the period 1992-1997. Only 2.4% of a total of 42,000 executive-year observations are female. After pooling the data together, they find that total compensation is on average 33% lower for women. They also find that women receive less compensation in the form of bonuses and more in the form of salary.

³ See <http://www.businessweek.com/articles/2013-09-09/in-times-of-trouble-wall-street-women-get-the-boot>

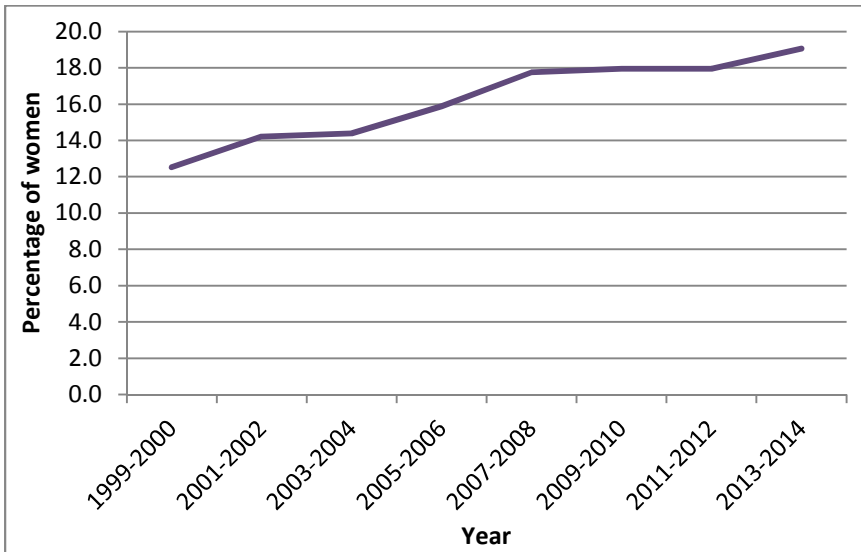
⁴ Catalyst, Opportunity or Setback? High Potential Women and Men During Economic Crisis

Exhibit II.1 Women among the Rank of Executive Officers and Top Earners in Fortune 500



Source: Catalyst Census, Fortune 500 Women Executive Officers and Top Earners, 2000-2013

Exhibit II.2 Women in the United States Congress



Source: Congressional Research Service

Note: The Congressional Research Service reports the total number of women serving as House Representatives and Senators in the Congress over the period 1999-2004. This study computes the percentage of women in Congress by dividing the total number of Congress women by 535, the total number of voting members.

Bertrand, Goldin, and Katz (2010) study the career dynamics in the business and finance sectors for female MBAs. They identify several factors that affect women's careers in these sectors. They recognize that career/family conflict arising from inflexible schedules of most high-powered finance and corporate jobs attribute to the lower career outcomes for women, but also acknowledge that even talented females may hardly get recognized under a male-dominated workplace because they are subject to implicit and explicit gender discriminations.

The cultural root cause of the gender gap has been eloquently addressed by Sheryl Sandberg, CFO of Facebook. According to Sandberg (2013), the traditional view that finance is a masculine domain often holds back the representation of women in the field. Furthermore, women are more portrayed in subordinate and domestic roles. Women themselves internalize this social image and face double bind if they desire to participate in the male domain, such as finance. She also demonstrates that for women, being less interested in finance can also result from the hostile environment that the workplace holds against the female individuals. Groysberg (2008) reports several challenges women face when they aspire to climb up the career ladder: they receive little support and mentorship from their peers because of implicit and explicit stereotypes, and they face double bind when they must act like a man in a man's world. Competitiveness, ambition, and confidence are extremely favorable in the business world and significantly determine an individual's success on the promotion ladder. As pointed out by Ms. Sandberg, women with these traits are viewed as negative and unlikeable.

Many previous studies attempt to explain the gender gap in the labor force in general and in the finance sector specifically. Most cited causes are derived from the observed differences between men and women and justify their fit in the labor market. For example, Niederle and Vesterlund (2007), and Gneezy, Niederle, and Rustichini (2003) show experimental evidence

suggesting that women are less interested and less effective in the highly-competitive environments in top finance jobs. Babcock and Laschever (2003) conclude in their study that females may be less willing to aggressively negotiate for pay and promotion. There are two widespread views about the distinct biological and psychological traits between men and women that affect their behaviors in making financial decisions: women are more risk-averse and less confident. These factors set the glass-ceiling that might hurt women's chance to succeed in the top finance professions.

The first stereotype widely associated with women is low confidence. Women are less confident about their financial knowledge and less comfortable in making financial decisions (Refer to Niederle and Vesterlund, 2005 for example). Groysberg (2012) argues that women are less confident in their financial knowledge despite their ability to outperform their male counterparts. Barber and Odean (2001) have a different interpretation concerning this behavior. In their study, they find that women are less prone to be overconfident compared to men. Based on a dataset of trading records of 35,000 households, they show empirical evidence that overconfidence observed in men relatively hurts their performance. Men tend to trade more, but underperform investments managed by their female peers. In particular, on average, men reduce their net returns through trading by 0.94 percentage points more a year than women.

Another widespread view is the risk-averse behavior of women in financial decision making, documented in psychology and behavioral finance research. These studies support this view with both empirical analysis and experimental investigation (see Sunden and Surette, 1998; Charness and Gneezy, 2007; Levin et al., 1988; Croson and Gneezy, 2009; Byrnes, Miller, and Schafer, 1999). In contrast to this widespread view, some scholars point out that weak control for information access and the level of wealth and choice options in the underlying financial

decisions bias generates the observed differences in risk propensity between men and women. Critiques also show the significance of omitted confounding factors, which caution the researchers in drawing causal relationships in their conclusions (see Schubert et al., 1999).

On another remark, several methods may not be relevant to study the general phenomenon. For example, Hershey and Schoemaker (1980) argue that gambling experiments are not adequate to generalize the gender difference in risk attitudes, an approach employed by Levin et al. (1988). The most relevant dispute to the focus of this paper is concerned with the stereotype related to women's behavior toward risks. Schubert et al. (1999) address the issue of stereotyping women with risk-averse behaviors in financial decision making. According to the study, the general perception that women have lower risk tolerance than men is a major cause of glass ceiling that blocks women from getting promoted in their career ladder. The common belief that risky decisions are necessary for a firm's success accounts for the fact that risk-averse propensity is unfavorable in the business setting. Women are less trusted than men to make risky decisions and are less likely to be promoted to the decision making ranks. As they remark, "A consequence of this stereotype is statistical discrimination which diminishes the success of women in financial and labor markets." (Schubert et al., 1999) The authors call into question the prevalence of stereotypical risk attitudes in financial decision-making. Their findings show that the risk propensity of male and female is strongly dependent on the financial decision setting. In this regard, they observe no gender differences in risk propensity when subjects face contextual decisions. Their results suggest that this gender stereotype may not reflect true male and female attitudes toward financial risks, based on the assumption that financial decisions are always contextual in practice. Consistent with this finding, many authors pointed out that this stereotype only applies to novice women in the financial realm (see Niessen and Ruenzi, 2007). On a

professional level, empirical evidence shows little support to the claim that women are more risk averse than men. Controlling for the investors' level of financial markets and expertise, as well as decision frame, the impact of gender on risk taking is significantly weakened (see Beckmann and Menkhoff, 2008; Martenson, 2007; Schubert, 1999; Bliss and Potter, 2002). Atkinson, Baird, and Frye (2003) compare fix-income mutual funds of female and male managers and find no significant difference in terms of performance, risk, and other fund characteristics. Consistent with this conclusion, Johnson and Powell (1994) find that in the "managerial population," males and females demonstrate similar risk propensity. However, this does not imply that women and men demonstrate similar attitudes toward risk. Olsen and Cox (2001) remark that women professionals weigh more risk in their portfolio compared to the level of portfolio risk held by their male counterparts. Li et al. (2012), studying sell-side analysts – whose major role is making recommendations and issuing forecasts – found that women demonstrate the similar abnormal returns but with lower idiosyncratic risks.⁵

This study aims to support the view that the participation of women as key-decision makers in financial services has certain benefits to the industry. Finance plays a crucial role in the economy as a whole, and the welfare of individuals, households, businesses and the government. The main function of the financial system is serving as intermediary market, channeling funds from those who have excess funds (at a certain period of time) to those who have more productive uses for them. This function provides immediate credit to the financial market as the blood vein system throughout the economy. This implies that the stability in the performance of the financial market is crucial to the economy. Unfortunately, the nature of the

⁵ The abnormal level of risk, which is caused by the investors' choice rather than natural risk caused by market volatility

financial market, with investment and trading as the most prevalent activities in finance and often associated with growth in wealth, makes the market inevitably vulnerable to the volatility.

On a micro level, the financial market plays a significant role in wealth management. In the US, investors (including individuals, households, corporations, and the government) rely on the financial market to accumulate wealth in order to achieve long term financial objectives as well as to maintain their financial securities. The financial market, on the other hand, is an expanding complex system: it continues to offer a great variety of financial products (accompanied by huge information packages). The regulations associated with the market highly involved in financial activities also accounts for this complexity. This raises the opportunity cost of obtaining financial knowledge for nonprofessional investors, creating an expansive market for wealth management, the sector specializing in (but not limited to) advisory and recommendation based on market research and analysis.

The efficiency in financial services is the key for wealth management. This means that financial service providers must be able to communicate with their clients to convey certain financial knowledge and offer relevant recommendations to help their clients achieve their financial needs. Secondly, the consistency in the outcome of these advices and recommendations (often evaluated by the performance of the investment) is very important. A poorly managed asset (such as constantly high risk profile and low liquidity) might cause major distress about financial issues for an investor. The financial welfare of individuals, households, and businesses is interconnected with other economic activities such as consumption, savings, debt-paying, mortgages, and credits. Hence, in turn, the financial activities have direct and indirect impacts on the well-being of the economy as a whole.

This points out that the consistency in the performance of wealth management, which relates to lower risk and lower volatility and the efficiency in financial services are two upside aspects for the finance market, particularly in the aftermath of a financial meltdown and/or economic downturn. As we investigate women's contribution to both of these aspects in terms of diversity with the unique skill sets they bring to the table, we acknowledge how gender diversity is often viewed as benefiting the outcomes of businesses and financial performance (See Cox, 1994; Erhardt et al., 2003). The positive effect of gender diversity in these sectors is documented by Herring (2009). Farrell and Hersch (2004) argue that rather than gender diversity being directly performance related, an increase in demand for female board members may be a response to internal preferences and external pressures for greater diversity, suggesting that women are added to boards to achieve a desired gender mix. They also point out that better performing firms are able to focus more on diversity goals. Furthermore, if women are scarce commodities, they may have the opportunity to choose to serve on better performing firms. They conjecture that these reasons account for the positive relation between performance and the number of women elected to the boards. However, their analysis is restricted to non-regulated industries, and excludes all financial institutions, insurance companies, and real estate firms.

Finally, many studies recognize that women have a distinct financial style.⁶ Olsen and Cox (2001) find that in general, women tend to be less confident in the traditional-viewed masculine domains like finance, in spite of their equal ability to perform. The study also showed that women placed more emphasis on the downside measures of risk and ambiguity than did men, and they gave lesser weight to variability of the return. Women professional investors were found to be more security prone decision makers. Women tend to select a return target and then work to reduce risk, while men focus more on increasing return. Groysberg (2008) makes a

⁶ http://www.nytimes.com/2014/02/23/business/mars-venus-and-the-handling-of-money.html?_r=0

notable remark that women are very good at strengthening client relationships, and are better at providing financial advice accordingly to their clients' individual financial situation. Niessen and Ruenzi (2007), investigating all single managed U.S. equity funds from 1994 to 2003, find that women follow less extreme investment styles and their investment styles are more stable over time than those of male managers. Recognizing that female managers are stereotyped as less skilled than male managers, they suggest upon their empirical results that female fund managers indeed have some desirable characteristics, such as high performance persistence and high reliability with respect to their investment styles.

In summary, there is no consensus among scholars concerning gender-related differences. Stereotypes, in particular low confidence and low risk tolerance, both anchored in behavioral studies, remain a persistent hindrance that prevent women from succeeding in finance, traditionally viewed as a male domain. In practice, many stereotypes are formed based on both widespread views and observations. Prior studies examine many distinct traits between men and women that may attribute to these stereotypical behaviors. However, most studies caution that their findings should be used to understand the difference, thus helping to resolve the potential conflicts in context. The analysis following this section will specifically examine women's investing skills by comparing the level of volatility in their investments to that of their male counterparts.

III. Methodology

Behavioral finance literature documents that women tend to invest more conservatively and weigh risk more heavily in their portfolios than men do, even at the professional level. This manifests the distinct investment styles between men and women, but certainly does not imply

the superiority of either gender-specific financial style. Driven by an unbiased standpoint, this study does not wish to demean the merit of the male investment style, but aims to point out the differences in financial styles between females and males, which enrich the diversification in finance management. This analysis is made on the assumption that gender diversity has positive effects on the ground level of financial services. The financial market can be destructive and highly susceptible to volatility. Investing is geared towards creating return, or the growth in assets. Evidence that attests this propensity may be found under the traditional emphasis across the media and press spectrum on the rates of return as a measure of performance for an investment, or the price per share as a measure of performance for stocks. However, financial analysis also takes into great consideration the risk-reward profile to assess the prospects of an investment, especially in the aftermath of the latest great recession. Chaos in the aftermath of a financial crisis shifts investors' prominent attention from growth to security in investment with the fear of default. Although risk and volatility are not the same and should not be addressed interchangeably, they have a great correlation in nature. The more volatile an investment is, the more it is perceived to be risky. With respect to this manner, the level of volatility can be a good measure of risk.

This paper will compare the level of volatility of the funds managed by men and women. The initial conjecture is that funds managed by females are less susceptible to volatility than funds managed by males. The level of volatility is measured with the spread (or variability) of the distribution of the funds' performance across a time frame.

I will start with the database of all US-based mutual funds provided by Morningstar. The Investment Company Institute estimated that 46% of all U.S. households, or roughly 90 million individuals, owned mutual funds in 2013. Investors rely on mutual funds as a cash

management tool to achieve a variety of financial goals, including saving for education expenses and retirement. The U.S. mutual fund industry holds roughly 15 trillion in assets and continues to grow rapidly. Therefore, mutual funds are an important component of wealth management.

Morningstar is an independent investment research company. Its mutual fund database tracks more than 30,000 mutual funds, providing quantitative as well as evaluative information.

Starting with this comprehensive mutual fund database, I will eliminate all mutual funds whose 10 year returns are not available (either because of the unavailability of the data or the inception date after 2004). This process reduces the number of mutual funds to 9323 funds.⁷

III.A Primary Database and Data-filtering Process

Mutual funds represent a significantly large share in the composition of investments in wealth management.⁸ Mutual funds pool money and allow the benefit of diversity in underlying investments and professional portfolio management, including analysis for fund allocation (for instance, stock picking and decisions on the percentage of the asset put in an investment) and transaction operations, aiming to achieve certain targets. Correspondingly, mutual fund managers show a high level of expertise in financial knowledge and understanding of the financial objectives of their clients, mostly non-professional investors.⁹ Thus, mutual fund managers are the relevant subjects of this research as we want to look at gender-specific performance attributes among the professional rank of individual fund managers in the finance industry.

⁷ See 2014 Investment Company Fact Book: A Review of Trends and Activities in the U.S. Investment Company Industry, available at http://www.icifactbook.org/fb_ch1.html

⁸ The Investment Company Fact Book reports a total of 15 billion U.S. dollar in mutual fund assets in 2013. Also according to the report, retirement assets are invested primarily in mutual funds. In particular, 60% of DC plans retirement assets and 45% of IRAs assets are in mutual funds (2013 data).

⁹ The term “non-professional investors” does not imply that the investors have little knowledge about finance. It means that they don’t specialize in the profession. For example, non-professional investors include individuals who are not constantly conducting extensive financial research or compiling data and formally analyzing market information.

Furthermore, since a mutual fund is often managed by a certain individual manager or a management team over a relatively long period, the performance of a fund is highly related to the financial and managerial skills of the manager or the management team. The data about mutual funds is well measured, regularly recorded, and readily available. For these characteristics, the Morningstar mutual fund database is a relevant source for investigating the performance of the fund managers. A cross-sectional study well serves the purpose of this empirical analysis, which primarily aims to find whether there is a significant difference in the level of volatility (which is a measure of risk) between female-managed versus male-managed funds. Since Morningstar's database covers a great number of funds, including records on management and historical performance, this conveniently provides an initial unbiased selection for a sample of mutual funds.

Recognizing that the performance of a fund must be evaluated in the long term rather than the short term to eliminate random luck factor, I will use the sorting tool of performance by 10 year returns, from highest to lowest, to remove all funds without 10 year returns available (the system sorts out all funds without this information in the bottom of the list), reducing the number of funds in the list to 9323 funds.

In the following step, I will control for the characteristics of the funds' management. Ideally, we want to have a large sample size comprised of funds managed by individual female managers and funds managed by individual male managers over the same time period. Two problems (out of many that will be mentioned later in this analysis) arise from this approach; both lie under the complex realm of fund management. First, a fund can be managed by either an individual manager or a team of management. The emphasis on diversification is a driven factor for the increasingly employed multi-manager structure. Second, since the analysis' agenda

requires a consistency in management style, it would be best to only consider funds without significant management turnover during the period of interest in this study. Controlling for these two factors will significantly reduce the number of funds that meet the criteria. The mutual fund manager turnover is a critical issue in this analysis, thus I will eliminate all funds with major fund manager turnover. Besides comparing the individual-managed funds for gender differences, this empirical analysis will also compare funds managed by a team with at least one female manager and funds managed by all-male managers. Thus, we will keep both funds managed by individuals and funds managed by teams. I will exclude waive-loaded funds and aggregate all share classes of the same fund to avoid multiple counting. Finally, I only include funds that are strictly classified as equity funds or fixed-income funds, the two segments that account for a majority of mutual funds. This elimination process narrows the dataset to 478 observations. Table III.1 shows descriptive statistics of this sample by categories that will be examined in this study.

III.B Cautions and Relevance of the Method

Earlier in this methodology section, I revealed several limitations of this approach. Another shortcoming of this method lies in the selection bias which is inevitably caused by the elimination process. Many funds are not included because they experience changes in the management personnel over the past ten years. Not only are a significant number of funds taken out from the list, but a large number of fund managers are excluded because they switch between funds.

The second problem also arises after controlling for different factors is the small size of the sample (only a few funds are left in each group). This causes the statistical results to be less

accurate in compare to the true value of the population. Thus, the empirical results are less reliable to reflect the pattern of the population.

Table III.1. Sample sizes of mutual fund dataset by fund segments, fund structure and gender of managers

	N	Percentage of sample
Total Sample Size	478	
Equity Funds	314	100%
Individual female	19	6%
Individual male	133	42%
Team with female	87	28%
Team without female	75	24%
Fixed-income Funds	164	
<i>Corporate bond funds</i>	116	100%
Individual female	6	5%
Individual male	56	48%
Team with female	28	24%
Team without female	26	22%
<i>T-bond/Municipal bond</i>	48	100%
Individual female	6	13%
Individual male	12	25%
Team with female	24	50%
Team without female	6	13%

Source: Author's calculation based on the data sample from the Morningstar Mutual Fund database

The third problem lies in the dearth of female managers in the sample size, which affects the interpretation of the empirical results. Even if we have enough statistical evidence to conclude that funds managed by female managers tend to have lower volatility, this may be because women are the minority in this profession, thus they are more prone to risk which can hurt their career significantly compared to men, who are already expected to have low risk tolerance.

However, using mutual funds to study differences in investing behaviors between men and women in a professional setting is not unique to this study. Niessen and Ruenzi cover all individual managed U.S. equity funds from January 1994 to December 2003 to examine the gender impact on financial management. The key difference between their method and this study's method lies in how observational units are determined. In Niessen and Ruenzi's study, one observational unit is determined by the performance of a fund over a year. Therefore, they have less difficulty to control for the consistency of management structure. The approach employed in this study, however, looks at longer periods of time (ten years, five years, and three years), so management turnover rate is a major issue in this setting. However, this method has a strength that the author has not found across previous literature. Managing mutual funds as well as other types of investment must deal with extreme exposure to the fluctuation of the financial market over the past ten years, which is the time frame of this study. The significance of the impact, if found, is strengthened by the occurrence of the financial crisis over this time period (as a test for managerial skills), and by the method utilized in this study, which looks at long-term historical volatility.

III.C Assumptions and Procedure

III.C.1 Hypothesis, variables, definitions and measurements

This investigation hypothesizes that the participation of women in the management of a fund helps to lower the historical volatility concerning the fund's returns. Historical volatility of a fund indicates how much the performance fluctuated during a given time period. It is important to recognize that there are different measurements of the volatility of a fund's performance. This analysis will look at standard deviation, beta, and alpha as the indicators of volatility.

The statistical volatility is measured by the dispersion of returns for a given fund. In statistics, standard deviation is a common measure for the dispersion (also known as the spread or variability) of a distribution. In this analysis, standard deviation tells us how much the return on a fund is deviating from the expected returns based on its historical performance. Morningstar provides standard deviations which are calculated based on daily returns across ten years, five years, and three years. The measures are ten year volatility, five year volatility, and three year volatility, respectively.

Like stocks, mutual funds also have beta and alpha coefficients, very common statistics used by investors to assess the investments' expected risk and return. Beta coefficient measures the fund's sensitivity to market movement. In other words, beta measures the volatility of the fund in comparison to the market as a whole (the computation of beta coefficient requires a benchmark, such as the S&P 500). A beta greater than 1 indicates greater volatility than the overall market, and a beta less than 1 indicates less volatility than the benchmark. It is important to note that beta only signifies the fund's market-related risk, which is relative level of volatility compared to the market. A low beta does not imply that the fund has a low level of volatility. Standard deviation is a measure of a fund's absolute volatility. The alpha coefficient measures the risk-adjusted return of an investment. Using beta, alpha's computation compares the fund's performance to that of the benchmark's risk-adjusted returns. If a fund has an alpha of one, it means that the fund outperformed the benchmark by 1%, given the same amount of risk. Beta and alpha are related to systematic risks, specifying how closely the funds follow market strategies. Standard deviation is related to unsystematic risks, which is resulted from the abnormal investments by the fund managers.¹⁰

¹⁰ Abnormal investments are investments with risk-return profiles that do not fit the category of the fund

III.C.2. Collecting data and Time period

This empirical analysis will specifically examine the volatility across 10-year span, 5-year span, and 3-year span. Data is collected over the period of December 2005 - November 2014. I chose this time period since a 10-year span is commonly considered long-term, and data is more likely to be available in recent years. Although the analysis does not focus on the volatility of the funds in comparison to the market movement, it is interesting to look at this period, given the sharp turn of the market from the boom, before 2007 (when the financial crisis started), to bust, after 2007. Managers face greater challenges during a fluctuating market and the level of the funds' volatility-resistance, which is highly associated with the ability to control risk of the fund managers, is more visible. Thus, it is easier to compare the funds' volatility during a chaotic period than a stable time period. If the funds yield high returns before the crisis, but struggle during the crisis, this indicates a low resistance to volatility. On the other hand, if the funds yield moderate returns, but persist this level of return over time and do not fluctuate significantly during the bear market, these funds are consistent in performance. This is the focus of comparison in the empirical analysis.

Gender-specific management is certainly not the only potential factor that accounts for the level of volatility of a fund. We need to identify other underlying attributes to control for these factors before making any comparisons. The data for these factors must be recorded accordingly. I will record the ten year volatility, five year volatility, three year volatility, management structure, genders of the managers, the fund styles (either equity or fixed-income), and turnover ratio for each fund in the dataset. All equity funds are recorded with alpha and beta using the S&P 500 benchmark (the benchmark must be consistent for the funds to be comparable). Fixed-income funds that invest primarily in corporate bonds are based on the

Barclays Capital Aggregate Bond Index, and fixed-income funds that invest primarily in Treasury/Municipal bonds are based on the Barclay's Capital Municipal Bond Index.

The investment style of a fund is significantly correlated to the volatility of the fund's performance. For example, a fund that allocates assets in established large companies is less likely to fluctuate in its performance than a fund with assets heavily allocated in new small companies. Similarly, high yield bond funds are more prone to volatility than other bond funds. I recorded the funds' Morningstar investment styles for all funds in this dataset.

The second piece of information that is helpful to analyze the volatility is the turnover ratio of the fund. The turnover ratio indicates the fund's trading activity, which is computed by taking the number of purchases or sales and dividing by the average monthly net assets (defined by Morningstar). Barber and Odean (2001) find a relationship between the turnover ratio and the performance outcome of an investment. According to their findings, excessive trading results in diminishing returns and higher volatility.

III.C. 3 Regression Model

I will run the following Ordinary Least Squares (hereinafter OLS) regressions using the dataset to estimate the impact of female participation in equity funds' management (equation (1)) and in fixed-income funds' management (equation (2)) on the level of volatility associated with the funds' returns. The empirical results will help to answer the following questions. First, is there a statistical difference in volatility between funds managed by individual males and individual females in the short-term, intermediate-term, and long-term? The same question can be asked when comparing funds managed by team with a female manager versus funds managed by all-male managers. This method also allows access to the risk-reward profile and the

$$\begin{aligned}
Volatility_i = & \beta_0 + \beta_1 Team_i + \beta_2 Female_i + \beta_3 Growth_i + \beta_4 Small_i + \beta_5 Medium_i \\
& + \beta_6 Turnover_i + u_i
\end{aligned} \tag{1}$$

where: $Volatility_i$ = one of the five volatility measures for fund i as defined previously
 $Team_i$ = a dummy variable equal to 1 if fund i is managed by a team, 0 otherwise
 $Female_i$ = a dummy variable equal to 1 if the management of fund i involved at least one female managers, 0 otherwise
 $Growth_i$ = a dummy variable equal to 1 if fund i is a growth fund and 0 otherwise¹¹
 $Small_i$ = a dummy variable equal to 1 if fund i invests in small-cap companies and 0 otherwise
 $Medium_i$ = a dummy variable equal to 1 if fund i invests in mid-cap companies and 0 otherwise
 $Turnover_i$ = the turnover ratio of fund i

$$\begin{aligned}
Volatility_i = & \beta_0 + \beta_1 Team_i + \beta_2 Female_i + \beta_3 HighIncome_i + \beta_4 Turnover_i \\
& + u_i
\end{aligned} \tag{2}$$

where: $Volatility_i$ = one of the five volatility measures for fund i as defined previously
 $Team_i$ = a dummy variable equal to 1 if fund i is managed by a team, 0 otherwise
 $Female_i$ = a dummy variable equal to 1 if the management of fund i involved at least one female managers, 0 otherwise
 $HighIncome_i$ = a dummy variable equal to 1 if fund i is a high income fund and 0 otherwise
 $Turnover_i$ = the turnover ratio of fund i

corresponding category of the funds, with respect to gender specific management, to examine whether women are more likely to manage funds with lower level of risk or there is no significant difference in the level of risk between funds managed by males and funds managed by females.

¹¹ Morningstar classifies equity funds across two dimensions: investment styles (growth, blend, value) and the market capitalism sizes of the stocks in the funds' portfolio (large cap, mid-cap, small cap). Among equity funds, large value is the least risky and small growth is the most risky. The model omits a dummy variable for mid-cap to separate from small cap because a test running the regression with mid-cap dummy variable included yields very insignificant estimated coefficient for this variable, and the goodness of fit is better when this variable is omitted.

IV. Empirical Analysis and Results

The analysis aims to find out whether the participation of female managers has an impact on the volatility of a mutual fund. The hypothesis is that the participation of female managers lowers the measures of volatility. The regression results show that the participation of woman in fund management lowers the ten-year volatility of an equity fund's return by 0.9062 on average. This gap is narrowed to 0.6654 and 0.5768 for five-year volatility and three-year volatility of equity mutual funds, respectively. However, no significant correlations are found between gender-specific management and the level of volatility for fixed-income funds. Furthermore, we observe no differences in alpha and beta measures between funds managed by males and funds managed by females or teams with at least one female. These results are consistent with the findings by Niessen and Ruenzi that investments of female managers have lower unsystematic risk, but no significant difference in systematic risk compared to that of male managers.¹² This analysis will examine the differences in unsystematic risk concerning gender-specific financial styles by looking at the standard deviation of returns over ten years, five years, and three years; and examine the differences in systematic risk by looking at alpha and beta.

IV.A Unsystematic risk

Long-term investments are riskier than short-term investments because long-term investments are subject to unforeseen events that can significantly alter the outcomes. The same

¹² Systematic risk is related to the market level of risk tolerance necessary to achieve a certain level of return, often observed with the measures of alpha and beta, which compare risk and risk-adjusted return to a benchmark. Unsystematic risk is the additional risk that the investors are willing to take by betting on an unusual prospect of return. High unsystematic risk associates with high standard deviation, which measures the spread of the returns. These findings imply that both female and male fund managers follow risk strategies that are close to the market. But male managers pursue more active investment styles; their investments are prone to higher volatility. This pattern is also recognized by Li et al. (2012) but they use the term idiosyncratic risk to address unsystematic risk. (See footnote 5)

argument can also be applied to compare the levels of volatility of mutual funds between long term and short term. Therefore, it is not surprising that ten year volatility is greater than five year volatility and three year volatility for a majority of mutual fund in the dataset. For example, the average ten year volatility, five year volatility, and three year volatility of the equity fund sample are 16.75, 14.99, and 11.04, respectively (author's calculation using the sample). As such, the ten year period of time is a strong test for the managers' resistance to volatility. That is, if gender-specific financial management styles do make a difference in the outcomes of the funds, then the difference is most evident when we compare the ten year volatility between the male and female groups. Furthermore, the time frame chosen in this study consist of stock market crash and the financial crisis in 2007-2008 makes the test more significant; a low measure of ten year volatility is a strong statistical evidence for the high level of managerial resistance to the market volatility. Hence, this analysis will primarily look at the correlation between ten year volatility and the female dummy variable. To put this in perspective, I also consider the regressions with five year volatility and three year volatility as dependent variables. The results of regressions for the samples of equity funds and fixed-income funds are presented in Tables IV.A.1.

We find that all else equal, on average, the ten year volatility of equity mutual funds managed by individual female manager or a team with at least one female manager is 0.9062 lower compared to that of equity mutual funds managed by individual male manager or an all-male management team. This result is significant at the 1% level. Consistent with the conjecture discussed previously, the impact of gender-specific management is less observable in intermediate and short term.

Table IV.A.1. Ordinary least squares regressions of volatility measures, management characteristics, and fund categories.

Cell content:	Coefficient β (SE (β))				
Panel A: Equity Funds (N = 314)					
	Dep. Var.= 10 year volatility	Dep. Var.= 5 year volatility	Dep. Var.= 3 year volatility	Dep. Var. = beta	Dep. Var. = alpha
Team	-0.434 (0.3327)	-0.1002 (0.3042)	0.0042 (0.2387)	-0.02793 (0.0343)	-0.5789 -0.396
Female	-0.9062 *** (0.3511)	-0.6654 ** (0.3211)	-0.5768 ** (0.2519)	0.03159 (0.0362)	0.0824 -0.418
Growth	0.5423 * (0.3049)	0.849 *** (0.2788)	1.0643 *** (0.2188)	0.05276 * (0.0315)	-0.4556 -0.363
SmallCap	3.1538 *** (0.3727)	3.5046 *** (0.3408)	2.638 *** (0.2674)	0.06736 * (0.0385)	-3.0229 *** -0.4437
MidCap	1.7316 *** (0.4017)	1.644 *** (0.3674)	1.1673 *** (0.2883)	0.03865 (0.0415)	-2.0224 *** -0.4783
Turnover	0.008126 *** (0.0011)	0.00573 *** (0.0010)	0.006118 *** (0.0008)	0.000116 (0.0001)	-0.01128 *** -0.00132
Adjusted R ²	0.35	0.37	0.4	0.12	0.31
F-statistics	27.79	28.44	34.48	1.61	23.49
Panel B: Fixed-income Funds, Corporate Bonds (N = 116)					
	Dep. Var.= 10 year volatility	Dep. Var.= 5 year volatility	Dep. Var.= 3 year volatility	Dep. Var. = beta	Dep. Var. = alpha
Team	0.0153 (0.3598)	-0.179 (0.3568)	-0.2194 (0.3307)	-0.0861 (0.1263)	0.9501 * 0.5295
Female	-0.0095 (0.3920)	-0.023 (0.3887)	-0.0028 (0.3603)	0.0253 (0.1376)	0.3391 0.5768
HighYield	5.8471 *** (0.3531)	4.4968 *** (0.3501)	3.2325 *** (0.3245)	0.4772 *** (0.1239)	2.8219 *** 0.5196
Turnover	0.000144 (0.0013)	0.000258 (0.0013)	0.00071 (0.0012)	6.15E-05 (0.0005)	-6.4E-05 0.001957
Adjusted R ²	0.72	0.61	0.48	0.1	0.21
F-statistics	71.46	43.61	26.32	4.15	8.27

Panel C: Fixed-income Funds, Treasury and Municipal Bonds (N = 48)					
	Dep. Var.= 10 year volatility	Dep. Var.= 5 year volatility	Dep. Var.= 3 year volatility	Dep. Var. = beta	Dep. Var. = alpha
Team	-0.193 (0.5530)	-0.2214 (0.4637)	-0.3129 (0.4839)	-0.0951 (0.1257)	-0.1146 -0.5504
Female	0.7248 (0.5476)	0.5216 (0.4592)	0.538 (0.4792)	0.1435 (0.1244)	-0.0838 -0.545
HighIncome	4.3758 *** (0.6051)	2.811 *** (0.5074)	2.9362 *** (0.5295)	0.6698 *** (0.1375)	-0.3539 -0.6022
Turnover	-0.010599 * (0.0059)	-0.00934 * (0.0050)	-0.01199 * (0.0052)	-0.00284 * (0.0013)	0.005735 -0.00588
Adjusted R ²	0.56	0.43	0.43	0.37	0
F-statistics	15.6	9.52	9.79	7.76	0.47

Notes: *** 1% significance, ** 5% significance, * 10% significance

Source: Author's calculation based on Morningstar data of U.S. equity funds and U.S. fixed-income funds from December 2005 to November 2014.

The participation of female managers lowers the five year volatility by 0.6654 and the three year volatility by 0.5768. Both statistics are significant at the 5% level. It is noteworthy that management structure is not a significant determinant of the funds' volatility level according to the results of this regression model.

The results for equity funds do not hold for fixed-income funds. The estimated coefficients of the female dummy variable in the first three columns in Panel B and Panel C are not statistically significant. Thus, we cannot reject the null hypothesis which states that management with respect to genders has no impact on the volatility level. One possible explanation is that the managerial skills are not visible across fixed-income funds.

U.S. equity funds account for the largest proportion of all mutual funds. Unlike fixed-income funds, equity funds' primary source of asset growth is capital return, which changes accordingly to the performance of the stocks in the portfolios. Therefore, equity mutual funds are

subject to high volatility compared to fixed-income funds. Since the returns of equity mutual funds are not pre-determined, managerial abilities, such as picking stocks and making timely trading decisions, have a substantial impact on the performance of the funds. Based on these characteristics of equity mutual funds, it is relevant to assume that differences in the outcome of gender-specific management are most observable among equity mutual funds. For this reason, the insignificant correlations between gender-specific management and the level of volatility of other types of funds are not necessarily inconsistent with the results for the same relationship found in equity funds.

IV.B Systematic Risk

The coefficients of the female dummy variables in the last two columns of Table VI.1 demonstrate systematic risk regarding gender-specific financial styles. Neither beta nor alpha as the dependent variable yields a statistically significant coefficients of the female dummy variable, indicating that both male and female pursue similar risk strategies with respect to the market benchmark.

V. Conclusion

The results concerning unsystematic and systematic risk behaviors between male and female managers imply that both male and female managers set the same risk strategy when constructing the portfolio of their funds, but male managers are more willing to take in a risky investment which does not correspond to the strategy, but rather has potential high returns.

These findings are consistent with prior studies across behavioral finance literature that examines gender-specific investing styles. Women demonstrate the ability to make strategic financial decision at the same level as men do. However, they are more likely to weight risk over

return and perform consistently according to their investing strategies. As a result, assets managed by women are less volatile than those managed by men.

VI. Limitations and Recommendations

Although the results show that the participation of women in fund management lowers the volatility of the mutual funds in the long-term, we cannot generalize these results beyond U.S. equity funds. First, the regression results also show that the differences are not significant for fixed-income funds. Furthermore, there are many variations of asset allocations rather than equity and fixed-income funds that this study does not investigate.

The author also recognizes that the sample used in this analysis has several shortcomings that may lead to inaccurate results. Although we have a large sample size, only a very small number of funds are managed by individual women. For team with at least one female manager, the weight of their contribution to the decisions made by the team is unknown. Therefore, the results built on pooling funds managed by female and funds managed by teams with female managers are less reliable.

The third problem we may encounter lies in the conclusions drawn upon the results. Although we may have empirical evidence to show that women outperform men and the outcomes of their investments are more consistent, it can be that the competitive environment of finance only allows the best to climb to the top. This selective problem is a major source of bias for our sample choice because all women in our sample are highly educated and talented. Therefore, we cannot generalize that women in general have the same level financial ability so they can excel in the field.

Nonetheless, the results of this study are consistent with previously studies. Since this study is supported by both empirical evidence and theory, the conclusions drawn upon this study's empirical results can be considered as a different insight into the topic. A way to improve the study can be tracing the performance of female and male individuals in terms of their market capitalization, which allows one to access the total net assets they manage and the performance of their investments in terms of risk-adjusted returns and volatility.

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