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Three Essays On Gender Diversity

Renee Oyotode Epse Adebile

THREE ESSAYS ON GENDER DIVERSITY

A Dissertation

by

RENEE OYOTODE EPSE ADEBILE

Submitted to Texas A&M International University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

August 2018

Major Subject: International Business Administration (Finance Concentration)

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ABSTRACT

Three Essays On Gender Diversity (August 2018)

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Recently, there has been significant debate on the leadership role of women. This dissertation supplements this discussion by revisiting the impact of gender diversity on firms and investors. The first chapter tests the relationship between board gender diversity and bondholders. Using data from US corporate bonds, I examine the impact of board gender diversity on bond terms and bondholders' returns. I find that firms with gender-diverse boards have better bonds terms. They have lower yields, higher ratings, larger issue size, and shorter maturity. I also find that bondholders require fewer returns from firms with gender-diverse boards. However, the effect is more pronounced when at least 29.67% of the firm's board of directors is women. This paper supplements the findings that board gender diversity is essential for bondholders.

The second chapter investigates the relationship between institutional investors and abnormal accruals and tests the moderating effect of board gender diversity on this relationship. I find that board gender diversity and independent institutional investors with long-term investment and concentrated ownership (ILTIS) increase earning quality. In fact, I find a significant negative relationship between board gender diversity and abnormal accruals. I also

find a negative and significant relationship between independent institutional investors with long-term investment and concentrated ownership (ILTIS) and abnormal accruals. However, when I include the interactions between these strong governance mechanisms, there is a decrease in earnings quality. This result shows that the association of a gender diverse board with independent institutional investors with long-term investment and concentrated ownership (ILTIS) leads to overmonitoring, which leads to a reduction in the earnings quality.

The third chapter tests the impact of gender diversity on socially conscious investors. I test if value-prone investors are also affected by gender stereotyping. I find that socially conscious investors invest less in socially conscious mutual funds with a gender-diverse management team. The reluctance of socially conscious investors to invest in these funds is not due to poor performance but to the reluctance to apply some of the social values, such as diversity and equal employment diversity.

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INTRODUCTION

With increasing focus on women empowerment, it is inevitable to explore "the role of women" in our modern society. Female leaders although limited in numbers have proven that they play a leadership role as good as men and better in many cases. According to Dollar, Fisman and Gatti (2001), female leaders are less likely to be involved in corruption. Higher women representation at the Parliament in a particular country is associated with the lower degree of corruption (Dollar, Fisman and Gatti (2001)). Female leaders are less likely to lie or deceive to obtain a monetary payoff (Dreber and Johannesson (2008)) and more likely to exhibit altruistic behavior even if altruism is costly (Andreoni and Vesterlund (2001)).

In the last decades, the need to understand female leadership has intensified. With the appointment of Mrs. Hillary Clinton as a major party nominee, the debate about female leadership is fiercely raging in political, social and academic circles. Although the majority of recent media articles put forward the notion that the first female candidate is better equipped to be president based on her experience (Lee (2016); Newmyer (2016)), the general public still find it difficult to trust her. They question her morality and trustworthiness (Clement and Balz (2016)).

In the corporate setting, while proponents in favor argue that female leaders are adequately equipped to lead, the number of women leaders is still limited. In fact, women represented sixty percent of the workforce worldwide but only six percent of them reached the corporate top executive and CEOs position in 2013 (Baker (2014)). Recent data published in June 2016 shows that the percentage of female CEOs among the Fortune 500 companies has dropped to 4.2%. The number firms with female CEOs dropped from 24 to 21 (Zarya (2016)).

This dissertation follows the model of *The Journal of Finance*.

This dissertation is an attempt to address the role of women in the corporate setting and contributes significantly to better understanding the role played by gender diversity.

Existing research on the role of gender diversity in the corporate setting looks at the impact of female CEOs, directors and mutual fund managers. Martin, Nishikawa and Williams (2009) find that stock market considers female CEO as more risk-averse and less likely to make risky decisions. Female CEO appointments are associated with a shift in market risk. In fact, they find that market risk is significantly lower after the appointment of female CEOs. Further, female CEOs are more conservative in their decision makings and associated with lower earnings management (Yu, Lord, Peni and Vähämaa (2010)). Looking at the impact of women on the board of directors, Adams and Ferreira (2009) find that board gender diversity is associated with stronger monitoring and lower agency risk. Gender diverse boards are more likely to control and question managers' strategies and decisions. Gender diverse boards also improve firm valuations, increase accounting informativeness by reducing earnings management (Fields, Fraser and Subrahmanyam (2012); Srinidhi, Gul and Tsui (2011)).

Looking at female managers, Atkinson, Baird and Frye (2003) find that there is a difference in investors' choice of fixed income funds based on gender. Investors invest less in fixed income mutual funds managed by women than the ones managed by men. Thus, they are affected by gender stereotyping. Using equity funds, Niessen and Ruenzi (2006) find that female managed funds use less risky investment strategies and have lower turnover meaning female managers are less overconfident. Thus, they have a less extreme loss and more persistent performance. However, despite their performance stability, female fund managers are only more likely to be employed by families of funds that face a risk of discrimination lawsuits.

The purpose of this dissertation is to contribute and expand the literature on gender diversity in three essays. The first essay discusses the impact of board gender diversity on bondholders. I examine whether board gender diversity proxied by the percentage of women on the board affects bond terms and bondholders' returns. In this essay, I assume that since board gender diversity facilitates access to reliable information and stronger governance (Peni and Vähämaa (2010)), firms will have a lower default risk and bondholders will be able to accurately evaluate it (Ajinkya, Bhojraj and Sengupta (1999); Bhojraj and Sengupta (2003); Sengupta (1998)). Thus, firms with gender diverse board will issue safer bonds and bondholders will require lower returns for holding these bonds.

Consistent with my assumption, I find that firms with gender diverse boards issue less risky bonds. The bonds have lower yields, higher ratings, shorter maturity and larger issue sizes. This result is stronger after controlling for firm, board and bond characteristics. I also find that bondholders require lower returns from these firms. However, the effect is more pronounced when board gender diversity is higher than 29.67%. This essay has two main implications. First, it shows that bondholders should look at the composition of the board of director when they decide to invest in corporate bonds. Second, it shows that firms with board gender diversity higher than 29.67% will have a lower cost of debt.

The second essay studies the impact of board gender diversity and institutional investors on accruals management. In this analysis, I suggest that the association of independent institutional investors with long-term investment and concentrated ownership with board gender diversity leads to overmonitoring, which affect abnormal accruals. To test this assumption, I introduce board gender diversity as the moderator of the relationship between independent institutional investors with long-term investment and concentrated ownership and abnormal

accruals. This essay has two main contributions. First, it revisits the relationship between earnings quality and institutional investors by assessing the impact of a specific type of institutional investors on abnormal accrual. Second, the analysis shows how a specific type of institutional investors coupled with a gender diverse board affects earnings quality.

In line with existing literature, the results find that board gender diversity and independent institutional investors with long-term investment and concentrated ownership are two governance mechanisms that can independently constrain managers' misbehavior (Srinidhi, Gul and Tsui (2011); Wang (2014)). However, firms that have both mechanisms will face an overmonitoring problem. This overmonitoring will motivate managers to manage earnings in order to satisfy both a gender diverse board and independent institutional investors with long-term investment and concentrated ownership. This result is significant after controlling for fixed effects and alternative specification for gender diversity and earnings management.

Finally, the third essay examines the effects of gender diversity on socially conscious investors. I test whether gender diversity in the management of socially conscious Mutual funds affects Investors' decision to invest in these funds? The main assumption is that gender stereotyping also affect socially conscious investors' decision making. Thus, they discriminate between socially conscious mutual funds base on gender. However, contrary to previous research on mutual funds, I compute Gender diversity as the percentage of female managers in a team. This measure allows me to test the effects on both team-managed and single-managed mutual funds.

Overall the findings show that socially conscious investors are reluctant to invest in the socially conscious mutual funds with higher gender diversity. In fact, I find that socially conscious funds with high gender diversity have lower fund inflow. This result is significant

when I control for measurement bias and the financial crisis. I successfully showed that while investors choose to invest in socially conscious funds because of the values that they support. They are also significantly affected by gender stereotyping. They do not trust in socially conscious mutual funds with gender-diverse management teams.

CHAPTER I

BOARD GENDER DIVERSITY AND CORPORATE BONDS: EVIDENCE FROM THE UNITED STATES

1.1 Introduction

Gender diversity on the board is a significant topic for policymakers and investors around the world. For example, the Norwegian and Spanish governments mandate boards to have at least forty percent women representation (Terjesen, Sealy and Singh (2009)). Recently, emerging countries like India made it mandatory for firms to have at least one woman on the board (Afsharipour (2015)). In the U.S., board gender diversity is part of the set of the recommendations developed by the National Association of Corporate Directors Blue Ribbon Commission (Carter, Simkins and Simpson (2003)).

For investors, especially shareholders, board gender diversity is a signal for a firm's future performance. They react positively to the inclusion of female directors on the board. Kang, Ding and Charoenwong (2010) show that shareholders' returns increase after the appointment of female board directors in Singapore firms. In fact, they find positive cumulative abnormal returns on the day of and the day after the appointment of a female board member. Positive reaction to the appointment of female board members is also true for Australian and Spanish firms (Adams, Gray and Nowland (2011); Campbell and Mínguez-Vera (2008)). However, there is limited research on gender diversity and bondholders' returns. Research studying the link between board gender diversity and creditors mainly focuses on bank loans (Fields, Fraser and Subrahmanyam (2012)). In this research, I propose to examine the effect of board gender diversity on bondholders. More precisely, I investigate whether board gender

diversity proxied by the percentage of women on board impacts bond terms and bondholders' returns.

Existing literature shows that the availability of reliable public information allows bondholders to accurately evaluate firms' default risk and reduce their agency and information risk (Bhojraj and Sengupta (2003)). Board gender diversity facilitates the access to reliable information (Peni and Vähämaa (2010); Yu, Lord, Peni and Vähämaa (2010)). Thus, board gender diversity will have a positive impact on bondholders since they would be able to evaluate the firm's risk more accurately and reduce agency and information risk. Firms with gender diverse boards will offer bonds with lower yields, higher ratings, shorter maturity and larger issue sizes. For abnormal bond returns, bondholders will require lower returns for holding these bonds.

To the best of my knowledge, this is the first comprehensive study to examine the effects of board gender diversity on bondholders using US data. The previous study that attempted to test this relationship looked only at bond yield, corporate leverage and used Japan data (Harris (2014); Stepanova and Rabotinskiy (2014); Tanaka (2014)). This analysis has two parts. I first test the impact of gender diversity on the board on the bond structure. I analyze the relationship between gender diversity and the yield, rating, maturity, and size of corporate bonds. Second, I test how the expectations inherent to the bond terms reflect in the bondholders' returns.

The results show that firms with gender-diverse boards offer bonds with better structure. I find that companies with gender-diverse boards offer less risky bonds in terms of yield, rating, maturity and issue size. For the abnormal bond returns, I find that bondholders require less abnormal return for firms with gender-diverse boards. However, the effect is more pronounced when the firm has at least 29.67% of women on the board. In fact, I find negative and significant

abnormal returns when the board gender diversity of a firm is higher than 29.67%. Consistent with prior studies, this finding shows that bondholders estimate that board gender diversity is associated with lower default risk (Searat (2017)).

These findings are essential for researchers, practitioners, bondholders, and creditors. For researchers, the study supplements the existing research on the relationship between corporate governance and bondholders. It shows that firms with gender-diverse boards provide bonds with better terms. Bondholders require lower returns from these firms. It allows showing that Tanaka (2014) findings are applicable also to other countries .i.e. the United States. For practitioners, this study shows that more women participation on boards leads to a reduction in agency costs of debt. However, an increase of women participation on boards to at least 29.67% of the board might help bondholders to notice. For bondholders and other creditors, this study shows that the presence of a gender-diverse board is a signal that firms have low default risk and better bond structure.

This essay is organized as follows: Section 1.2 discusses the theory, framework used, and hypotheses development; Section 1.3 discusses the methodology used to test the hypotheses and data collection; Section 1.4 presents the results of the analysis of bond terms and returns, and section 1.5 presents the conclusions.

1.2 Literature review and hypotheses development

The main assumption of this essay is that board gender diversity has an important impact on bondholders. In this section, I outline the theoretical literature that supports this assumption. First, I revisit the existing research on the relationship between bondholders and the board of directors. Then, I provide about the channels through which board gender diversity mitigate this relationship. Especially, I discuss how board gender diversity reduces the agency and

information risk of the bondholders. Finally, I develop a set of hypotheses to empirically test the effect of gender diverse boards on bond terms (yield, rating maturity, issue size) and bondholders' returns.

1.2.1 How does of the board of directors affect bondholders?

The agency theory examines the agency relationship and the issues that can arise from the relationship between the firm's owners and management (Jensen and Meckling (1976)). The theory assumes that the firm's owners and management must have the same goal, but sometime their interests might differ. These differences in interests, along with asymmetric information, lead to agency problems. To reduce these problems, shareholders have put in place governance mechanisms to monitor the management. The board of directors and debt are two important governance mechanisms used to discipline and control managers. The board of directors, in theory, monitors the management on behalf of the shareholders. Its role is to outline and authorize significant business decisions and corporate strategy and oversee risk management (Tirole (2010)). The primary goal of the board is to make sure that shareholders' and managers' incentives are aligned and maximize the long-term wealth of shareholders (Jensen and Meckling (1976)). Meanwhile, Debt forces managers to spend the surplus of cash flows and to generate enough cash flows for future debt repayment (Wei and Yermack (2011)). Bondholders control managers' behavior through stricter covenants and enforcement in case of violation (Jha, Shankar and Prakash (2015)). However, these mechanisms can come into conflict with each other.

The board of directors can favor shareholders to the detriment of bondholders through wealth expropriation and risk shifting. The board might strengthen the position of shareholders relative to bondholders, resulting in firms' accepting high-risk projects that benefit shareholders but expropriate debtholders. Bondholders of firms with pro-shareholder boards receive a lower

return (Fields, Fraser and Subrahmanyam (2012)). In fact, they can increase shareholders' wealth by pushing managers to invest in a riskier project. This action is more likely to increase shareholders' returns while reducing bondholders' returns. To protect themselves against wealth expropriation, bondholders will be sensitive to the board characteristics and adjust their bond choice based on this sensitivity (Anderson, Mansi and Reeb (2004)).

To understand this conflict, research has analyzed the impact of different board characteristics on bondholders. Based on the assumption that bondholders are concerned with the board of directors' characteristics that affect the financial accounting process, Anderson, Mansi and Reeb (2004) study the impact of board size and independence on bond yield. They find that firms with large and independent boards have lower corporate bond yields. They concluded that bondholders interpret size and independence as characteristics that reduce the board's ability to expropriate wealth. Following the same line of research, Bhojraj and Sengupta (2003) examine the impact of outside board members and institutional ownership on bond ratings and yield. They find that boards with a higher percentage of outside directors are associated with lower yield and higher bond ratings. This shows that the percentage of outside directors has a significant impact on bondholders.

Missing from these studies is the test of the impact of an important board characteristic: board gender diversity. In the following section, I will discuss how board gender diversity can mitigate the conflict between the board of directors and bondholders.

1.2.2 How does board gender diversity affect the bondholders?

Board gender diversity is defined as the percentage of female directors on the board. The higher the percentage of female directors on the board, the more diverse the board is. Board gender diversity is an important characteristic that affects the ability of managers to expropriate

bondholders' wealth. It allows bondholders to evaluate the default risk of a firm accurately. Given that board gender diversity facilitates access to reliable public information for bondholders ((Gul, Srinidhi and Ng (2011); Gul, Srinidhi and Tsui (2012)). This ease of access to reliable public information leads to reductions in agency risk and information risk. These two dimensions of risk are significantly associated with the board's ability to expropriate bondholders' wealth (Bhojraj and Sengupta (2003)).

Agency risk is the risk that managers expropriate wealth from both bondholders and shareholders (Jensen and Meckling (1976)). This risk is reduced in firms with stronger governance (Bhojraj and Sengupta (2003)). Research on board gender diversity reveals that a firm with a gender-diverse board shows stronger governance (Kang, Ding and Charoenwong (2010)). In fact, gender-diverse boards have explicit definitions of criteria for measuring corporate strategies and monitoring the implementation of these strategies (Brown, Brown and Anastasopoulos (2002)). They also exhibit better communication within the board and with shareholders. Moreover, they foster transparency and reduce the effect of the "old boys' network" (Terjesen, Sealy and Singh (2009)). Increasing board gender diversity enhances the board's ability to control managers since female directors are more likely to question managers' decisions. It also enhances the strategic role of the board in reducing the likelihood of taking risky decisions (Kang, Ding and Charoenwong (2010)). These characteristics of board gender diversity reduce the agency risk, which, in turn, reduces the probability of wealth expropriation from the bondholders.

Information risk, the second dimension of risk faced by bondholders, refers to the risk that management has private information that can increase the probability of expropriation of bondholders' wealth (Bhojraj and Sengupta (2003)). Board gender diversity can reduce this risk

by prompting firms to disclose information properly. For instance, women's traits such as conservatism, risk aversion, and ethical behavior influence the quality of earnings (Peni and Vähämaa (2010)). In fact, gender diverse boards are likely to have high-quality earnings due to the "value-commitment" of the members and the "disciplining incentive" that come from it (Srinidhi, Gul and Tsui (2011)). Gender diverse boards also have stronger monitoring, independent thinking, and more significant activism (Carter, Simkins and Simpson (2003)). These boards are more likely to undertake activities that foster higher accuracy of earnings forecasts and corporate disclosure. Finally, board gender diversity increases stock price informativeness by reducing volatility in the stock market (Srinidhi, Gul and Tsui (2011)).

In sum, board gender diversity is a characteristic that reduces bondholders' wealth expropriation by providing the reliable information needed to evaluate default risk. It fosters a reduction in agency and information risk and favors the disclosure of more credible public information. In the following section, I hypothesize the effect of board gender diversity on bond terms (yield, rating, maturity, issue size) and bondholders' returns.

1.2.3 Hypothesis development

Based on the argument that board gender diversity reduces bondholders' wealth expropriation through a reduction in agency and information risks, I formulate the hypothesis that bondholders will be sensitive to board gender diversity. The following is a discussion of the channels through which board gender diversity affects bond terms (yield, rating maturity, issue size) and bondholders' returns.

Board gender diversity and bond terms

In this section, I discuss the impact of gender diversity on bond terms and develop testable hypotheses. First, I examine the impact of gender diversity on bond yield and ratings.

Bond yield and ratings are determined by the likelihood that a firm can default and the amount of safety provided to bondholders (Bhojraj and Sengupta (2003)). Specifically, yields are lower and ratings are higher when default risk is lower. Sengupta (1998) finds that firms with detailed and precise disclosure have lower default risk and a lower cost of borrowing. Since gender-diverse boards enhance the quality of available information, then I expect that the default risk will be lower. Thus, I hypothesize:

Hypothesis 1: An increase in board gender diversity is associated with lower bond yields

Hypothesis 2: An increase in board gender diversity is associated with higher bond ratings

Next, I examine the effect of gender diversity on maturity. Bonds with longer maturity are riskier than bonds with shorter maturity. They have significant exposure to interest-rate risk. More precisely, for any change in interest rate, changes in bond prices are higher, when the maturity is longer (Hopewell and Kaufman (1973)). Also, bonds with longer maturity are associated with higher yields and lower ratings (Bhojraj and Sengupta (2003)). Since I expect firms with gender diverse board to have lower risk, lower yields and higher ratings; I can assume that they will also issue bonds with shorter maturity. This leads to the following hypothesis:

Hypothesis 3: An increase in board gender diversity is associated with bonds with shorter maturity

Finally, bond issue size is also an important bond term. It represents the amount that is borrowed when the bond is offered. It is highly affected by the probability that a firm can repay its debt. If bondholders anticipate a high probability of default or wealth expropriation, they may choose not to lend. However, if they anticipate lower default or expropriation risk, they will provide the debt with some restrictions. To make this decision, bondholders need to have access to reliable information to evaluate the default risk (Armstrong, Guay and Weber (2011)). A

gender-diverse board provides bondholders with easy access to transparent and credible information. Thus, I can assume that a bond's issue size will be larger for the firm with a gender-diverse board. This leads to the following hypothesis:

Hypothesis 4: An increase in board gender diversity is associated with larger bond issue size.

Board gender diversity and abnormal bond returns

Since bondholders interpret firms with gender-diverse boards as less risky, I hypothesize that firms with gender-diverse boards are more likely to issue bonds with lower yields, higher ratings, shorter maturity and larger issue sizes. In this section, I test for differences in average abnormal returns for firms with gender-diverse boards and firms without them.

According to Cremers, Nair and Wei (2007), abnormal bond returns mimic the expected bonds yields. Bondholders require lower returns from firms that issue bonds with lower yields, because these firms have lower default or expropriation risk. Since firms with gender diverse boards issue bonds with lower yields, I expect that bondholders will face lower default and expropriation risk. This leads to the following hypothesis:

Hypothesis 5: Increase in board gender diversity is associated with lower abnormal bond returns

The abnormal bond returns represent the difference between the bond returns and the bond benchmark returns. The benchmark returns are computed using rating and maturity (Bessembinder, Kahle, Maxwell and Xu (2009)).

1.3 Data and methodology

To test the previous hypotheses, I collect data for bond, board, CEO and financial characteristics. My sample is composed of firms that have available data for all the characteristics. Below, I discuss the sources of the bond, board, CEO and financial

characteristics. Then, I summarize the sample characteristics and description. Finally, I present the methodology used to test my hypotheses and provide a description of the variables used in the analysis.

1.3.1 Data sources

For the empirical analysis, I use five different databases: the Trace Reporting and Compliance Engine (TRACE), Bloomberg, Institutional Shareholder Services (ISS), EXECUCOMP, and the Federal Reserve database. Also, I collect financial data from COMPUSTAT.

I collect the bond level data from TRACE, Bloomberg, and the Federal Reserve. TRACE is a database introduced on July 1, 2002 that provides information about individual bond trades. It was first introduced on July 1, 2002. It provides the bond identification information, maturity, coupon, price, yield, and investment grade. I follow Bessembinder, Kahle, Maxwell and Xu (2009) for cleaning the data and drop the canceled, corrected, and commission trades. I also drop the trades categorized as "when issued," "special price," and "as of" trades, as well as any trade with special conditions. Also, I remove all trades under $100,000. Further, I only include bonds that have been traded at least 100 times from 2002 to 2014 to control for the fact that bonds trade less frequently. I restrict the dataset to non-zero coupon bonds with semi-annual coupon payments that mature within 1 to 50 years. Since TRACE provides intraday data, I convert the data into quarterly data. Following, Dick-Nielsen, Feldhütter and Lando (2012), I collect data for all bond trades on the last day of the last month of the quarter when the bond was last traded. This process allows me to control for infrequent trading.

Based on Bloomberg, I collect other bond characteristics such as ratings, issue size, date of original issue, and information concerning the industry group, convertibility, and

denomination of bonds. I restrict the dataset to industrial, non-convertible, non-puttable, and U.S.-denominated bonds. I further include bonds which are rated by Moody's and S&P, without any default and with a par value of $1,000. Then, I merge these two datasets with the treasury benchmark yields with a time to maturity of 1 to 30 years from the Federal Reserve database to compute the quarterly yield spreads.

Next, I collect data on gender diversity, the board, the CEO, and the firm's financial characteristics from ISS, EXECUCOMP, and COMPUSTAT. ISS provides annual data on boards of directors originated from proxy statements, annual reports, and SEC filings. This data provides me with the gender, age, tenure, independence status, and ownership status of each director. It is also used to compute the board size. EXECUCOMP provides data on CEO ownership, CEO compensation, a firm's volatility, and sales growth. Finally, COMPUSTAT offers a comprehensive financial profile of firms. I collect information on total assets, the market value of the firm, sales, long-term debt, current debt, the total liability, and net income.

To be included in the analysis, information about the firm-year observation must be provided for all of the six databases for the period of 2007 to 2014 for bond data and 2006 to 2013 for the other variables. Then, I require these firms to be non-financial and non-regulated. Finally, I winsorize the data in the 1st and the 99th percentiles to remove outliers. Merging the dataset and applying these requirements generates a sample of 1087 firm-year observations on 319 firms. I summarize the data sources and measurements of each variable in Appendix A.

I also report the descriptive statistics for the dataset in Table 1.1. I find that, on average, firms have at least 16.8952% women on their boards. While relating this percentage to the average board size, I find that, on average, firms have between 1 and 2 women on their boards (16.8952%*11.0295). However, the maximum number of women on a board is 5 (40%*16).

These statistics show that while many firms' boards include women, the number of female board members is still quite low. In fact, Terjesen, Sealy and Singh (2009) suggest that firms need three or more female board members for women to have a significant impact on management behavior. According to this requirement, more than half of the firms in the sample might not have enough women on their boards to profit from their impact.

Table 1.1
Descriptive statistics

This table contains data for 1087 firm-years observation for 15,537 bonds for the year 2007 to 2014. Note that except for the bond data, all the other variables are collected from 2006 to 2013. The bond data are collected quarterly. The main variables are defined as followed: Y*ield* is measured at firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. *Gender diversity variable* is measured as the percentage of female directors on the board. *Abnormal returns* refer to the firm level bond abnormal returns computed following Bessembinder, Kahle, Maxwell and Xu (2009).

	Obs.	Mean	SD.	Min	Max
Bond Characteristics					
Yield	15,537	1.509	1.290	0.166	7.666
Rating	15,537	4.173	1.002	1.000	6.000
Maturity	15,537	13.395	7.964	3.000	31.000
Investment grade	15,537	0.818	0.371	0.000	1.000
Bond age	15,537	3.752	3.696	0.000	19.000
Issue size(log)	15,537	13.130	0.594	11.918	14.626
Board Characteristics					
Gender diversity	15,537	16.895	8.651	0.000	40.000
Board size	15,537	11.029	2.022	7.000	16.000
Independent directors (%)	15,537	83.077	9.389	55.556	93.333
Director with >4 board (%)	15,537	2.745	4.551	0.000	18.182
Directors with tenure>15 years (%)	15,537	14.199	13.176	0.000	55.556
Director with zero ownership (%)	15,537	3.705	8.212	0.000	50.000
Gender diversity dummy	15,537	0.191	0.393	0.000	1.000

(Continued)

Table 1.1 Descriptive statistics *–Continued*

Variable	Obs.	Mean	SD.	Min	Max
Gender diversity> median	15,537	0.487	0.500	0.000	1.000
percentage of female independent directors	15,537	15.652	8.262	0.000	44.444
Blau index	15,537	26.585	11.649	0.000	48.000
Critical mass	15,537	0.244	0.429	0.000	1.000
CEO characteristics					
CEO total compensation	15,537	10103.0	6253.2	1228.3	35813.3
CEO salary and bonus	15,537	1244.1	731.5	377.6	6181.3
CEO ownership	15,537	0.499	1.403	0.001	12.124
CEO option granted	15,537	1982.1	2175.0	0.00	12074.4
CEO duality	15,537	0.671	0.470	0.000	1.000
CEO gender	14,797	0.077	0.266	0.00	1.000
Financial characteristics					
Firm size (log of total asset)	15,537	9.796	1.192	7.074	12.230
Leverage	15,537	0.274	0.118	0.066	0.672
Return on assets	15,537	6.639	4.908	-12.722	22.469
Book to market ratio	15,537	0.429	0.292	-0.052	1.570
3 year sales growth	15,537	5.951	9.565	-31.844	38.946
Margin	15,537	0.066	0.049	-0.127	0.225
Standard deviation of returns	15,537	0.018	0.008	0.006	0.086
Abnormal accruals	15,537	0.068	0.170	0.000	3.297
Other variables					
Abnormal returns	141,724	0.0120	5.665	-98.150	92.391
Number of analysts	15,533	19.615	7.679	1.000	54.000

Table 1.2 provides the distribution of the sample by year and industry. From the yearly distribution, I observe a significant increase in the average number of bonds per firm. In fact, the average number of bonds issued per firm increased from 4.85 in 2007 to 17.3556 in 2014. The distribution shows that firms are issuing more and more bonds. However, these numbers need to be taken with caution, because they are due to the increased availability of Trace data and CEO

ownership. Trace data was created in 2002 and became more comprehensive in 2005 (Ederington, Guan and Yang (2013)). Data on CEO ownership and abnormal accruals were not available for most of the firms in 2007, 2008, and 2009.

Table 1.2
Sample distributions

This table provides the distributions of the sample comprised of 319 firms with 1087 firm years' observations. Panel A presents the distribution by year. Panel B presents the distribution by industry. It also provides the percentage of firms with gender diversity higher than 0% and percentage of firms with gender diversity higher than 25%. Finally, the table provides the number of female directors per firms.

Panel A: Sample distribution by Fiscal year

fiscal year	number of issues	Issues/ Firms	Gender diversity>0 (%)	Gender diversity >25% (%)	Total number of female directors	Female directors/Firms
2007	68	4.8571	64.29%	14.29%	18	1.29
2008	101	5.3158	68.42%	15.78%	22	1.25
2009	179	6.6296	77.78%	7.41%	33	1.22
2010	1,628	11.5461	83.69%	12.06%	221	1.57
2011	2,218	12.2541	84.53%	11.05%	282	1.56
2012	3,268	14.7873	84.62%	14.93%	363	1.64
2013	3,927	16.0286	84.49%	17.96%	421	1.72
2014	4,148	17.3556	89.12%	16.74%	439	1.84
Total	15,537	14.2935			1799	1.66

Panel B: Sample Distribution by Fama-French Industry Classification

Industry description	All firms	Gender diversity>0 (%)	Gender diversity>25 (%)
Business Equipment	145	79%	13%
Chemicals and allied products	84	93%	18%
Consumer durable	23	100%	17%
Consumer nondurable	110	93%	30%
Health Care, Medical Equipment, Drugs	114	96%	11%
Manufacturing	245	81%	8%
Oil, Gas and Coal Extraction and Production	146	68%	2%
Others	62	85%	27%
Wholesale, Retail and some services	158	90%	23%
Total	1087	85%	15%

Next, the percentage of firms with at least one woman on the board increases by nearly 25%. The percentage increased from 64.26% to 89.12% from 2007 to 2014. More firms included at least one woman on their board. This situation can be explained by the increased emphasis by policymakers and researchers on the importance of women on the board (Fields, Fraser and Subrahmanyam (2012); Gul, Srinidhi and Tsui (2012)). I observe a similar progression in the total number of women on the board for all the firms for each year. However, the average number of women on the board per firm was less than two from 2007 to 2014. Also, the percentage of firms with 25% gender diversity has been less than 18% for all eight years. This distribution shows that while many firms have included women on board, only a few of them have more than 25% women on board. The percentage of firms with at least 25% women on their boards is even lower in 2009 when it drops merely to 7.41%.

From the industry distribution, I find that the sample is composed of a more significant number of manufacturing firms (245) followed by firms in wholesale, retail and some services sector (158). However, the percentage of firms with at least one woman on board is higher in the consumer durable industry (100%), the healthcare, medical equipment, and drug industries (96%), consumer nondurable industry (93%) and chemicals and allied products industry (93%). Also, the percentage of firms with at least 25% gender diversity is higher in the consumer nondurable industry (30%), other industries (27%) and Wholesale, Retail and some services industry (23%). Similar to the yearly distribution, I notice a significantly higher percentage of firms with at least one woman on their boards, but a very low percentage of firms with 25% women on board. For example, while all the firms in the consumer durable industry have one woman on the board, only 17% of the firms have at least 25% gender diversity. In sum, data

suggest that firms are more and more willing to include women on their boards. However, they are reluctant to increase women representation to 25% on their boards.

1.3.2 Methodology and variables descriptions

In this section, I present the methodology used to test the effects of board gender diversity on bond terms and bondholders returns. I also discuss about the main variables and control variables used in my empirical analysis

Analysis of bond terms

I conduct multiple pool regressions at the firm level and then model the study to capture the impact of gender diversity on bond terms. The regression model is defined as follows:

$$\text{Bond terms variable}_{i,t} = \beta_0 + \beta_j \text{Gender Diversity}_{i,t-1} + \beta_k \text{Bond characteristics}_{i,t} + \beta_l \text{Board characteristics}_{i,t-1} + \beta_m \text{CEO characteristics}_{i,t-1} + \beta_n \text{Financial characteristics}_{i,t-1} + \varepsilon_{i,t} \quad (1)$$

The dependent variable in the above model is the bond terms proxied by the yield spread, rating, maturity, and issue size. The yield spread is measured for each bond by subtracting the yield to maturity from the yield of a Treasury security with a similar time to maturity. Then, a firm-level yield is computed by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds (Klock, Mansi and Maxwell (2005)). Following Mansi and Reeb (2002), the firm level rating is computed using Moody's and S&P ratings. It represents the average rating of the firm's bonds. The ratings are converted following the conversion process proposed by Bessembinder, Kahle, Maxwell and Xu (2009). I divide the sample into 6 rating groups (Aaa and Aa, A, Baa, Ba, B, and below B) and assign a numerical value to each group, with Aaa and Aa having a value

of 6 and below B having a value of 1. The firm-level maturity is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. The firm-level issue size is computed as the average issue size of the firm's bonds. The issue size of each bond is measured using the offering amount of each bond.

The primary independent variable is the gender diversity variable, measured as the percentage of female directors on the board. The higher the percentage of female directors on the board, the more diverse it is. Using the directors' gender (provided by ISS), I identify the number of female directors on the board. Then, I divide it by the total board size to compute the percentage of female directors. The assumption is that board gender diversity should have a significant impact on bond terms by lowering yield and resulting in better ratings, longer maturity, and larger issue size.

To investigate this relationship, I control for bond, board, CEO, and financial characteristics of the firm following prior literature (Bhojraj and Sengupta (2003); Cremers, Nair and Wei (2007); Fields, Fraser and Subrahmanyam (2012); Klock, Mansi and Maxwell (2005)). The bond characteristics include information concerning the investment grade and the age of the bonds. The choice of these variables is based on prior research on the determinant of bond yields, rating, maturity, and issue size (Bhojraj and Sengupta (2003); Klock, Mansi and Maxwell (2005)).

The analysis is based on the assumption that bondholders make their assessment of firm risks using only public information (Rajan (1992)). Thus, information concerning the board, CEO, and financial characteristic control variables need to be available at least a year before the bond trade. To maintain this assumption, gender diversity, board, CEO, and financial

characteristics are lagged for one period. Also, the use of lagged variables allows controlling for bias due to endogeneity and simultaneity problems in governance research (Fields, Fraser and Subrahmanyam (2012); Hermalin and Weisbach (2004)).

For the board characteristics, I collect data on board size, board independence, the percentage of directors with at least 15 years tenure, the percentage of directors serving on four or more boards, and the percentage of directors with no ownership. These variables have been shown to be determinants of board quality. For robustness check, I also control for shareholder protection measures like the governance index of Gompers, Ishii and Metrick (2003) and the entrenchment index of Bebchuk, Cohen and Ferrell (2009). For CEO characteristics, I control for percentage of CEO ownership, CEO current compensation (salary and bonus), and the value of the option granted, and total compensation (salary, bonus, and option granted). Research on corporate governance has argued that CEO ownership, compensation, and options increase managers' incentives to act on behalf of shareholders (Fama (1980); Jensen and Murphy (1990); Lilienfeld-Toal and Ruenzi (2014)). Thus, these elements can strengthen shareholders' position to the detriment of bondholders. Finally, regarding financial characteristics, I control for firm size, leverage, return on assets, sales -growth for the last three years, book-to-market ratio, and margin. I also control for the industries by using the Fama-French industry classification.

Analysis of abnormal bond returns

In this section, I compare the abnormal bond returns of firms based on board gender diversity. To perform this analysis, I use two dichotomous measures of gender diversity. First, I employ a widely used measure of gender diversity, an indicator that is equal to one when the percentage of women on a board is different from zero, and to zero otherwise. This indicator measures the impact of gender diversity when there is at least one female board member. It has

been used in multiple areas of research in corporate governance (Adams and Kirchmaier (2013); Srinidhi, Gul and Tsui (2011)). Next, I use a measure that takes one if gender diversity is higher than 29.67% and zero otherwise. This second measure was developed using the approach employed by Srinidhi, Gul and Tsui (2011). In fact, I determine the cutting point by looking at the graphic representation of abnormal returns as measured by the percentage of women on a company board (Figure 1). I identified 29.67% as the point at which there is a significant difference in abnormal returns based on the percentage of women on the board.

Then, I compared the mean and median abnormal bond returns and tested the significance of the differences using t-statistics and Wilcoxon sign rank tests. I use the Wilcoxon signed rank test because, as discussed by Bessembinder, Kahle, Maxwell and Xu (2009) and Ederington, Guan and Yang (2013), bond returns have high heteroscedasticity. In fact, each firm has many different bonds based on maturity, ratings, yield, and other bond characteristics. Moreover, bond returns are highly volatile. Thus, a parametric test like t-statistics might have estimation bias. The use of a non-parametric test like the signed rank test permits alleviation of any bias. Finally, I test the robustness of the effect of board gender diversity on abnormal bond returns using the propensity score matching method.

The firm-level bond abnormal returns are computed following the methodology used by Bessembinder, Kahle, Maxwell and Xu (2009) and revised by Ederington, Guan and Yang (2013). I first calculate the two days bond returns for nth bond from day t-1 to t+1 as follow:

$$\text{Bond return}(t\text{-}1,\, t\text{+}1)_n = \frac{\left(P_{n,\,t+1} - P_{n,t-1}\right) + \Delta AI_n}{\left(P_{n,t-1} + AI_{n,\,t-1}\right)} \qquad (2)$$

Where AI_n is the accrued interest $P_{n,\,t-1}$, is the trade-weighted price of bond 'n' at event date't' and $P_{n,t-1}$ is the trade-weighted price of bond 'n' at day prior to the event date. ΔAI_n is the change in accrued interest from t-1 to t+1.

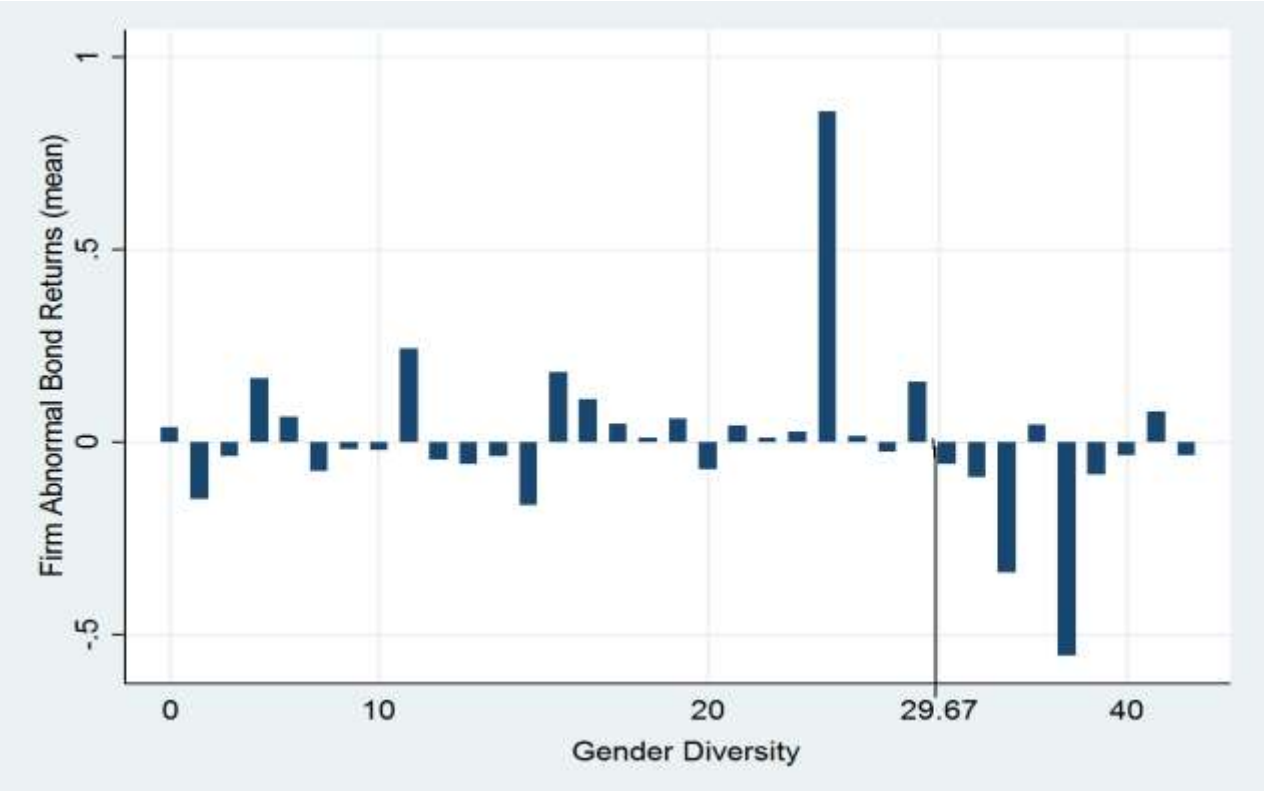

Figure 1: Graphical representation of abnormal returns as measured by the percentage of women on the board. The figure reports the mean of firm Abnormal Returns is the mean value of all firm abnormal bond returns from 2007 to 2014 with respect to the specified percentage of women on the board (gender diversity).

Then, I calculated the abnormal bond returns as the difference between the bond returns and the mean returns on 24 rating/maturity benchmark portfolios. Following Ederington et al. (2013), I created 24 maturity/ratings benchmark portfolios composed of 6 rating groups (Aaa and

Aa, A, Baa, Ba, B, and below B) by using Moody's and S&P ratings, and 4 maturity groups (1 to 3 years, 3 to 5 years, 5 to 10 years or over 10 years). Finally, firm-level abnormal returns are computed as the weighted average of abnormal returns for individuals' bonds, where the weight is the price of the bond divided by the total price of all the bonds of a firm.

1.4 Results

This section provides the results from the empirical analysis. First, I present the main results. Then, I present the results from the further analyses and robustness checks done to test the validity of my results.

1.4.1 Main results

Table 1.3 presents the results from the pooled ordinary least squares regression conducted to test the impact of gender diversity on bond terms at the firm level. Model 1 includes bond yield as a dependent variable. Model 2 includes rating as a dependent variable. Model 3 includes maturity as a dependent variable. Finally, Model 4 includes issue size as a dependent variable. I control for bond, board, CEO, and firm financial characteristics.

For the bond yield, I find that an increase in board gender diversity is associated with lower bond yield, supporting Hypothesis 1. In fact, the coefficient of -0.003 on gender diversity is significant ($p<0.01$). Based on this coefficient, one standard deviation increase in gender diversity leads to a decrease in bond yield of 2%. I obtain this percentage by multiplying the coefficient (-0.003) by the standard deviation of gender diversity (8.6505) divided by the standard deviation of bond yield [(-0.003*8.6505)/1.2896)*100]. When I translate this effect in basis point, I find that yield decreases by 2.59 basis points.

For bond rating, I find that an increase in board gender diversity is associated with higher bond ratings, supporting hypothesis 2. I uncover a positive and significant coefficient on gender

(0.002, p<0.01). In fact, one standard deviation in gender diversity increases the bond rating by 1.73% [(0.002*8.6505)/1.0019)*100]. These results show that bondholders who invest in corporate bonds from firms with gender-diverse boards have access to safer and less risky bonds. They are less likely to face default. Thus, it will be a safer choice to invest in bonds of firms with gender-diverse boards.

For maturity, I find that an increase in gender diversity is associated with shorter bond maturity. In fact, a one standard deviation increase in gender diversity reduces maturity by

Table 1.3

Main regressions

This table presents the pooled OLS regression results for the relationship between bond terms and gender diversity. I control for bond, board, CEO, firm financial characteristics. Model1 includes *yield* as the dependent variable. Model 2 includes *rating* as the dependent variable. Model 3 includes *maturity* as the dependent variable. Finally, model 4 includes *issue size* as the dependent variable. Y*ield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. *Gender diversity variable* is measured as the percentage of female directors on the board. Bond data are collected for the period 2007 to 2014. The other characteristics are collected for the period 2006 to 2013. All models include industry as a control variable. t-statistics in parentheses. *, **, *** indicate p-value less than 0.1, 0.05 and 0.01 respectively.

	(1) Yield (-)	(2) Rating (+)	(3) Maturity(-)	(4) Issue size (+)
Gender diversity	-0.003***	0.002***	-0.033***	0.001***
	(-4.043)	(2.692)	(-4.787)	(3.424)
Bond Characteristics				
Investment grade	-0.984***	0.575***	2.596***	-0.059***
	(-46.189)	(37.406)	(14.096)	(-5.803)
Bond age	0.035***	0.005***	1.008***	-0.060***
	(20.255)	(3.728)	(67.831)	(-73.100)

(Continued)

Table 1.3 Main regressions –*Continued*

	(1) Yield (-)	(2) Rating (+)	(3) Maturity(-)	(4) Issue size (+)
Board Characteristics				
Board size	-0.01***	0.063***	0.213***	-0.025***
	(-3.226)	(23.038)	(6.437)	(-13.864)
Independent directors (%)	-0.006***	-0.001	0.022***	0.000
	(-7.614)	(-1.020)	(3.461)	(0.039)
Directors with > 4 board (%)	0.005***	-0.006***	-0.026**	0.006***
	(3.472)	(-6.179)	(-2.062)	(9.004)
Directors with tenure >15 years (%)	-0.001***	0.001**	-0.016***	0.001**
	(-2.716)	(2.412)	(-3.546)	(2.369)
Director with zero ownership (%)	0.000	-0.004***	-0.006	0.002***
	(0.127)	(-7.182)	(-0.935)	(6.144)
CEO Characteristics				
CEO total compensation	0.000	-0.000***	-0.000*	0.000***
	(1.447)	(-18.222)	(-1.942)	(8.763)
CEO salary and bonus	-0.000	0.000***	0.001***	0.000***
	(-1.524)	(5.695)	(6.652)	(-6.922)
CEO ownership (%)	0.034***	0.000	0.002	0.001
	(6.949)	(0.110)	(0.047)	(0.436)
CEO option granted	-0.042***	-0.029***	0.178**	-0.046***
	(-4.753)	(-4.564)	(2.360)	(-11.214)
CEO duality	-0.00***	0.000***	-0.000***	-0.000
	(-5.274)	(11.202)	(-2.048)	(-0.465)
Financial Characteristics				
Firm size	-0.268***	0.354***	0.710***	0.375***
	(-34.448)	(63.089)	(10.563)	(101.841)
Leverage	1.186***	-1.599***	-2.398***	0.598***
	(19.237)	(-35.968)	(-4.500)	(20.462)
Return on Assets	-0.579***	1.308***	4.312***	-0.060
	(-5.645)	(17.677)	(4.864)	(-1.239)

(Continued)

Table 1.3 Main regressions –*Continued*

	(1) Yield (-)	(2) Rating (+)	(3) Maturity(-)	(4) Issue size (+)
Book to Market ratio	0.740***	-0.640***	1.098***	0.031**
	(26.129)	(-31.286)	(4.482)	(2.275)
3 Year sales growth	-0.003***	-0.005***	-0.022***	0.001**
	(-4.106)	(-9.658)	(-3.723)	(2.214)
Margin	55.45***	-127.3***	-429.3***	6.777***
	(5.408)	(-17.219)	(-4.842)	(1.393)
Standard deviation of return	43.52***	-11.95***	66.773***	2.810***
	(43.949)	(-16.735)	(7.798)	(5.981)
Abnormal accruals	0.184***	-0.195**	0.286	-0.010
	(4.953)	(-7.286)	(0.891)	(-0.577)
Industry classification	0.025***	-0.026***	0.016	0.005***
	(12,274)	(-17.458)	(0.881)	(5.399)
Constant	4.113***	0.580***	-4.335***	9.651***
	(40.066)	(7.827)	(-4.884)	(198.199)
Observations	15,537	15,537	155,37	15,537
R-squared	0.641	0.690	0.296	0.619

3.58%, and the coefficient is significant at 1% [(-0.033*8505)/7.9643)*100]. This represents a reduction in maturity at three and a half months. Hypothesis 3 is supported. This result shows that firms with gender-diverse boards consider that bonds with longer maturity are riskier. They prefer to issue bonds with shorter maturity to reduce the bond riskiness.

Finally, for bond issue size, I find that an increase in gender diversity is associated with a larger bond issue size, supporting hypothesis 4. A one-standard-deviation increase in gender diversity raises the bond issue size by 0.87% [(exp (0.001*8.6505) -1)*100]. This result means

that a firm with a bond issue size of $500,000 will increase that size to $504,350.The results are similar when I include year fixed effects and firm fixed effects (Table 1.4).

In short, I find support for all of the hypotheses. In fact, I find that firms with higher levels of board gender diversity are associated with bonds with lower yields, better ratings, shorter maturity and larger issue sizes.

Table 1.4

Fixed effects regressions

This table presents fixed effects regression results on the relationship between bond terms and gender diversity. I control for bond, board, CEO, financial characteristics. Model 1 uses *yield* as the dependent variable. Model 2 uses *rating* as the dependent variable. Model 3 uses *maturity* as the dependent variable. Model 4 uses *issue size* as the dependent variable. Y*ield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. *Gender diversity variable* is measured as the percentage of female directors on the board. Bond data are collected from TRACE and Bloomberg from 2007 to 2014. Other characteristics are collected from 2006 to 2013. Panel A includes the Year fixed effects. Panel B includes the firm fixed effects. t-statistics in parentheses. *,**,*** indicate p-value less than 0.10, 0.05 and 0.01 respectively

Panel A: Year Fixed effects				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Gender diversity	-0.003***	0.001**	-0.031***	0.001**
	(-3.312)	(2.111)	(-4.608)	(3.606)
Bond Characteristics				
Investment grade	-0.958***	0.526***	2.592***	-0.053***
	(-46.184)	(34.74)	(13.978)	(-5.224)
Bond age	0.035***	0.005***	1.009***	-0.060***
	(20.97)	(4.141)	(67.993)	(-73.142)
Board Characteristics				
Board size	-0.003	0.053***	0.220***	-0.024***
	(-0.886)	(19.373)	(6.540)	(-13.184)
Independent Directors (%)	-0.005***	0.001	0.027***	-0.000
	(-6.464)	(1.150)	(4.175)	(-0.108)

(Continued)

Table 1.4 Fixed effects regressions - *Continued*

Panel A: Year Fixed effects				
	(1)	(2)	(3)	(4)
	Yield (-)	rating (+)	Maturity (-)	Issue size (+)
Directors with > 4 board (%)	0.007***	-0.009***	-0.028**	0.006***
	(4.71)	(-8.574)	(-2.247)	(9.179)
Directors with tenure >15 years (%)	-0.002***	0.001**	-0.015***	0.001**
	(-3.132)	(2.427)	(-3.484)	(2.541)
Director with zero ownership (%)	-0.001	-0.002***	-0.011	0.002***
	(-1.158)	(-4.319)	(-1.582)	(5.243)
CEO Characteristics				
CEO total compensation	-0.000	-0.000***	-0.000**	0.000***
	(-0.115)	(-13.606)	(-2.139)	(7.710)
CEO salary and bonus	-0.000	0.000***	0.001***	-0.000***
	(-1.572)	(6.90)	(6.740)	(-7.035)
CEO ownership (%)	0.011**	-0.010***	-0.05	0.004*
	(2.20)	(-2.818)	(-1.155)	(1.762)
CEO option granted	-0.000***	0.000***	-0.000	0.000
	(-5.305)	(8.544)	(-1.634)	(0.186)
CEO duality	-0.063***	-0.058***	0.079	-0.05***
	(-6.636)	(-8.245)	(0.927)	(-10.100)
Financial Characteristics				
Firm size	-0.248***	0.346***	0.748***	0.376***
	(-32.73)	(62.57)	(11.041)	(-101.14)
Leverage	1.119***	-1.572***	-2.372***	0.602***
	(18.643)	(-35.864)	(-4.421)	(20.462)
Return on Assets	-0.531***	1.131***	4.280***	-0.04
	(-5.325)	(15.556)	(4.809)	(-0.828)
Book to Market ratio	0.678***	-0.610***	1.170***	0.035**
	(24.456)	(-30.148)	(4.725)	(2.546)
3 Year sales growth	-0.004***	-0.004***	-0.028***	0.001*
	(-5.258)	(-7.507)	(-4.375)	(1.866)
Margin	50.67***	-109.9***	-424.248***	4.869
	(5.087)	(-15.122)	(-4.766)	(0.997)
Standard deviation of return	51.54***	-24.42***	82.419***	4.192***
	(43.118)	(-27.998)	(7.716)	(7.153)
Abnormal accruals	0.188***	-0.158***	0.369	-0.013
	(5.230)	(-6.022)	(1.147)	(-0.744)
Industry classification	0.026***	-0.027***	0.014	0.005***
	(12.829)	(-18.711)	(0.761)	(5.389)
Constant	3.673***	0.911***	-5.512***	9.608***
	(35.657)	(12.121)	(-5.989)	(190.269)

(Continued)

Table 1.4 Fixed effects regressions - *Continued*

Panel A: Year Fixed effects				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Year FEs	X	X	X	X
Observations	15,537	15,537	15,537	15,537
R-squared	0.63	0.702	0.296	0.608
Panel B: Firm Fixed effects				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Gender diversity	-0.002*	0.001**	-0.033**	0.003***
	(-1.691)	(2.406)	(-2.184)	(4.996)
Bond Characteristics				
Investment grade	0.477***	0.030***	9.002***	0.174***
	(12.903)	(2.810)	(25.279)	(10.548)
Bond age	0.031***	-0.003***	0.902***	-0.056***
	(19.636)	(-6.622)	(58.373)	(-77.523)
Board Characteristics				
Board size	-0.024***	-0.004**	-0.05	-0.009***
	(-3.537)	(-2.210)	(-0.762)	(-2.852)
Independent directors (%)	-0.005***	0.001	-0.039***	-0.000
	(-3.339)	(1.145)	(-2.665)	(-0.345)
Directors with > 4 board (%)	0.000	-0.001	-0.012	0.002**
	(0.219)	(-1.276)	(-0.609)	(2.254)
Directors with tenure >15 years (%)	-0.002**	-0.000*	-0.021**	-0.001*
	(-2.372)	(-1.675)	(-2.253)	(-1.758)
Director with zero ownership (%)	-0.005***	0.000	-0.028***	0.000
	(-5.803)	(0.807)	(-3.305)	(1.051)
CEO Characteristics				
CEO total compensation	-0.000	-0.000**	0.000*	-0.000*
	(-0.473)	(-2.226)	(1.796)	(-1.879)

(Continued)

Table 1.4 Fixed effects regressions – *Continued*

Panel B: Firm Fixed effects				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
CEO Salary and bonus	0.000**	0.000	-0.000*	-0.000*
	(-8.435)	(0.623)	(0.199)	(1.125)
CEO ownership (%)	-0.125***	0.003	0.029	0.007
	(1.774)	(-3.280)	(-0.191)	(0.970)
CEO option granted	0.001	0.006**	0.093	-0.013***
	(0.083)	(2.011)	(0.971)	(-2.935)
CEO duality	-0.000	-0.000***	-0.000	-0.000
	(-0.379)	(-4.042)	(-1.378)	(-0.120)
Financial Characteristics				
Firm size	-0.794***	0.104***	-1.264***	0.240***
	(-16.236)	(7.290)	(-2.681)	(10.971)
Leverage	1.137***	-0.348***	-2.667*	0.319***
	(7.700)	(-8.081)	(-1.874)	(4.840)
Return on Assets	-0.244	0.916***	-2.317	-0.574***
	(-1.273)	(16.377)	(-1.255)	(-6.712)
Book to Market ratio	1.083***	0.062***	0.098	-0.037*
	(21.669)	-4.244	(0.203)	(-1.656)
3 Year sales growth	-0.004***	-0.001***	0.006	0.000
	(-4.181)	(-2.588)	(0.640)	(0.482)
Margin	24.114	-91.75***	228.27	257.312***
	(1.261)	(-16.444)	(1.239)	(6.710)
Standard deviation of return	23.015***	-1.749***	14.329	-3.707***
	(19.976)	(-5.200)	(1.290)	(-7.202)
Abnormal accruals	0.014	-0.022**	-0.009	0.002
	(0.385)	(-2.061)	(-0.026)	(0.150)
Constant	8.443***	3.318***	20.518***	10.919***
	(18.112)	(24.388)	(4.567)	(52.427)

(Continued)

Table 1.4 Fixed effects regressions – *Continued*

Panel B: Firm Fixed effects				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Firm FEs	X	X	X	X
Observations	15,537	15,537	15,537	15,537
R-squared	0.166	0.038	0.210	0.304

1.4.2 Further analysis and robustness checks

In this section, I attempt to analyze further the impact of gender diversity on bond terms and test the robustness of the primary results. First, based I test the effects when the female directors are independent

- **The effect of gender diversity is stronger if the female director is independent**

Research on board gender diversity has found that stakeholders are more receptive when the female director is independent. However, they are less receptive when the female director is a CEO or internal to the organization. In fact, in an equity market, studies show that investors respond positively to gender diversity when women are independent directors (Kang, Ding and Charoenwong (2010); Lee and James (2007)). In the bond market, Tanaka (2014) found using data from Japan that independent female directors have a significant impact on the cost of debts. To examine this relationship, I generate a new measure of gender diversity, which is the percentage of independent female directors on the board. Then, I conduct a regression analysis. The dependent variables in these regressions are still the bond terms, but the independent variable is the percentage of independent female directors. The control variables are the same.

Table 1.5 provides the results for independent female directors. I find that the percentage of independent female directors has a stronger effect on bond terms. For the bond yield, I find that an increase in the percentage of independent female directors is associated with a lower

bond yield. In fact, a coefficient of -0.004 for gender diversity is significant (p<0.01). Based on this coefficient, one standard deviation increase in the percentage of female independent directors leads to a decreased bond yield of 2.68% [(-0.004*8.6505)/1.2896)*100].

Table 1.5

Impact of gender diversity when women are independent directors

This table present OLS regression results for the relationship between bond terms and the percentage of female independent directors. I control for bond, board, CEO, financial characteristics. Model 1 uses yield as the dependent variable. Model 2 uses rating as the dependent variable. Model 3 uses maturity as the dependent variable. Model 4 uses issue size as the dependent variable. Bond data are collected from TRACE and Bloomberg from 2007 to 2014. Other characteristics are collected from 2006 to 2013. Y*ield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. *Gender diversity variable* is measured as the percentage of female directors on the board. *% independent female directors* refer to the percentage of independent female directors on the board. t-statistics in parentheses. *,**,*** indicate p-value less than 0.10, 0.05 and 0.01 respectively.

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
% independent female directors	-0.004***	0.003***	-0.031***	0.001**
	(-5.103)	(5.178)	(-4.273)	(2.209)
Bond Characteristics				
Investment grade	-0.985***	0.577***	2.593**	-0.059***
	(-46.262)	(37.535)	(14.074)	(-5.822)
Bond age	0.035***	0.005***	1.009***	-0.060***
	(20.337)	(3.631)	(67.85)	(-73.080)
Board Characteristics				
Board size	-0.012***	0.063***	0.213***	-0.025***
	(-3.173)	(22.96)	(6.442)	(-13.836)
Independent directors (%)	-0.005***	-0.001**	0.025***	-0.000
	(-6.598)	(-1.991)	(3.905)	(-0.131)
Directors with > 4 board (%)	0.005***	-0.006***	-0.024*	0.006***
	(3.539)	(-6.174)	(-1.934)	(8.891)

(Continued)

Table 1.5 Impact of gender diversity when women are independent directors -*Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Directors with tenure >15 years (%)	-0.001***	0.001**	-0.015***	0.001**
	(-2.701)	(2.529)	(-3.405)	(2.208)
Director with zero ownership (%)	0.000	-0.004***	-0.006	0.002***
	(0.181)	(-7.292)	(-0.941)	(6.181)
CEO Characteristics				
CEO total compensation	0.000	-0.000***	-0.000**	0.000***
	(1.410)	(-18.295)	(-2.058)	(8.89)
CEO salary and bonus	-0.000	0.000***	0.001***	-0.000***
	(-1.301)	(5.416)	(6.777)	(-6.947)
CEO ownership (%)	0.034***	0.000	0.002	0.001
	(7.006)	(0.009)	(0.050)	(0.463)
CEO option granted	-0.000***	0.000***	-0.000*	-0.000
	(-5.258)	(11.309)	(-1.921)	(-0.607)
CEO duality	-0.043***	-0.028***	0.168**	-0.046***
	(-4.927)	(-4.374)	(2.220)	(-11.139)
Financial Characteristics				
Firm size	-0.268***	0.353***	0.696***	0.376***
	(-34.639)	(63.247)	(10.386)	(102.394)
Leverage	1.178***	-1.597***	-2.483***	0.602***
	(19.138)	(-35.958)	(-4.663)	(20.598)
Return on Assets	-0.585***	1.318***	4.339***	-0.064
	(-5.707)	(17.830)	(4.893)	(-1.309)
Book to Market ratio	0.733***	-0.633***	1.057***	0.031**
	(25.826)	(-30.936)	(4.304)	(2.326)
3 Year sales growth	-0.003***	-0.005***	-0.022***	0.001**
	(-4.371)	(-9.089)	(-3.667)	(2.00)
Margin	56.047***	-128.432***	-432.261***	7.130
	(5.47)	(-17.371)	(-4.875)	(1.466)
Standard deviation of return	43.501***	-11.833***	67.867***	2.731***
	(44.01)	(-16.598)	(7.938)	(5.822)
Abnormal accruals	0.186***	-0.197***	0.296	-0.010
	(5.012)	(-7.367)	(0.922)	(-0.581)
Industry classification	0.026***	-0.027***	0.019	0.005***
	(12.583)	(-17.860)	(1.085)	(5.330)
Constant	4.080***	0.606***	-4.546***	9.656***
	(39.64)	(8.166)	(-5.105)	(197.66)

(Continued)

Table 1.5 Impact of gender diversity when women are independent directors -*Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Observations	15,537	15,537	15,537	15,537
R-squared	0.641	0.691	0.296	0.619

For bond rating, I uncover a positive and significant coefficient on the percentage of female independent directors (0.003, $p<0.01$). In fact, one standard deviation in gender diversity increases the bond rating by 2.59% [((0.003*8.6505)/1.0019)*100]. For maturity, I find a negative and significant at 1%. In fact, one standard deviation shows that an increase in the percentage of female directors reduces maturity by only 3.36% [((-0.031*8.6505)/7.9643)*100]. Finally, for the bond issue size, I find a similar effect in magnitude, direction, and significance ($p<0.01$). One standard deviation increase in the percentage of female directors increases the bond issue size by 0.87% [(exp (0.001*8.6505)-1)*100].

- **The effect of gender diversity is stronger even after controlling for the 2008 financial crisis**

The financial crisis was a period of high turbulence for the bond market. In fact, during the crisis, credit and liquidity risks were very high and significantly affected bond terms (Shin and Kim (2015)). To ensure that the results are not driven by the effect of the 2008 financial crisis, I conduct the regression analysis while excluding the years 2007, 2008, and 2009. Table 1.6 provides the results of this analysis.

I find that the effect of gender diversity on the bond terms is significant and similar to the main results. For bond yield, I find that one standard deviation change in gender diversity decreases bond yield by 2.68% [((-0.004*8.6505)/1.2896)*100), $p<0.01$].

Table 1.6
Results without the years 2007, 2008, 2009

This table presents the pooled OLS regression results for the relationship between bond terms and gender diversity after excluding the years 2007, 2008, and 2009. I control for bond, board, CEO, firm financial characteristics. Model 1 includes *yield* as the dependent variable. Model 2 includes *rating* as the dependent variable. Model 3 includes *maturity* as the dependent variable. Finally, model 4 includes *issue size* as the dependent variable. Bond data are collected for the period 2007 to 2014. The other characteristics are collected for the period 2006 to 2013. *Yield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. *Gender diversity* variable is measured as the percentage of female directors on the board. t-statistics in parentheses. *, **, *** indicate p-value less than 0.1, 0.05 and 0.01 respectively.

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Gender diversity	-0.004***	0.001**	-0.031***	0.001***
	(-4.820)	(2.124)	(-4.486)	(2.851)
Bond Characteristics				
Investment grade	-1.001***	0.527***	2.634***	-0.066***
	(-48.080)	(33.979)	(13.899)	(-6.345)
Bond age	0.034***	0.004***	1.004***	-0.059***
	(20.615)	(3.302)	(66.947)	(-72.322)
Board Characteristics				
Board size	-0.010***	0.065***	0.228***	-0.025***
	(-2.609)	(23.944)	(6.843)	(-13.618)
Independent directors (%)	-0.005***	-0.001	0.024***	0.000
	(-7.082)	(-1.177)	(3.644)	(0.163)
	(-3.611)	(2.057)	(-3.713)	(2.581)
Director with zero ownership (%)	0.001	-0.004***	-0.005	0.002***
	(0.709)	(-7.140)	(-0.806)	(5.972)
CEO Characteristics				
CEO total compensation	0.000**	-0.000***	-0.000	0.000***
	(2.508)	(-18.459)	(-1.489)	(8.997)
CEO salary and bonus	-0.000	0.000***	0.001***	-0.000***
	(-1.379)	(7.161)	(6.313)	(-7.062)
CEO ownership (%)	0.011**	-0.023***	-0.005	0.006**
	(2.196)	(-5.902)	(-0.107)	(2.353)
CEO option granted	-0.000***	0.000***	-0.000**	-0.000
	(-6.480)	(11.478)	(-2.177)	(-1.367)

(Continued)

Table 1.6 Results without the years 2007, 2008, 2009 – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
CEO duality	-0.044***	-0.030***	0.148*	-0.045***
	(-5.190)	(-4.740)	(1.931)	(-10.799)
Financial Characteristics				
Firm size	-0.263***	0.348***	0.708***	0.376***
	(-35.138)	(62.415)	(10.392)	(100.931)
Leverage	1.109***	-1.676***	-2.374***	0.604***
	(18.521)	(-37.560)	(-4.358)	(20.282)
Return on Assets	-0.654***	1.194***	4.271***	-0.033
	(-6.672)	(16.343)	(4.788)	(-0.673)
Book to Market ratio	0.718***	-0.649***	1.212***	0.044***
	(26.239)	(-31.789)	(4.864)	(3.215)
3 Year sales growth	-0.003***	-0.005***	-0.024***	0.001***
	(-4.474)	(-10.813)	(-3.956)	(2.628)
Margin	63.019***	-115.9***	-425.43***	4.111
	(6.429)	(-15.878)	(-4.769)	(0.842)
Standard deviation of return	42.718***	-15.65***	67.806***	3.446***
	(42.386)	(-20.844)	(7.393)	(6.868)
Abnormal accruals	0.192***	-0.185***	0.374	-0.012
	(5.426)	(-7.022)	(1.164)	(-0.654)
Industry classification	0.025***	-0.024***	0.002	0.005***
	(12.585)	(-16.328)	(0.104)	(4.903)
Constant	4.046***	0.735***	-4.643***	9.624***
	(40.574)	(9.894)	(-5.116)	(193.833)
Observations	15,189	15,189	15,189	15,189
R-squared	0.64	0.699	0.296	0.615

Maturity is reduced by 3.36% [((-0.031*8.6505)/7.9643)*100), p<0.01]. Meanwhile, issue size is increased by 0.87% [(exp(0.001*8.6505) -1)*100), p<0.01]. However, for rating, I find that the magnitude of the effect of gender diversity is lower but remains significant. In fact, the rating is increased by only 0.86% [((0.001*8.6505)/1.0019)*100), p<0.05][1] . In sum, I observe that the

[1] Note that in the present distribution of the dataset, 2007, 2008 and 2009 represents only 2.24% of the data [((68+101+179)/15537)*100] This is due to the fact that data on CEO ownership and abnormal accruals where available for only 60 firms from 2007 to 2009. I rerun the analysis without these variables. Data for 2007, 2008, 2009 represents now 15.44% of the overall dataset [(686+1038+1910)/23540)*100].I find significant and similar results for yield, issue and maturity. For rating, I find the same coefficient but insignificant. The table for this analysis is not included in this paper, but it can be provided if required.

2008 financial crisis did not affect the relationship between board gender diversity and the bond terms.

- **The effect of gender diversity is stronger after controlling for analysts coverage**

Analysts coverage has been associated with more precision of firms information (Kim and Shi (2012); Yu (2008)). It reduces the information risk of bondholders, by reducing the probability that the managers can use private information to expropriate bondholders. To ensure the validity of the results, I include one more control variable. The control variable is the number of analysts following a firm at the latest forecast consensus. I report the results of this analysis in Table 1.7.

Table 1.7
Results are stronger after controlling for Analyst Coverage

This table present Ordinary Least Squares regression results on the relationship between bond terms and gender diversity. I control for bond, board, CEO, financial characteristics. I also control for the *number of analysts* following the firm. Model 1 uses *yield* as the dependent variable. Model 2 uses *rating* as the dependent variable. Model 3 uses *maturity* as the dependent variable. Model 4 uses *issue size* as the dependent variable. Y*ield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. *Gender diversity variable* is measured as the percentage of female directors on the board. Bond data are collected from TRACE and Bloomberg from 2007 to 2014. Other characteristics are collected from 2006 to 2013.t-statistics in parentheses. *,**,*** indicate p-value less than 0.10, 0.05 and 0.01 respectively.

	(1) Yield (-)	(2) Rating (+)	(3) Maturity (-)	(4) Issue size (+)
Gender diversity	-0.0113***	0.00129**	-0.032***	0.00172***
	(-6.497)	(2.246)	(-4.578)	(4.587)
Bond Characteristics				
Investment grade	-0.651***	0.575***	2.601***	-0.0739***
	(-13.92)	(37.24)	(14.04)	(-7.323)
Bond age	0.041***	0.005***	1.009***	-0.06***
	(11.14)	(3.841)	(67.75)	(-72.73)

(Continued)

Table 1.7 Results are stronger after controlling for Analyst Coverage – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Board Characteristics				
Board size	0.007	0.064***	0.218***	-0.02***
	(0.797)	(22.99)	(6.501)	(-11.46)
Independent directors (%)	-0.012***	0.0003	0.023***	0.0012***
	(-7.254)	(0.588)	(3.562)	(3.495)
Directors with > 4 board (%)	0.003	-0.006***	-0.03**	0.007***
	(0.996)	(-6.156)	(-2.054)	(10.03)
Directors with tenure >15 years (%)	-0.005***	0.0008**	-0.015***	0.0005**
	(-4.184)	(2.236)	(-3.479)	(2.179)
Director with zero ownership (%)	-0.0003	-0.004***	-0.007	0.002***
	(-0.175)	(-7.225)	(-1.038)	(6.280)
CEO Characteristics				
CEO total compensation	4.11e-06	-2.05e-05***	-2.61e-05**	5.06e-06***
	(1.233)	(-18.64)	(-1.971)	(7.034)
CEO salary and bonus	2.22e-05	4.24e-05***	0.0006***	-3.16e-05***
	(0.997)	(5.766)	(6.798)	(-6.574)
CEO ownership (%)	0.077***	0.003	-0.001	0.005**
	(7.248)	(0.832)	(-0.0244)	(2.285)
CEO option granted	-3.03e-05***	2.99e-05***	-6.36e-05**	2.99e-07
	(-3.886)	(11.64)	(-2.061)	(0.178)
CEO duality	0.108***	-0.085***	0.146	-0.098***
	(3.358)	(-8.048)	(1.151)	(-14.30)
Financial Characteristics				
Firm size	-0.210***	0.356***	0.709***	0.354***
	(-11.03)	(56.52)	(9.387)	(86.09)
Leverage	1.228***	-1.600***	-2.457***	0.612***
	(9.126)	(-36.03)	(-4.609)	(21.09)
Return on Assets	0.348	1.307***	4.206***	-0.0978**
	(1.550)	(17.67)	(4.735)	(-2.023)
Book to Market ratio	0.678***	-0.610***	1.170***	0.035**
	(24.456)	(-30.148)	(4.725)	(2.546)
3 Year sales growth	-0.00328**	-0.0048***	-0.024***	0.000103
	(-2.139)	(-9.393)	(-3.944)	(0.312)
Margin	-38.50*	-127.4***	-418.6***	10.47**
	(-1.718)	(-17.21)	(-4.714)	(2.165)
Standard deviation of return	66.75***	-11.99***	70.08***	1.861***
	(31.18)	(-16.96)	(8.261)	(4.030)
Abnormal accruals	0.108	-0.181***	0.270	0.00589
	(1.326)	(-6.751)	(0.841)	(0.337)

(Continued)

Table 1.7 Results are stronger after controlling for Analyst Coverage – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Industry classification	0.039***	-0.026***	0.013	0.003***
	(8.682)	(-17.74)	(0.715)	(3.321)
Other Control variables				
Number of analysts	-0.02***	0.0003	0.0008	0.007***
	(-7.507)	(0.491)	(0.0847)	(13.11)
Constant	5.414***	0.517***	-4.501***	9.632***
	(24.05)	(6.955)	(-5.046)	(198.3)
Observations	15,533	15,533	15,533	15,533
R-squared	0.329	0.691	0.296	0.625

I find that gender diversity had a similar effect on the bond terms and that the effect is significant at 1% for all of the bond terms. I find that firms with gender-diverse boards have bonds with a lower yield, higher rating, shorter maturity, and higher issue size.

- **The effect of gender diversity when I add corporate governance controls**

This analysis looks at board gender diversity as an essential governance mechanism that leads to better bond terms. However, better governance, as measured by the governance and entrenchment indices, leads to lower firm risks and better bond terms (Cremers, Nair and Wei (2007)). There is a possibility that the results are driven by corporate governance measures and not board gender diversity. To ensure that the findings are not due to corporate governance measurements but due to gender diversity, I include the governance index (G-index) and entrenchment index (E-index) and rerun the first regression. Since the G-index and E-index are only available from 2002 to 2006 and can only be extended to 2009, I recollect the data for each variable except CEO ownership from the years 2002 to 2009. The sample size drops to 2455 observations, but the results remain robust. I find that firms with gender-diverse boards issue bonds with lower yields, higher ratings, shorter maturity, and larger issue sizes. However, the

impact of gender diversity on the rating is insignificant. This robustness test is reported in Table 1.8.

Table 1.8
The impact of shareholder protection

This table presents the pooled OLS regression results for the relationship between bond terms and gender diversity. I control for bond, board, CEO, firm financial characteristics. I also control for the governance index and entrenchment index proposed by Gompers, Ishii and Metrick (2003) and Bebchuk, Cohen and Ferrell (2009) respectively. Model 1 includes *yield* as dependent variables. Model 2 includes *rating* as dependent variables. Model 3 includes *maturity* as the dependent variable. Finally, model 4 includes *issue size* as the dependent variable. Bond data are collected for the period 2007 to 2014. The other characteristics are collected for the period 2006 to 2013. *Yield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. *Gender diversity* variable is measured as the percentage of female directors on the board. t-statistics in parentheses. *, **, *** indicate p-value less than 0.1, 0.05 and 0.01 respectively.

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Gender diversity	-0.008**	0.002	-0.037*	0.005***
	(-2.139)	(1.107)	(-1.905)	(4.847)
Bond Characteristics				
Investment grade	0.257	0.171*	7.357***	-0.102
	(1.167)	(1.724)	(6.295)	(-1.573)
Bond age	0.032***	0.001	1.192***	-0.067***
	(4.777)	(0.386)	(33.191)	(-33.804)
Board Characteristics				
Board size	-0.030*	-0.001	0.395***	0.001
	(-1.692)	(-0.108)	(4.187)	(0.269)
Independent directors (%)	-0.003	-0.003*	-0.030*	-0.003**
	(-0.959)	(-1.658)	(-1.657)	(-2.564)
Directors with > 4 board (%)	0.010**	-0.010**	-0.087***	0.005***
	(2.013)	(-4.722)	(-3.354)	(3.171)
Independent directors (%)	-0.003	-0.003*	-0.030*	-0.003**
	(-0.959)	(-1.658)	(-1.657)	(-2.564)

(Continued)

Table 1.8 The impact of shareholder protection – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Directors with > 4 board (%)	0.010**	-0.010**	-0.087***	0.005***
	(2.013)	(-4.722)	(-3.354)	(3.171)
Directors with tenure >15 years (%)	-0.003	-0.014***	-0.053***	-0.002**
	(-1.104)	(-11.761)	(-3.723)	(-2.075)
Director with zero ownership (%)	0.013***	-0.007***	0.010	0.003***
	(2.974)	(-3.611)	(0.463)	(2.757)
CEO Characteristics				
CEO total compensation	-0.000	-0.000	-0.000	0.000***
	(-0.947)	(-0.180)	(-0.252)	(5.706)
CEO salary and bonus	-0.000***	0.000***	0.000***	-0.000***
	(-2.115)	(9.542)	(2.149)	(-8.409)
CEO option granted	0.000***	-0.000***	0.000	0.000***
	(4.447)	(-8.430)	(0.210)	(4.835)
CEO duality	-0.138***	-0.096***	-0.535***	0.008
	(-4.678)	(-7.200)	(-3.416)	(0.889)
Financial Characteristics				
Firm size	-0.419***	0.400***	0.998***	0.276***
	(-10.165)	(21.493)	(4.552)	(22.695)
Leverage	0.877***	-1.226***	-7.838***	0.253***
	(2.690)	(-8.338)	(-4.526)	(2.638)
Return on Assets	-2.729***	2.050***	4.050	0.330
	(-3.476)	(5.792)	(0.972)	(1.428)
Book to Market ratio	1.829***	-1.216***	-2.205***	-0.010
	(12.980)	(-19.133)	(-2.945)	(-0.237)
3 Year sales growth	-0.006	-0.006***	-0.090***	-0.004***
	(-1.356)	(-3.019)	(-4.040)	(-3.533)
Margin	269.39***	-203.80***	-407.70	-33.60
	(3.432)	(-5.758)	(-0.978)	(-1.454)
Standard deviation of return	9.180***	2.423*	-2.841	-0.204
	(2.838)	(1.661)	(-0.165)	(-0.215)
Abnormal accruals	3.038***	0.777**	-6.267	0.300
	(3.994)	(2.266)	(-1.551)	(1.341)
Industry classification	0.059***	-0.046***	-0.050	0.010***
	(5.715)	(-9.856)	(-0.920)	(3.422)
Other variables				
Governance index	-0.036	-0.051***	0.313*	-0.004
	(-1.012)	(-3.197)	(1.673)	(-0.372)

(Continued)

Table 1.8 The impact of shareholder protection – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Entrenchment index	-0.001	0.067***	0.137	-0.038***
	(-0.058)	(8.078)	(1.412)	(-6.987)
Constant	5.857***	1.466***	4.943*	10.978***
	(11.273)	(6.259)	(1.792)	(71.785)
Observations	2,455	2,455	2,455	2,455
R-squared	0.290	0.484	0.401	0.556

- **The effect of gender diversity is stronger when using alternative measures of gender diversity**

In this analysis, I measure gender diversity as the percentage of women on the board. However, the corporate governance literature provides other measures of gender diversity. To ensure that the validity of the results, I run the regressions using alternative measures of gender diversity. I construct four dichotomous measures of gender diversity.

First, I construct an indicator that is equal to one when there is at least one woman on the board. This is the most used measure of gender diversity in the literature. Then, I generate an indicator that takes one if gender diversity is higher than the median of gender diversity. Following Torchia, Calabrò and Huse (2011), I also constructed a dummy variable for the critical mass of female directors, which equals one if there are at least three women on the board. Finally, I used the Blau index of board gender diversity measured as per Harrison and Klein (2007). I find that all of the results are qualitatively similar to the primary results. In fact, I find that firms with gender diverse boards issue bonds with lower yields, higher ratings, shorter maturity, and larger issue size. The results are provided in Table 1.9.

Table 1.9
Alternative measures of gender diversity

This table present pooled Ordinary Least Squares regression results on the relationship between bond terms and gender diversity. In Panel A, Gender diversity is measured as a dummy variable that equals 1 if gender diversity is higher than 0. In Panel B, Gender diversity is measured as a dummy variable equal to 1 if gender diversity is higher than the median. In Panel C, Gender diversity is measured using the *Blau index* computed as 1- square (gender diversity) - square (1-gender diversity). In Panel D, Gender diversity is measured as the critical mass. *Critical mass* is a dummy variable equal to one if there are at least 3 women on the board. I control for bond, board, CEO, firm financial characteristics. Model 1 includes *yield* as dependent variables. Model 2 includes *rating* as dependent variables. Model 3 includes *maturity* as the dependent variable. Finally, model 4 includes *issue size* as the dependent variable. Bond data are collected for the period 2007 to 2014. The other characteristics are collected for the period 2006 to 2013. *Yield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. Bond data are collected from TRACE and Bloomberg from 2007 to 2014. Other characteristics are collected from 2006 to 2013. t-statistics in parentheses. *,**,*** indicate p-value less than 0.10, 0.05 and 0.01 respectively.

Panel A: Gender diversity dummy

	(1) Yield (-)	(2) Rating (+)	(3) Maturity (-)	(4) Issue size (+)
Gender diversity dummy	-0.099***	0.075***	-0.040	0.038***
	(-4.177)	(4.394)	(-0.195)	(3.378)
Bond Characteristics				
Investment grade	-0.977***	0.570***	2.625***	-0.061***
	(-45.830)	(37.098)	(14.234)	(-6.069)
Bond age	0.035***	0.004***	1.007***	-0.060***
	(20.379)	(3.557)	(67.663)	(-73.141)
Board Characteristics				
Board size	-0.009**	0.061***	0.210***	-0.026***
	(-2.439)	(21.616)	(6.193)	(-14.18)
Independent directors (%)	-0.006***	-0.001	0.019***	0.000
	(-7.761)	(-1.077)	(2.930)	(0.155)
Directors with > 4 board (%)	0.005***	-0.007***	-0.022*	0.006***
	(3.788)	(-6.431)	(-1.793)	(8.755)
Directors with tenure >15 years (%)	-0.001***	0.001**	-0.014***	0.001**
	(-2.556)	(2.389)	(-3.116)	(2.226)
Director with zero ownership (%)	0.000	-0.004***	-0.007	0.002***
	(0.096)	(-7.212)	(-1.106)	(6.177)

(Continued)

Table 1.9 Alternative measures of gender diversity – *Continued*

Panel A: Gender diversity dummy				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
CEO Characteristics				
CEO total compensation	0.000	-0.000***	-0.000**	0.000***
	(1.182)	(-18.070)	(-2.227)	(9.003)
CEO salary and bonus	-0.000	0.000***	0.001***	-0.000***
	(-1.586)	(5.711)	(6.493)	(-6.870)
CEO ownership (%)	0.034***	-0.000	-0.004	0.001
	(7.012)	(-0.009)	(0.092)	(0.386)
CEO option granted	-0.000***	0.000***	-0.000*	-0.000
	(-4.911)	(10.962)	(-1.677)	(-0.785)
CEO duality	-0.042***	-0.028***	0.180**	-0.046***
	(-4.846)	(-4.453)	(2.386)	(-11.134)
Financial Characteristics				
Firm size	-0.270***	0.355***	0.673***	0.377***
	(-35.930)	(63.714)	(10.072)	(102.80)
Leverage	1.179***	-1.597***	-2.504***	0.601***
	(19,148)	(-35.966)	(-4.699)	(20.568)
Return on Assets	-0.541***	1.286***	4.562***	-0.075
	(-5.284)	(17.407)	(5.148)	(-1.547)
Book to Market ratio	0.746***	-0.643***	1.136***	0.028**
	(26.350)	(-31.483)	(4.634)	(2.098)
3 Year sales growth	-0.003***	-0.005***	-0.017***	0.001**
	(-4.095)	(-9.402)	(-2.828)	(2.171)
Margin	51.676***	125.195***	454.570***	8.272*
	(5.046)	(-16.948)	(-5.129)	(1.703)
Standard deviation of return	43.6644***	-11.929***	71.015***	2.757***
	(44.197)	(-16.749)	(8.311)	(5.886)
Abnormal accruals	0.186***	-0.197***	0.268	-0.011
	(5.018)	(-7.377)	(0.834)	(-0.629)
Industry classification	0.025***	-0.026***	0.009	0.005***
	(12.224)	(-17.544)	(0.505)	(5.472)
Constant	4.142***	0.561***	-4.230**	9.640***
	(40.317)	(7.566)	(-4.759)	(197.820)
Observations	15,537	15,538	15,539	15,540
R-squared	0.641	0.691	0.295	0.619
Panel B: Gender diversity > median				
Gender diversity > median	-0.029**	0.047***	-0.645***	0.001

(Continued)

Table 1.9 Alternative measures of gender diversity – *Continued*

Panel B: Gender diversity > median

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
	(-2.209)	(4.936)	(-5.617)	(0.129)
Bond Characteristics				
Investment grade	-0.984***	0.579***	2.555***	-0.060***
	(-46.114)	(37.604)	(13.856)	(-5.889)
Bond age	0.035***	0.004***	1.010***	-0.060***
	(20.270)	(3.569)	(67.962)	(-72.986)
Board Characteristics				
Board size	-0.014***	0.065**	0.191***	-0.025***
	(-3.523)	(23.484)	(5.778)	(-13.702)
Independent directors (%)	-0.006***	-0.001	0.021***	0.000
	(-7.932)	(-1.105)	(3.366)	(0.426)
Directors with > 4 board (%)	0.005***	-0.006***	-0.026**	0.006***
	(3.594)	(-6.106)	(-2.059)	(8.821)
Directors with tenure >15 years (%)	-0.001**	0.001***	-0.016***	0.000**
	(-2.567)	(2.679)	(-3.688)	(2.060)
Director with zero ownership (%)	0.000	-0.004***	-0.006	0.002***
	(0.076)	(-7.305)	(-0.860)	(6.261)
CEO Characteristics				
CEO total compensation	0.000	-0.000***	-0.000*	0.000***
	(1.380)	(-18.437)	(-1.780)	(8.939)
CEO salary and bonus	-0.000	0.000***	0.001***	-0.000***
	(-1.714)	(5.911)	(6.358)	(-6.803)
CEO ownership (%)	0.034***	0	0.002	0.001
	(6.865)	(0.068)	(0.037)	(0.388)
CEO option granted	-0.000***	0.000***	-0.000**	-0.000
	(-5.115)	(11.348)	(-2.068)	(-0.722)
CEO duality	-0.042***	-0.028***	0.168**	-0.047***
	(-4.786)	(-4.436)	(2.226)	(-11.226)
Financial Characteristics				
Firm size	-0.269***	0.352***	0.718***	0.377***
	(-34.610)	(62.793)	(10.687)	(102.111)
Leverage	1.1177***	-1.597***	-2.472***	0.602***
	(19.100)	(-35.958)	(-4.645)	(20.614)
Return on Assets	-0.574	1.326**	4.147***	-0.069
	(-5.582)	(17.907)	(4.670)	(-1.423)
Book to Market ratio	0.740***	-0.635***	1.049***	0.029**

(Continued)

Table 1.9 Alternative measures of gender diversity – *Continued*

Panel B: Gender diversity > median

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
	(29.069)	(-31.034)	(4.276)	(2.172)
3 Year sales growth	-0.002***	-0.005***	-0.021***	0.001
	(-3.636)	(-9.680)	(-3.532)	(1.579)
Margin	54.918***	128.252***	412.844***	7.695
	(5.345)	(-17.450)	(-4.650)	(1.579)
Standard deviation of return	43.726***	-11.798***	66.156***	2.645***
	(44.148)	(-16.525)	(7.730)	(5.629)
Abnormal accruals	0.181***	-0.193***	0.253	-0.009
	(4.883)	(-7.219)	(0.788)	(-0.532)
Industry classification	0.025***	-0.026***	0.016	0.006***
	(12.109)	(-17.616)	(0.897)	(5.669)
Constant	4.121***	0.577***	-4.266***	9.648***
	(40.141)	(7.800)	(-4.809)	(198.095)
Observations	15,541	15,542	15,543	15,544
R-squared	0.641	0.691	0.297	0.619

Panel C: Blau index

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Blau Index	-0.002***	0.001***	-0.019***	0.001***
	(-3.649)	(3.325)	(-3.698)	(4.099)
Bond Characteristics				
Investment grade	-0.983***	0.575***	2.605***	-0.059***
	(-46.164)	(37.422)	(14.14)	(-5.798)
Bond age	0.035***	0.005***	1.009***	-0.060***
	(20.302)	(3.664)	(67.835)	(-73.164)
Board Characteristics				
Board size	-0.012***	0.063***	0.216***	-0.025***
	(-3.098)	(22.863)	(6.529)	(-14.012)
Independent directors (%)	-0.006***	-0.001	0.021***	0
	(-7.672)	(-1.084)	(3.325)	(-0.028)
Directors with > 4 board (%)	0.005***	-0.006***	-0.024*	0.006***
	(3.575)	(-6.222)	(-1.924)	(8.964)
Directors with tenure >15 years (%)	-0.001***	0.001**	-0.015***	0.001**
	(-2.689)	(2.481)	(-3.454)	(2.445)
Directors with zero ownership(%)	0.000	-0.004***	-0.007	0.002***
	(0.120)	(-7.212)	(-0.967)	(6.112)
CEO Characteristics				

(Continued)

Table 1.9 Alternative measures of gender diversity – *Continued*

Panel C: Blau index				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
CEO total compensation	0.000	-0.000***	-0.000**	0.000***
	(1.388)	(-18.238)	(-2.043)	(8.770)
CEO salary and bonus	0.000	0.000***	0.001***	-0.000***
	(-1.540)	(5.677)	(6.611)	(-6.942)
CEO total compensation	0.000	-0.000***	-0.000**	0.000***
	(1.388)	(-18.238)	(-2.043)	(8.770)
CEO salary and bonus	0.000	0.000***	0.001***	-0.000***
	(-1.540)	(5.677)	(6.611)	(-6.942)
CEO ownership (%)	0.034***	0.000	0.002	0.001
	(6.959)	(0.068)	(0.037)	(0.388)
CEO option granted	-0.000***	0.000***	-0.000*	0.000
	(-5.201)	(11.220)	(-1.917)	(-0.466)
CEO duality	-0.042***	-0.028***	0.175**	-0.046***
	(-4.794)	(-4.519)	(2.322)	(-11.159)
Financial Characteristics				
Firm size	-0.268***	0.353***	0.702***	0.375***
	(-34.469)	(62.994)	(10.441)	(101.735)
Leverage	1.183***	-1.600***	-2.435***	0.598***
	(19.200)	(-35.987)	(-4.569)	(20.468)
Return on Assets	-0.571***	1.307***	4.420***	-0.062
	(-5.568)	(17.677)	(4.987)	(-1.266)
Book to Market ratio	0.740***	-0.639***	1.099***	0.031**
	(26.103)	(-31.236)	(4.485)	(2.328)
3 Year sales growth	-0.003***	-0.005***	-0.021***	0.001**
	(-4.082)	(-9.442)	(-3.562)	(2.411)
Margin	54.630***	-127.276***	-440.119***	6.9025
	(5.331)	(-17.219)	(-4.967)	(1.420)
Standard deviation of return	43.548***	-11.897***	67.589***	2.854***
	(43.940)	(-16.641)	(7.886)	(6.073)
Abnormal accruals	0.185***	-0.196***	0.29	-0.011
	(4.975)	(-7.319)	(0.905)	(-0.617)
Industry classification	0.025***	-0.026***	0.015	0.005***
	(12.267)	(-17.530)	(0.829)	(5.299)
Constant	4.118***	0.578***	-4.279***	9.650***
	(40.116)	(7.81)	(-4.821)	(198.241)
Observations	15537	15537	15537	15537
R-squared	0.641	0.69	0.296	0.619

(Continued)

Table 1.9 Alternative measures of gender diversity – *Continued*

Panel D: Critical Mass				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Critical Mass	-0.030*	0.137***	-0.921***	0.023***
	(-1.823)	(11.786)	(-6.577)	(3.044)
Bond Characteristics				
Investment grade	-0.977***	0.595***	2.482***	-0.056***
	(-45.546)	(38.610)	(13.404)	(-5.520)
Bond age	0.035***	0.005***	1.006***	-0.060***
	(20.222)	(3.945)	(67.720)	(-73.007)
Board Characteristics				
Board size	-0.014***	0.058***	0.247***	-0.026***
	(-3.607)	(20.778)	(7.372)	(-14.095)
Independent directors (%)	-0.006***	0	0.019***	0
	(-8.144)	(-0.784)	(2.966)	(0.421)
Directors with > 4 board (%)	0.005***	-0.006***	-0.026**	0.006***
	(3.784)	(-5.794)	(-2.113)	(8.962)
Directors with tenure >15 years (%)	-0.001**	0.001***	-0.016***	0.001**
	(-2.170)	(3.254)	(-3.707)	(2.330)
Directors with zero ownership(%)	0	-0.004***	-0.009	0.002***
	(0.046)	(-6.668)	(-1.361)	(6.385)
CEO Characteristics				
CEO total compensation	0.000	-0.000***	-0.000*	0.000***
	(1.134)	(-18.642)	(-1.956)	(8.846)
CEO salary and bonus	-0.000*	0.000***	0.001***	-0.000***
	(-1.659)	(5.820)	(6.496)	(-6.808)
CEO ownership (%)	0.033***	0.000	0.000	0.001
	(6.797)	(0.020)	(-0.005)	(0.497)
CEO option granted	-0.000***	0.000***	-0.000**	0.000
	(-4.703)	(12.475)	(-2.501)	(-0.342)
CEO duality	-0.042***	-0.031***	0.193**	-0.047***
	(-4.767)	(-4.901)	(2.562)	(-11.312)
Financial Characteristics				
Firm size	-0.274***	0.345***	0.745***	0.375***
	(-34.966)	(61.340)	(11.017)	(101.062)
Leverage	1.175***	-1.594***	-2.508***	0.602***
	(19.077)	(-36.030)	(-4.714)	(20.625)
Return on Assets	-0.534***	1.396***	3.889***	-0.053
	(-5.175)	(18.854)	(4.368)	(-1.082)
Book to Market ratio	0.744***	-0.642***	1.141***	0.029**

(Continued)

Table 1.9 Alternative measures of gender diversity – *Continued*

Panel D: Critical Mass				
	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
	(26.249)	(-31.566)	(4.664)	(2.156)
3 Year sales growth	-0.002***	-0.004***	-0.021***	0.001*
	(-3.167)	(-9.098)	(-3.536)	(1.895)
Margin	0.885***	-136.257***	-386.748***	6.038
	(4.936)	(-18.404)	(-4.343)	(1.235)
Standard deviation of return	44.151***	-11.244***	64.970***	2.795***
	(44.546)	(-15.797)	(7.590)	(5.948)
Abnormal accruals	0.183***	-0.187***	0.221	-0.008
	(4.937)	(-7.029)	(0.689)	(-0.468)
Industry classification	0.024***	-0.026***	0.013	0.005***
	(11.913)	(-17.756)	(0.716)	(5.589)
Constant	4.144***	0.676***	-4.914***	9.665***
	(40.095)	(9.105)	(-5.504)	(197.190)
Observations	15537	15537	15537	15537
R-squared	0.641	0.693	0.297	0.619

- **The effect of gender diversity is stronger when controlling for the simultaneous effects**

In the previous section, I looked at the bond terms as being independent of each other. This assumption might lead to some biases in the results because most bonds offered will have the four characteristics simultaneously. Bondholders look at the four characteristics simultaneously, when they buy bonds. To control for the issue, I rerun the main regressions while including the bond terms as control variables in each regression. For example, when yield is the dependent variable, I include rating, maturity and issue size as control variables. Table 1.10 provides the results from the regressions. I find that the results are similar to the main results. Firms with a gender diverse board offer bonds with lower yields, higher ratings, shorter maturity and larger issue size. Results are significant at 1%.

Table 1.10

Results are stronger after controlling for the bond terms

This table present Ordinary Least Squares regression results on the relationship between bond terms and gender diversity. I control for bond, board, CEO, financial characteristics. I also control for bond terms used for the dependent variables. Model 1 uses *yield* as the dependent variable. Model 2 uses *rating* as the dependent variable. Model 3 uses *maturity* as the dependent variable. Model 4 uses *issue size* as the dependent variable. *Yield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. Bond data are collected from TRACE and Bloomberg from 2007 to 2014. Other characteristics are collected from 2006 to 2013. t-statistics in parentheses. *,**,*** indicate p-value less than 0.10, 0.05 and 0.01 respectively

Variables	Model 1 Yield(-)	Model 2 rating(+)	Model 3 Maturity(-)	Model 4 Issue size(+)
Gender diversity	-0.0053***	0.001**	-0.01**	0.001***
	(-3.578)	(2.088)	(-2.242)	(2.674)
Bond Characteristics				
Yield		-0.03***	0.00187	2.001***
		(-11.04)	(0.929)	(72.89)
Rating	-0.232***		0.611***	-0.0150***
	(-11.04)		(7.326)	(-2.842)
Maturity	0.0297	-0.03***		-0.00171***
	(0.929)	(-2.842)		(-3.361)
Issue size	0.127***	0.006***	-0.425***	
	(72.89)	(7.326)	(-3.361)	
Investment grade	-0.884***	0.536***	3.606***	-0.0450***
	(-20.99)	(34.12)	(21.63)	(-4.197)
Bond age	-0.0826***	-0.00154	0.894***	-0.0578***
	(-20.02)	(-0.965)	(59.92)	(-61.36)
Board Characteristics				
Board size	0.00618	0.0624***	0.131***	-0.0239***
	(0.841)	(22.66)	(4.507)	(-13.03)
Independent directors (%)	-0.0133***	-0.000179	0.0444***	0.000723**
	(-9.404)	(-0.331)	(7.883)	(2.021)
Directors with > 4 board (%)	0.00653**	-0.00594***	-0.0292***	0.00602***
	(2.389)	(-5.709)	(-2.694)	(8.791)
Directors with tenure >15 years (%)	-0.0025***	0.000777**	-0.00636*	0.000503**
	(-2.654)	(2.133)	(-1.681)	(2.095)

(Continued)

Table 1.10 Results are stronger after controlling for the bond terms – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
Director with zero ownership (%)	-0.000423	-0.00396***	-0.00286	0.00225***
	(-0.287)	(-7.061)	(-0.490)	(6.079)
CEO Characteristics				
CEO total compensation	3.64e-07	-2.01e-05***	-1.49e-05	5.51e-06***
	(0.125)	(-18.32)	(-1.296)	(7.566)
CEO salary and bonus	-3.39e-05*	3.85e-05***	0.000497***	-3.33e-05***
	(-1.760)	(5.254)	(6.520)	(-6.897)
CEO ownership(%)	0.0819***	0.00572	-0.164***	0.00363
	(8.918)	(1.631)	(-4.498)	(1.570)
CEO option granted	-1.54e-05**	2.93e-05***	-2.07e-05	7.75e-07
	(-2.284)	(11.43)	(-0.775)	(0.457)
CEO duality	0.0664**	-0.0857***	-0.0491	-0.0983***
	(2.381)	(-8.074)	(-0.444)	(-14.12)
Financial Characteristics				
Firm size	-0.293***	0.357***	1.204***	0.385***
	(-14.23)	(48.47)	(14.76)	(91.95)
Leverage	1.192***	-1.525***	-3.747***	0.569***
	(9.753)	(-33.85)	(-7.731)	(18.69)
Return on Assets	-0.0241	1.293***	2.971***	-0.0195
	(-0.124)	(17.58)	(3.850)	(-0.399)
Book to Market ratio	0.581***	-0.617***	-0.255	0.0213
	(10.56)	(-30.19)	(-1.164)	(1.534)
3 Year sales growth	-0.0037***	-0.00473***	-0.00923*	0.00090***
	(-2.876)	(-9.578)	(-1.790)	(2.765)
Margin	-0.994	-126.0***	-289.0***	2.765
	(-0.0510)	(-17.14)	(-3.748)	(0.565)
Standard deviation of return	53.18***	-10.06***	-51.68***	2.322***
	(28.61)	(-13.93)	(-6.849)	(4.850)
Abnormal accruals	0.0353	-0.179***	0.161	0.00209
	(0.504)	(-6.700)	(0.578)	(0.119)
Industry classification	0.0269***	-0.0252***	-0.0382**	0.00452***
	(6.879)	(-17.02)	(-2.462)	(4.597)
Constant	5.866***	1.060***	-11.67***	9.602***
	(16.13)	(7.597)	(-8.051)	(190.4)
Observations	15,537	15,537	15,537	15,537
R-squared	0.500	0.694	0.476	0.621

Next, I perform a path analysis to test the effect of board gender diversity on the bond terms simultaneously. Path analysis is a methodology that allows testing the relationship between gender diversity and the bond terms using a set of simultaneous linear regressions (Boker and McArdle (2014)). This methodology will allow me to test the simultaneous effects of gender diversity on each of the bond terms. Figure 2 provides the results of the path analysis. The results are similar to the main results. I find that firms with gender diverse board have better bond terms. Their bonds have lower yields, higher ratings, shorter maturity and larger issue size. The results are significant at 1%.

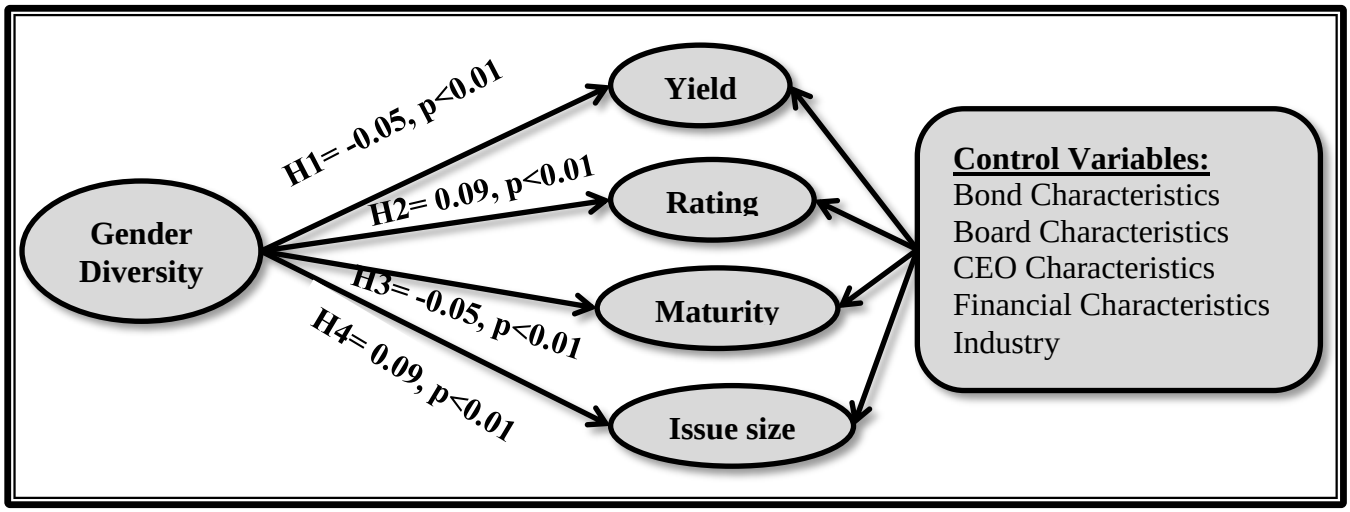

Figure 2: SEM regression of the relationship between gender diversity and bond terms. This figure presents the model that I used in the path analysis. The path analysis is performed in Warp PLS 4.0. This model tests the simultaneous impact of gender diversity on yield, rating, maturity and issue size. I control for Bond, Board, CEO, Financial characteristics and industry. As shown in the figure, the main relationships between the variables are statistically significant. Hypothesis 1, 2, 3 and 4 are supported.

- **The effects of gender diversity are stronger when controlling for CEO gender**

Research finds that bondholders react negatively to the appointment of a new CEO (Oyotode, Raja and Brusa (2015)). Thus, my results might be due to the presence of a female

CEO and not Board gender diversity. I control for this issue by controlling for CEO gender and the interaction between CEO gender and board gender diversity. Table 1.11 provides the results of the regressions.

I find the effects of board gender diversity are still stronger. Firms with gender diverse boards issue bonds with lower yields, higher ratings, shorter maturity and larger issue size. The results are significant except for maturity. Looking at the interaction term, I see that firms with gender diverse boards issue bonds with lower ratings and lower issue size when the CEO is a woman. However, they still issue bonds with lower yields. Thus, bondholders might not profit if firms have both a gender diverse board and a female CEO.

Table 1.11
Results are stronger after controlling for CEO gender

This table present Ordinary Least Squares regression results on the relationship between bond terms and gender diversity. I control for bond, board, CEO, financial characteristics. I also control for CEO gender. Model 1 uses *yield* as the dependent variable. Model 2 uses *rating* as the dependent variable. Model 3 uses *maturity* as the dependent variable. Model 4 uses *issue size* as the dependent variable. *Yield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. Bond data are collected from TRACE and Bloomberg from 2007 to 2014. Other characteristics are collected from 2006 to 2013. t-statistics in parentheses. *,**,*** indicate p-value less than 0.10, 0.05 and 0.01 respectively

VARIABLES	(1) Yield(-)	(2) rating(+)	(3) Maturity(-)	(4) Issue size(+)
Gender diversity	-0.00670***	0.00297***	-0.00739	0.00107**
	(-3.384)	(4.475)	(-0.931)	(2.462)
Bond Characteristics				
Investment grade	-0.636***	0.577***	2.830***	-0.0492***
	(-13.07)	(35.43)	(14.51)	(-4.624)
Bond age	0.0407***	0.00275**	0.999***	-0.0581***

(Continued)

Table 1.11 Results are stronger after controlling for CEO gender – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
	(10.54)	(2.131)	(64.58)	(-68.80)
Board Characteristics				
Board size	0.0166**	0.0619***	0.202***	-0.0273***
	(1.968)	(21.96)	(5.993)	(-14.81)
Independent directors(%)	-0.0095***	0.000339	0.0247***	0.000493
	(-5.680)	(0.608)	(3.691)	(1.353)
Directors with > 4 board (%)	0.00734**	-0.0092***	-0.0364***	0.00581***
	(2.246)	(-8.387)	(-2.777)	(8.115)
Directors with tenure >15 years (%)	-0.0037***	0.000920**	-0.0149***	0.000598**
	(-3.307)	(2.466)	(-3.341)	(2.452)
Director with zero ownership (%)	0.00137	-0.0048***	-0.00932	0.00233***
	(0.776)	(-8.140)	(-1.315)	(6.018)
CEO Characteristics				
CEO total compensation	1.98e-06	-1.99e-05***	-1.92e-05	6.12e-06***
	(0.587)	(-17.57)	(-1.421)	(8.270)
CEO salary and bonus	6.23e-05***	3.24e-05***	0.0008***	-3.76e-05***
	(2.590)	(4.019)	(8.699)	(-7.144)
CEO ownership (%)	0.0777***	0.00279	-0.0250	0.00408*
	(7.269)	(0.780)	(-0.584)	(1.743)
CEO option granted	-3.70e-05***	2.71e-05***	-0.0001***	-6.36e-07
	(-4.655)	(10.18)	(-3.511)	(-0.366)
CEO duality	0.0840***	-0.0745***	0.147	-0.0958***
	(2.583)	(-6.843)	(1.126)	(-13.46)
Financial Characteristics				
Firm size	-0.265***	0.360***	0.718***	0.378***
	(-15.35)	(62.14)	(10.37)	(99.80)
Leverage	1.337***	-1.624***	-1.494***	0.597***
	(9.665)	(-35.06)	(-2.693)	(19.71)
Return on Assets	-0.684**	1.965***	1.464	0.00505
	(-2.060)	(17.67)	(1.100)	(0.0694)
Book to Market ratio	0.807***	-0.680***	1.067***	0.0199
	(12.18)	(-30.68)	(4.016)	(1.374)
3 Year sales growth	-0.0060***	-0.0048***	-0.0237***	0.000991***
	(-3.816)	(-9.009)	(-3.752)	(2.876)
Margin	64.43*	-193.0***	-143.8	0.258
	(1.941)	(-17.37)	(-1.081)	(0.0355)
Standard deviation of return	67.83***	-11.54***	81.02***	2.614***

(Continued)

Table 1.11 Results are stronger after controlling for CEO gender – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
	(30.96)	(-15.73)	(9.224)	(5.450)
Abnormal accruals	0.0932	-0.197***	0.356	-0.00599
	(1.083)	(-6.846)	(1.034)	(-0.318)
Industry classification	0.0328***	-0.0303***	-0.0133	0.00400***
	(7.037)	(-19.47)	(-0.711)	(3.927)
Other Control variables				
CEO gender	0.266	0.506***	-0.894	0.131***
	(1.162)	(6.592)	(-0.974)	(2.604)
Gender diversity x CEO gender	-0.0144*	-0.0217***	-0.0299	-0.00455***
	(-1.791)	(-8.065)	(-0.929)	(-2.593)
Constant	5.184***	0.546***	-5.526***	9.650***
	(22.56)	(7.090)	(-5.997)	(191.8)
Observations	14,797	14,797	14,797	14,797
R-squared	0.318	0.687	0.296	0.620

- **Increase in gender diversity is associated with better bond terms**

. The main assumption of the essay is that an increase in board gender diversity leads to better bond terms. I retest this assumption by analyzing the effect of a recent change in board gender diversity on the bond terms In this part, I look for the effects when there was a recent change in the board gender composition. The independent variable of interest is the change in gender diversity during the most recent period (a year). The dependent variables are yield, rating, maturity and issue size. Table 1.12 reports the results of this new model.

I find similar results; increase in gender diversity is associated with lower yield, higher rating, shorter maturity and larger issue size. However, I did not find significant results for maturity and issue size. These results show that firms that recently increase their board gender composition have better bond terms.

Table 1.12

Results are stronger using year over year change in gender diversity

This table present Ordinary Least Squares regression results on the relationship between bond terms and gender diversity. I control for bond, board, CEO, financial characteristics. I measure gender diversity as the year over year change in gender diversity. Model 1 uses *yield* as the dependent variable. Model 2 uses *rating* as the dependent variable. Model 3 uses *maturity* as the dependent variable. Model 4 uses *issue size* as the dependent variable. *Yield* is measured at the firm level by taking the weighted average yield spread, with the weight being the amount outstanding of each bond divided by the total amount outstanding for all of a firm's bonds. *Rating* is measured at firm level rating as the average of rating for all the bonds of the firm. *Maturity* is computed as the weighted average of the maturity of all of a firm's bonds, with the weight being the amount outstanding for each bond divided by the total amount outstanding for all the bonds of the firm. *The issue size* is computed as the log of the average issue size of the firm's bonds. Bond data are collected from TRACE and Bloomberg from 2007 to 2014. Other characteristics are collected from 2006 to 2013. t-statistics in parentheses. *,**,*** indicate p-value less than 0.10, 0.05 and 0.01 respectively

VARIABLES	(1) Yield (-)	(2) Rating (+)	(3) Maturity (-)	(4) Issue size (+)
Change in gender diversity	-0.00615**	0.00506***	-0.00589	0.000880
	(-2.070)	(5.180)	(-0.501)	(1.370)
Bond Characteristics				
Investment grade	-0.680***	0.575***	2.634***	-0.0601***
	(-14.60)	(37.53)	(14.30)	(-5.967)
Bond age	0.0427***	0.00486***	1.007***	-0.0594***
	(11.36)	(3.928)	(67.71)	(-73.05)
Board Characteristics				
Board size	0.0166**	0.0644***	0.213***	-0.0250***
	(1.993)	(23.46)	(6.446)	(-13.88)
Independent directors (%)	-0.0117***	0.000512	0.0193***	0.000797**
	(-7.152)	(0.952)	(2.992)	(2.254)
Directors with > 4 board (%)	0.00597*	-0.00666***	-0.0226*	0.00606***
	(1.890)	(-6.405)	(-1.805)	(8.864)
Directors with tenure >15 years (%)	-0.00400***	0.000674*	-0.0134***	0.000433*
	(-3.618)	(1.853)	(-3.065)	(1.811)
Directors with zero ownership(%)	-0.000437	-0.00418***	-0.00787	0.00233***
	(-0.256)	(-7.441)	(-1.164)	(6.295)
CEO Characteristics				
CEO total compensation	1.16e-06	-2.05e-05***	-2.91e-05**	5.94e-06***
	(0.347)	(-18.72)	(-2.214)	(8.257)
CEO salary and bonus	2.67e-05	4.33e-05***	0.00058***	-3.43e-05***
	(1.198)	(5.909)	(6.647)	(-7.123)
CEO ownership(%)	0.0791***	0.00309	-0.00851	0.00396*

(Continued)

Table 1.12 Results are stronger using year over year change in gender diversity – *Continued*

	(1) Yield (-)	(2) rating (+)	(3) Maturity (-)	(4) Issue size (+)
	(7.414)	(0.880)	(-0.202)	(1.716)
CEO option granted	-2.76e-05***	2.98e-05***	-5.31e-05*	9.08e-08
	(-3.539)	(11.63)	(-1.725)	(0.0539)
CEO duality	0.110***	-0.0853***	0.176	-0.0980***
	(3.440)	(-8.074)	(1.387)	(-14.11)
Financial Characteristics				
Firm size	-0.283***	0.357***	0.676***	0.379***
	(-16.72)	(64.01)	(10.09)	(103.3)
Leverage	1.248***	-1.606***	-2.532***	0.601***
	(9.263)	(-36.22)	(-4.752)	(20.63)
Return on Assets	0.311	1.276***	4.481***	-0.0581
	(1.388)	(17.31)	(5.056)	(-1.199)
Book to Market ratio	0.880***	-0.643***	1.116***	0.0295**
	(14.20)	(-31.56)	(4.558)	(2.204)
3 Year sales growth	-0.00394***	-0.00497***	-0.0182***	0.000823***
	(-2.671)	(-10.23)	(-3.125)	(2.578)
Margin	-35.11	-124.2***	-446.4***	6.572
	(-1.567)	(-16.85)	(-5.038)	(1.356)
Standard deviation of return	66.06***	-12.02***	73.90***	2.390***
	(31.11)	(-17.20)	(8.802)	(5.203)
Abnormal accruals	0.0977	-0.175***	0.241	0.00634
	(1.200)	(-6.515)	(0.747)	(0.360)
Industry classification	0.0326***	-0.0258***	0.00660	0.00522***
	(7.251)	(-17.49)	(0.372)	(5.378)
Constant	5.501***	0.508***	-4.385***	9.607***
	(24.40)	(6.851)	(-4.919)	(197.0)
Observations	15,537	15,537	15,537	15,537
R-squared	0.325	0.692	0.295	0.621

1.4.3 Board gender diversity and abnormal bond returns

In this section, I look at the impact of board gender diversity on the abnormal bond returns of firms. I investigate if there is a difference in bond returns of firms based on the percentage of women on board. My assumption is that the expectations inherent to bond yield are supposed to be reflected in the returns of bondholders. Since bondholders are more interested in

the repayment of their debt than the returns for holding the debt (Cremers, Nair and Wei (2007)), they will require lower returns for a firm with a gender-diverse board. The analysis is based on 141,724 daily firm abnormal bond returns for the period of 2007 to 2014.

To implement this analysis, I use two dichotomous measures of gender diversity. First, I constructed an indicator that is equal to 1 when the percentage of women on the board is different from 0. This indicator is developed following existing literature which discusses that a board is diverse as soon as there is at least one woman on the board. Then, I construct an indicator that takes the value of 1 if gender diversity is higher than 29.67%. This is the indicator developed using the approach employed by Srinidhi, Gul and Tsui (2011). I identify 29.67% as the point at which there is a significant difference in abnormal returns based on the percentage of women on the board.

The results are reported in Table 1.13. I compute the annualized abnormal returns as the average abnormal returns for each year. Using the commonly used indicator, I find a significant difference between the firm abnormal returns for t statistics and the sign rank test. However, the mean and the median abnormal returns are all positive and significant. These results show that bondholders require higher returns for firms with no women on the board. However, they require lower returns sensibly for firms with at least one female board member compared with firms with no women on the board. Regarding the mean, returns for firms with no women on the board are higher than for firms with at least one women on the board, by 0.00324 [0.0402-0.0078, $p<0.01$]. Regarding the median, returns for firms with no women on the board are higher than they are for firms with at least one female board member, by 0.0214 [0.0249-0.0035, $p<0.01$]. These results are in line with the hypothesis that bondholders require lower returns from firms with gender-diverse boards. Thus, hypothesis 5 is supported.

Table 1.13:
t-statistics and sign ranked test of annualized firm abnormal returns based on gender diversity indicators

This table reports the results for the t statistics and sign ranked test. Two dichotomous variables were used to test the mean and median differences. I constructed an indicator that is equal to 1 when the percentage of women on the board is different from 0. Then, I constructed an indicator that takes the value of 1 if gender diversity is higher than 29.67%. This is the indicator developed using the approach employed by Srinidhi, Gul and Tsui ((2011)).

	Mean		median	
all	0.0119	8.7583	0.0042	8.683
=0	0.0402	9.0115	0.0249	4.634
>0	0.0078	5.5257	0.0035	11.795
p-value difference	7.87		9.884	
<=29.67	0.0146	10.0446	0.0062	11.990
>29.67	-0.0214	-7.010	-.0025	-13.870
p value difference	6.87		14.653	

1.4.4 Propensity score matching

The results from the regression models, t-test and signed-rank test provide evidence that firms with gender diverse board have lower yields, higher ratings, shorter maturity and larger issue size. And bondholders require lower returns from these firms. However, these results can suffer from selection bias if observations with gender diverse board are non-randomly selected. For example, old firms with larger boards are more likely to have gender diverse board (Srinidhi, Gul and Tsui (2011)).To address this concern, I use the propensity matching method proposed by Rosenbaum and Rubin (1985). This matching method allows the comparison of firms with similar characteristics and provides additional robustness to the main analysis.

Using the indicator that takes the value of 1 when gender diversity is higher than 29.67%, I divide the sample into two subsamples Then I match each observation from the subsamples using propensity scores. For the matching, I use the one to one closest neighbor matching with a caliper of 0.01 and the kernel matching. The kernel matching generates matches using the weight

average of all observation in the same support area. Following Tanaka (2014), the propensity scores are estimated using board size, return on assets, leverage, firm size, firm age, square of firm age, firm and year fixed effects. Finally, I retest the relationship between board gender diversity, the bond terms and the abnormal bond returns. The results are provided in Table 1.14.

Panel A provides the estimates from the probit model used to determine the propensity score. Panel B provides for the one to one matching and the kernel matching. The results are similar to the main results. I find that bonds have lower yields, higher ratings, shorter maturity and larger issue size when board gender diversity is higher than 29.67%. For the abnormal returns, I find that bondholders require lower returns from firms with board gender diversity higher than 29.67%. The results are significant for both matching approaches.

Table 1.14
PSM results

This table reports the results from the propensity score matching. Panel A provides the results for the probit model used to estimate the propensity scores. I estimate the propensity scores using board size, return on asset, leverage, firm size, firm age and square of firm age. I also include the year and industry fixed effects. Panel B provides the average treatment effects of the treatment and the control samples for yield, rating, maturity, issue size and firm abnormal returns. t-statistics in parentheses. Far panel B, the t-statistics are estimated using the bootstrapped standard error. The bootstrapped procedure is based on 500 replications of the data *, **, *** indicates the p-value is 0.1, 0.05 and 0.01 respectively.

Panel A: Probit results of propensity score

Variable	Gender diversity >29.67%
Board size	-0.131***
	(-11.83)
Return on Asset	-0.035***
	(-9.40)
Leverage	-0.425***
	(-2.67)
Firm size	0.062***
	(3.08)
Firm age	0.011***
	(3.88)

(Continued)

Table 1.14.PSM results - *Continued*

Panel A: Probit results of propensity score			
Variable		Gender diversity >29.67%	
Square of firm age		0.001	
		(0.44)	
Industry FEs		X	
Year FEs		X	
Observations		15343	
Pseudo R2		0.204	
Panel b: Matching estimates for yield, rating, maturity, issue size and firm abnormal returns			
		one to one matching	Kernel matching
Yield	ATT	-0.428***	-0.219*
		(-2.87)	(-1.71)
Rating	ATT	0.144***	0.098***
		-2.16	-4.28
Maturity	ATT	-0.1659*	-1.047*
		(-1.76)	(-1.90)
Issue size	ATT	0.355***	0.144*
		-3.61	-1.91
Firm abnormal returns	ATT	-2.420*	-0.452*
		(-1.87)	(-1.74)

1.5 Conclusion

This paper investigated the relationship between board gender diversity, bond terms, and bond returns. This research is motivated by the fact that as equity holders, bondholders are stakeholders of firms. Since they can suffer from the misbehavior of managers, and specifically the expropriation of their wealth, bondholders will be significantly affected by any governance mechanisms that restrain manager misbehavior. Using insights from agency theory and corporate governance, I empirically and theoretically test that board gender diversity is a governance mechanism that bondholders perceive as efficiently restraining manager misbehavior. This is done by reducing agency and information risk while increasing the reliability of public information.

Looking at bond terms, the result of this study showed that firms with gender diverse boards have bonds with lower yields, higher ratings, shorter maturity, and higher issue sizes. These results show that bondholders interpret bonds from firms with gender diverse boards as less risky while making their decisions on yield, rating, and issue size. However, for maturity, I see that board gender diversity leads to the issue of shorter maturity bonds since longer maturity comes with higher interest risks.

Next, I test if the expectations in yield are reflected in returns. For bond returns, I find that bondholders require fewer returns to firms with a gender diverse board. However, the effect is more pronounced when at least 29.67% of the firm's board of directors is women. In fact, I find negative and significant abnormal returns when a firm's board gender diversity is higher than 29.67%. While this result can be interpreted as an adverse reaction, I must remember that bondholders are more interested in the repayment of the debts than in the returns for holding the debts. Thus, contrary to equity holders, they will require less return when the risk of the firm is perceived as low.

In sum, I find that board gender diversity has a significant impact on bond terms. In addition, bondholders require low returns from firms with gender-diverse boards. However, firms must have boards that are 29.67% women to benefit from these lower returns. These results are robust when I use the propensity score matching method.

The main limitations of this study are the heteroscedasticity in data on bond returns and the infrequent trading of bonds, since bonds are more volatile and they are different within firms based on maturity, rating, yield, and other variables. Missing to control for heteroscedasticity will affect the specifications of the regression analysis. Moreover, as bonds trade less often, computing the returns for all available firms is difficult. To resolve these issues, Ederington,

Guan and Yang (2013) proposed to compute the bond returns as two days returns standardized by standard deviation of returns. Future studies can retest the impact of gender-diverse boards on bondholders using this methodology.

CHAPTER II

BOARD GENDER DIVERSITY, INSTITUTIONAL INVESTORS AND ACCRUALS MANAGEMENT

2.1 Introduction

Considerable research has been done to identify and understand factors which are more likely to constrain firms' abnormal accruals. For example, researchers study the constraining effects of the BIG 4 auditing firms (Kanagaretnam, Krishnan and Lobo (2010)), outside directors (Peasnell, Pope and Young (1999)) and women board presence (Thiruvadi and Huang (2011)). More recently, the accounting literature has emphasized on the constraining impact of institutional ownership on accruals management (Koh (2003)).

The issue with this new focus is that most studies do not take into consideration the heterogeneity of institutional investors. In fact, Mitra and Cready (2005) studied the impact of institutional investors on accruals management by treating them as a homogenous group. This misrepresentation of the institutional investor characteristics leads to inconsistent results. To resolve this issue, Hsu and Koh (2005) and Koh (2007) study the impact of institutional ownership on accruals management by including the heterogeneity of institutional ownership. Using a sample of Australian and US firms, they find that institutional investors with low portfolio turnovers are more likely to constrain abnormal accruals. In the same spirit, Wang (2014) provides a detailed description of the institutional investors that constrain earnings management. However, his results are only applicable to UK firms and could not be applicable in the US.

Research on corporate governance provides a similarly detailed description of institutional investors, which is applicable in the US. Chen, Harford and Li (2007) show that

independent institutional investors with long-term investment and concentrated ownership (ILTIS) favor monitoring to trading. Thus, they are more likely to monitor management and take action to restrain managers' misbehaviors. The first research question is whether this assumption applies to accruals management. To implement this analysis, I test whether independent institutional investors with long-term investment and concentrated ownership (ILTIS) are more likely to constrain abnormal accruals.

Another stream of research show how female directors affect firms' earnings quality (Srinidhi, Gul and Tsui (2011)). They show that board gender diversity is more likely to constrain abnormal accruals and increase earnings quality. The increase in board gender diversity leads to a decrease in inflated or deflated earnings. In addition, research on board composition also finds that boards with higher women representation have the characteristics to foster stronger governance (Brown, Brown and Anastasopoulos (2002)). However, the increase in board gender diversity in firms that already have stronger governance leads to overmonitoring, which affects performance (Adams and Ferreira (2009)).

In my second research question, I test the overmonitoring hypothesis of Adams and Ferreira (2009) using a measure of managers' misbehaviors, i.e. accrual management. I analyze whether an increase in board gender diversity for firms with independent institutional investors with long-term investment and concentrated ownership (ILTIS) might lead to overmonitoring; and how it will affect abnormal accruals. To implement this analysis, I introduce board gender diversity as the moderator of the relationship between independent institutional investors with long-term investment and concentrated ownership and abnormal accruals.

The findings show that both board gender diversity and independent institutional investors with long-term investment and concentrated ownership (ILTIS) increase earning

quality (decrease in abnormal accruals). In fact, I find a negative significant relationship between board gender diversity and abnormal accruals. I also find a negative and significant relationship between independent institutional investors with long-term investment and concentrated ownership (ILTIS) and abnormal accruals. However, I see an increase in abnormal accruals after including the interaction term between these strong governance mechanisms. This result shows that the association of a gender diverse board with independent institutional investors with long-term investment and concentrated ownership (ILTIS) leads to overmonitoring, which decreases earning quality. The findings are significant after controlling for fixed effects and alternative specification for gender diversity and earning management.

This study makes two important contributions to the literature. First, it revisits the relationship between earnings quality and institutional investors by assessing the impact of a specific type of institutional investors on abnormal accrual. Second, the analysis shows how a specific type of institutional investors coupled with a gender diverse board affects earnings quality. The essay is organized as follows. The next section discusses the theory and framework used in this study and hypotheses development. The third section discusses the methodology used to test the hypotheses and data collection. The fourth section provides the results. The fifth section provides the conclusion.

2.2 Literature review and hypotheses development

Agency theory explains agency relationship as a relationship that is formed when firm owners hire managers to manage their organizations (Eisenhardt (1989)). This theory also posits that an agency cost arises as managers decide to extract rents or perquisites (Jensen and Meckling (1976)). To reduce agency costs, shareholders need to monitor the managers to make sure that their incentives are aligned. To better protect investors and resolve the monitoring

problem, research has been done to understand the different possibilities to constrain managers' behaviors and accounting manipulation. For example, researchers studied the constraining effects of institutional investors (Chung, Firth and Kim (2002)) and board gender diversity (Terjesen, Sealy and Singh (2009)). In the following section, I discuss the constraining effects of institutional investors on abnormal accruals and the effect of board gender diversity on these constraining effects.

2.2.1 Constraining effects of independent institutional investors with long-term investment and concentrated ownership (ILTIS) on abnormal accruals

The literature on institutional ownership assumes that institutional investors are more likely to monitor management and focus on shareholder goals (Hsu and Koh (2005)). In fact, institutional investors can influence management actions directly through voting rights. In addition, they can influence management by their decision to sell or buy shares since they have a significant part of firm ownership. Therefore, they are more likely to take an active part in corporate governance (Chen, Harford and Li (2007)). Management will also have greater incentive to behave since a potential loss of important institutional investors can incite the board of directors to fire managers that seem to manipulate earnings.

Research in accounting studied the constraining effect of institutional investors on accrual management (Jiambalvo, Rajgopal and Venkatachalam (2002); Mitra and Cready (2005); Rajgopal, Venkatachalam and Jiambalvo (1999)). However, these studies assume that all institutional investors have the same preferences for firm' strategies and are more likely to monitor management similarly. For instance, Rajgopal, Venkatachalam and Jiambalvo (1999) assume that institutional investors are all more focused on short-term profitability. Thus, they incite managers to manipulate accruals in the short term. Mitra and Cready (2005) assume that it

is the percentage of institutional ownership in a firm that affects accrual management. Thus, an increase in the percentage of institutional ownership will lead to a reduction in accrual management. Consequently, it created an important debate on the topic.

Proponents of the constraining effect of institutional investors found that the presence of a large number of institutional investors in a firm is more likely to reduce agency problems. For example, Chung, Firth and Kim (2002) show that institutional investors limit "opportunistic earnings management." Opponents of the constraining effect of institutional investors, such as Jones (1991), show that institutional investors as a homogeneous group do not have any incentives to constrain earnings management. To resolve this debate, researchers have studied investors as a heterogeneous group with different preferences. They identified the characteristics of the institutional investors that would have a constraining effect on earning manipulation (Cheng and Reitenga (2009); Wang (2014)).

Wang (2014) finds that investors have different preferences based on their block-holdings, investment strategies, and investment duration. After analyzing a sample of UK firms, he finds that institutional investors with 10-20% block-holdings, with active investment strategy and holding share for more than one year, have an important constraining effect on abnormal accruals. The main issue in his analysis is the generalizability of the results.

While the UK is a country with a very developed stock market, it is still different from the US. Contrary to the US, UK institutional investors do meet with the board of directors and top management to evaluate company strategies (Aguilera, Williams, Conley and Rupp (2006); Williams and Aguilera (2008)). Earnings management is significantly lower in the UK than in the US (Brown, Brown and Anastasopoulos (2002)). Whereas UK firms are subject to common law fiduciary duties, company law and requirement from London stock exchange (Rushton and

Council (2005)); US corporate laws are based on the state and the securities exchange act of 1933 and 1934. These are the only sources of law at the federal level.

To palliate to this issue, a brief review of the existing literature on corporate governance in the US led to the discovery of a type of institutional investor similar to the one proposed by Wang (2014). A similarly detailed analysis of institutional investors' heterogeneity is found in the corporate governance literature. Chen, Harford and Li (2007) analyze the type of institutional investors that favor monitoring to trading. They find that independent institutional investors with long-term investment and concentrated ownership (ILTIS) prefer firm monitoring to trading. For these institutional investors, the benefits of monitoring outweigh the cost of monitoring.

Relating this finding to earnings management, I can infer that independent institutional investors with long-term investment and concentrated ownership have greater incentives to limit opportunistic earning manipulation and they are more likely to push for the dismissal of managers that manipulate earnings. Thus, I propose the following hypothesis:

Hypothesis 1: independent institutional investors with long-term investment and concentrated ownership (ILTIS) have an important constraining effect on abnormal accruals in the US.

Chen, Harford and Li (2007) also find that independent institutional investors with long-term investment and concentrated ownership are associated with stronger governance. Institutional investors prefer to invest in firms with strong governance because they make better decisions. However, the association of independent institutional investors with long-term investment and concentrated ownership and a stronger governance mechanism might lead to overmonitoring. In the following section, I discuss how a strong governance mechanism, i.e. Board gender diversity, affects the relationship between of independent institutional investors

with long-term investment and concentrated ownership and abnormal accruals. I also develop two alternate hypotheses to test its effects.

2.2.2 The impact of women board presence on the constraining effects of institutional investors

Men and women have different traits. Women 's traits such as conservatism, risk aversion and ethical behavior influence the quality of earnings (Peni and Vähämaa (2010)). In fact, board gender diversity increases the chance to get less inflated earnings (Srinidhi, Gul and Tsui (2011)). Diverse boards are likely to have high-quality earnings because of the "value-commitment" of the members and the "disciplining incentive" that come from it. Gender diverse boards also have stronger monitoring, independent thinking and greater activism (Carter, Simkins and Simpson (2003)). These boards are more likely to undertake activities that foster higher accuracy of earnings forecasts. Thus, gender-diverse boards are more likely to constrain abnormal accruals and increase earning quality. However, the association of board gender diversity with strong governance leads to overmonitoring (Adams and Ferreira (2009)).

As stated above, Independent institutional investors with long-term investment and concentrated ownership is a mechanism of strong governance. Since independent institutional investors with long-term investment and concentrated ownership prefer to invest in firms with stronger governance (Chen, Harford and Li (2007)), they will prefer firms with gender-diverse boards. Thus, firms with this type of institutional investors might also have gender-diverse boards. However, it has been shown that the association of board gender diversity with another mechanism of strong governance leads to overmonitoring. This overmonitoring is might affect the constraining effects of Independent institutional investors with long-term investment and concentrated ownership on abnormal accruals. Thus, I propose the following hypothesis:

Hypothesis 2: Board gender diversity moderates the relationship between independent institutional investors (ILTIS) with long-term investment and concentrated ownership and abnormal accruals

There are two competing views on the effects of board gender diversity on the constraining effects of Independent institutional investors with long-term investment and concentrated ownership on abnormal accruals. The first view is based on a developed assumption in accounting and corporate governance. It states that stronger monitoring of management allows shareholders to control the corporation. Thus, managers are more likely to be fired if earnings management is detected (Agrawal and Knoeber (1996); Jha, Shankar and Prakash (2015)). In addition, stronger monitoring increases the value to shareholders (Adams and Ferreira (2009); Hermalin and Weisbach (2004)). Hence, managers have less incentive to manage earnings, since they have nothing to hide (Becker, DeFond, Jiambalvo and Subramanyam (1998)). Thus, earnings management will decrease. Since the presence of independent institutional investors with long-term investment and concentrated ownership and board gender diversity leads to ovemonitoring, I can assume that their association might lead to a reduction in earnings management. Thus I hypothesize the following:

Hypothesis 3a: When board gender diversity is higher, the constraining effects of independent institutional investors with long-term investment and concentrated ownership (ILTIS) on abnormal accruals is increased

The second view is based on the evidence shown by Adams and Ferreira (2007) that too much monitoring leads to decrease the value to shareholders. They discuss that stronger monitoring leads to increased interference in managers' decision-making and negatively affects firm performance. For example, managers faced with stronger monitoring are more likely to

manage earnings to avoid losing their jobs (Murphy and Zimmerman (1993)). Thus, earnings management will increase. Since the presence of independent institutional investors with long-term investment and concentrated ownership and board gender diversity leads to ovemonitoring, I can assume that their association will lead to an increase in earning management. Thus, I hypothesize the following:

Hypothesis 3b: When Board gender diversity is higher, the constraining effect of independent institutional investors with long-term investment and concentrated ownership (ILTIS) on abnormal accruals is reduced.

2.3 Data and methodology

In this section, I discuss the sources of data collected to test my hypotheses. I also describe the sample construction. Then, I present the methodology used to test my hypotheses and provide a description of the variables used in the analysis.

2.3.1 Data sources

To test the hypotheses, the data are collected on board gender diversity, institutional investors, accounting variables to estimate the abnormal accruals, other types of ownership and firm characteristics. The sources are Institutional Shareholder Services (ISS), EXECUCOMP, COMPUSTAT and Thomson Reuters 13f Institutional Investors. ISS provides annual data on board directors originated from proxy statements, annual reports and SEC filings. This data provides the gender, age, tenure, independence, ownership of each director. It is also used to compute the board size, and board composition. The accounting data (current assets, current liabilities, etc.) are collected from COMPUSTAT North America. I use these accounting data to compute the abnormal accruals using the Francis (2005) model. The data for the institutional investor's holdings are collected from Thomson Reuters 13f Institutional Investors. The firm

and CEO characteristics and other information are collected using Bloomberg, EXECUCOMP and COMPUSTAT. These variables are firm leverage, book to market ratio, CEO tenure, CEO duality, CEO gender, firm age, return on assets, operating cash flow over assets and firm size.

To be included in the analysis, information for firm-year observation must be provided for all the four databases for the period of 2003 to 2014 for institutional ownership and 2002 to 2013 for the other variables. Then, I require these firms to be non-financial and non-regulated firms. Finally, I winsorize the data at 1st and the 99th percentiles to remove the outliers. Merging the dataset and applying these requirements generates a sample of 5,668 firm-year observations on 973 firms. Since, the institutional investor's data are collected quarterly; I end up with 22,595 firm-quarter observations. I summarize the data sources and measurement of each variable in Appendix A.

2.3.2 Methodology and variables description

Below, I describe how I determined the independent institutional investors with long-term investment and concentrated ownership (ILTIS), following the methodology proposed by Chen, Harford and Li (2007). Then, I discuss how I measure abnormal accruals using the model proposed by Francis, LaFond, Olsson and Schipper (2005).. Next, I outline the methodology used to empirically test my hypotheses. Finally, I provide a description of the main variables and control variables used in the analysis.

Independent institutional investors with long-term investment and concentrated ownership (ILTIS) estimation

To determine the independent institutional investors with long-term investment and concentrated ownership (ILTIS), I follow the methodology proposed by Chen, Harford and Li (2007). Table 2.1 provides the definitions and descriptive statistics of the variables used to

determine ILTIS. To measure concentrated ownership, I determine the ownership controlled by the five largest institutional investors (top 5 holdings) for each firm. I first determine the five largest institutional investors for each firm. Next, I categorize the top 5 holdings by the duration of holding and type of investor.

I divide the top 5 holdings based on the independence of the holders using Institutional Investor Classification Data provided on Brian Bushee's website[2]. This data allows me to reclassify the CDA/Spectrum institutional classification based on the institutions' relationship with the firms. I classify as independent holders, the institutional investors that do not have any business ties with the firms. The independent holders are the investment companies (CDA type 3), independent investment advisors (CDA type 4) and public pension funds (part of CDA type 5). Then, following Chen, Harford and Li (2007) I classify as long-term independent top 5 holders, independent top 5 holders that remain in the top 5 for 4 quarters during the previous year.

Next, I intersect the group of long-term independent top 5 holders with the quasi-indexers and dedicated institutional investors using the Bushee's method. Bushee classifies institutional investors based on their past investment strategy in term of diversification, portfolio turnover and momentum. They find that dedicated institutions exercise full monitoring role and attempt to influence management. Quasi-indexer institutions exercise only some influence on management (Bushee and Noe (2000)). The data for the quasi-indexers and dedicated institutions are provided on Brian Bushee's website[3]. Finally, I aggregate the holdings for the long-term, independent, quasi-indexers and dedicated top 5 holders to determine ILTIS. I also aggregate the holdings of the rest of the top5 holders into other top 5 holdings.

[2] http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html
[3] http://acct.wharton.upenn.edu/faculty/bushee/IIclass.html

Table 2.1:
ILTIS estimation

This table provides the definition of the variables used to compute ILTIS and their descriptive statistics

Panel A: Determinants of ILTIS

Variables	Definitions
Top 5 Holding	Ownership controlled by the five largest institutional investors (top5 holdings)
Long-Term Holders	Holders that remain in the top 5 for 4 quarters during the previous year
Independent Holders	Dummy variable takes 1 if the holder is independent and 0 otherwise. It is determined using the Institutional Investor Classification Data provided on Brian Bushee's website. This data allows me to reclassify the CDA/Spectrum institutional classification.
Quasi-indexer / Dedicated Holders	Dedicated institutions exercise full monitoring role and attempt to influence management. Quasi-indexer institutions exercise only some influence on management. The data for the quasi-indexers and dedicated institutions are provided on Brian Bushee's website.

Panel B: Descriptive statistics

Variables	Obs.	Mean	Std. Dev.	Min	Max
Top 5 holding	96,929	32,100,000	50,800,000	56	1,350,000,000
Long term Holders	96,929	0.5634	0.4959	0	1
Independent Holders	96,929	0.8609	0.3459	0	1
Quasi-indexer / Dedicated Holders	96,929	0.8428	0.3639	0	1
independent, long term, dedicated and quasi-indexer institutions among the top 5 holders	96,929	0.4106	0.4919	0	1
ILTIS	96,929	10,100,000	13,900,000	0	324,000,000

Abnormal accruals estimation

To estimate the abnormal accruals, I use the model proposed by Francis, LaFond, Olsson and Schipper (2005). This version introduces growth in revenue in order to reflect performance, and it adds Property, Plant and Equipment, which gives a broader view of total accruals. The Francis, LaFond, Olsson and Schipper (2005) model is expressed as:

$$\frac{TC}{ASSETS_{i,t-1}} = \alpha_0 + \frac{\alpha_1 CFO_{i,\,t-1}}{ASSETS_{i,t-1}} + \frac{\alpha_2 CFO_{i,\,t}}{ASSETS_{i,t-1}} + \frac{\alpha_3 CFO_{i,\,t+1}}{ASSETS_{i,t-1}} + \frac{\alpha_4 \Delta SALES_{i,\,t}}{ASSETS_{i,t-1}} + \frac{\alpha_5 PPE_{it}}{ASSETS_{i,t-1}} + \varepsilon_{i,t} \quad (3)$$

Where TC= $\Delta CA_{i,t}$-$\Delta CL_{i,t}$-$\Delta Cash_{i,t}$+$\Delta STDEBT_{i,t}$-$DA_{i,t}$ = total current accruals. $\Delta CA_{i,t}$= change in current assets between year t-1 and year t. $\Delta CL_{i,t}$= change in current liabilities between year t-1 and year t. $\Delta Cash_{i,t}$= change in cash between year t-1 and year t. $\Delta STDEBT_{i,t}$= change in debt in current liabilities between year t-1 and year t. $DA_{i,t}$= depreciation and amortization for year t. $CFO_{i,\ t-1}$= cash flow from operating activities in previous year t-1. $CFO_{i,\ t}$= cash flows from operating activities in current year t. $CFO_{i,\ t+1}$= cash flow from operating activities in next year t+1. $\Delta SALES_{i,\ t}$= change in sales between year t-1 and year t. PPE_{it} is the gross value of property, plant and equipment in year t. $\varepsilon_{i,t}$ represents the abnormal accruals. $ASSETS_{i,t-1}$= lag of total assets.

Using Francis, LaFond, Olsson and Schipper (2005), I estimate the estimation errors for firm i in year t within the industry classification code and fiscal year combination. Note that in this equation, the residuals or error terms represent the abnormal accruals. The Accounting literature has shown positive abnormal accruals are associated with the assumption that managers are managing accruals to increase their earnings. Since, Becker, DeFond, Jiambalvo and Subramanyam (1998) noted that firms do willingly manipulate accruals in order to decrease their earnings, but they are less likely to do so to increase earnings. In contrast, Jha, Shankar and Prakash (2015) discuss that firms have the incentive to manage accruals downward or upward either to make equity issuance more appealing or to signal steady growth. To incorporate this assumption, I use the unsigned value of the estimated abnormal accrual.

Regression Models

I develop the following regression to test the effect of both the independent institutional investors with long-term investment and concentrated ownership and gender diversity on constraining abnormal accruals. To measure the moderating effect of board gender diversity on

the relationship between institutional investors and abnormal accruals, I included a variable for gender diversity and the interaction between the gender diversity and Chen, Harford and Li ((2007) type of institutional investors. The model is expressed as follows:

$$y_{t+1} = \beta_0 + \beta_1 \text{ILTIS}_{i,t} + \sum_{2}^{3} \beta_j \text{Holdings}_{i,t} + \sum_{k=4}^{5} \beta_k \text{Board}_{i,t} + \sum_{l=6}^{13} \beta_l X_{i,t} + \beta_{14} \text{Gender diversity}_{i,t} + \beta_{15} \text{ILTIS}_{i,t} \times \text{Gender diversity}_{i,t} + \varepsilon_{i,t} \quad (4)$$

The dependent variable is the variable y which represents the unsigned abnormal accruals for year t+1. The main independent variables are $\text{ILTIS}_{i,t}$, $\text{gender diversity}_{i,t}$ and $\text{ILTIS}_{i,t} \times \text{gender diversity}_{i,t}$. $\text{ILTIS}_{i,t}$ represents Chen, Harford and Li (2007) type of institutional investors. It is measured as the aggregate holdings by independent, long-term, dedicated and quasi-indexer institutions among the top 5 institutional investors. $\text{gender diversity}_{i,t}$ represents gender diversity which is the percentage of women on the board. $\text{ILTIS}_{i,t} \times \text{gender diversity}_{i,t}$ is the interaction between institutional ownership and gender diversity. It represents the main independent variable in this model. It measures the moderating effects of board gender diversity on the relationship between institutional investors and abnormal accruals.

To investigate this relationship, I control for holdings board, CEO and firm characteristics. $\text{holdings}_{i,t}$ is composed of the total holdings and the other type of top 5 institutional investors. Total holding refers to the total number of shares outstanding for each firm. The other type of top 5 institutional investors refers to institutional investors that are among the top 5 but do not satisfy Chen typology. $\text{Board}_{i,t}$ represents the different characteristics of the boards: Board composition as the proportion of independent directors and board size. $X_{i,j}$

represents the firm and CEO characteristics, which are book to market ratio, firm leverage, firm age, firm size, return on asset, operating cash flow over asset, CEO gender, CEO tenure and CEO duality.

2.4 Results

This section provides the results from this empirical analysis. First, I provide a summary of the sample characteristics. Then I present the main results and the robustness checks.

2.4.1 Descriptive statistics

Descriptive statistics of the dataset are reported in Table 2.2. I find that on average firms have at least 10.8373% of women on the board. While reporting this percentage to the average board size, I find that on average firms have between 0 and 1 women on their board (10.8909%*8.9898). However, the maximum number of women on a board is around 7 (36.3636%*19). These statistics show that while many firms include women on their board, the number of women on their boards is still quite low. Thus, their impact might be very minimal. Terjesen, Sealy and Singh (2009) discuss that firms need at least three or more women on the board for them to have a significant impact on management behavior. Based on this requirement more than half of the firms in the sample might not have enough women on the board to profit from their impact.

Table 2.2
Summary statistics

This table provides the summary statistics of the main sample. All the variables have been winsorized at 1st and the 99th percentiles to remove the outliers. A description of each variable is available in appendix 1. *Abnormal accruals* are measured following Francis, LaFond, Olsson and Schipper (2005). *ILTIS* represent the Chen, Harford and Li (2007) type of institutional investors. *Gender diversity* represents the percentage of women on board. *Interaction* refers to the interaction between ILTIS and each indicator of gender diversity. The control variables include other top 5 holdings, total holdings, board size, the percentage of independent directors, CEO tenure, CEO duality, CEO gender, firm size, book to market ratio, leverage, firm age, return on asset, OCF/asset.

Table 2.2 Summary statistics - *Continued*

Variable	Obs.	Mean	SD	Min	Max
Main variables					
Abnormal accruals	22,595	0.0609	0.0706	0.0006	0.4073
ILTIS	22,595	10,200,000	13,400,000	0	74,100,000
Gender diversity	22,595	10.89098	9.455917	0	36.36364
Interaction	22,595	130,000,000	249,000,000	0	1,520,000,000
Holdings characteristics					
Other top 5 holdings	22,595	14,500,000	17,700,000	0	103,000,000
Total holdings	22,595	126,000,000	224,000,000	4,373,569	1,430,000,000
board and CEO characteristics					
Board size(log)	22,595	2.1670	0.2395	1.6094	2.6390
Board size	22,595	8.989888	2.169838	3	19
% independent directors	22,595	75.9859	12.6812	37.5	92.3076
CEO duality	22,595	0.6156	0.4864	0	1
CEO tenure	22,595	9.312	7.776	0	37
CEO gender	22,595	0.0410	0.1984	0	1
Financial Characteristics					
Firm size	22,595	7.7257	1.5175	4.6858	11.7545
Firm age	22,595	3.2171	0.6215	1.6094	4.4773
Leverage	22,595	0.1849	0.1549	0	0.6376
Return on asset	22,595	5.6816	7.5398	-28.278	22.833
OCF/asset	22,595	0.1136	0.0687	-0.0862	0.3051
Book to Market Ratio	22,595	0.4810	0.3069	0.0263	1.6858

Table 2.3 provides the distribution of the sample by year and industry. From the yearly distribution, I observe a significant increase in the number of firms with at least one woman on the board from 2003 to 2014. In fact, the number of firms with at least one woman on the board increases from 179 in 2003 to 479 in 2014. The distribution shows that more firms are including women on their boards. Next, the percentage of firms with more than 25% women on their board increases by nearly 10%. The percentage increased from 4.09% to 14.24% from 2003 to 2014. This increase in female directors is consistent with the increased focus on women board representation by lawmakers, practitioners and scholars (Adams, Gray and Nowland (2011); Brown, Brown and Anastasopoulos (2002); Campbell and Mínguez-Vera (2008); Fields, Fraser and Subrahmanyam (2012); Gul, Srinidhi and Tsui (2012)). However, the low percentage shows

that while the number of firms that include women on their board has increased; only a limited number of firms have more than 25% women on their board. Finally, looking at the total number of female directors, I see that the number of female board members has increased from 254 to 816 during a period of 11 years, while the average number of women on boards per firm is less than two.

From the industry distribution, I see that the dataset includes a higher number of business equipment firms (1466) followed by firms in manufacturing (958). However, the percentage of firms with at least one woman on the board is higher in the consumer nondurable and the Chemicals and allied products industries. Similarly, the percentage of firms with at least 25% gender diversity is higher for firms in the Consumer nondurable and Chemicals and allied products industries. Like for the yearly distribution, I see that the number of firms with at least one woman on the board is higher, while the number of firms with 25% women on the board is limited. In sum, I see that more firms include women on their board of directors. However, it is difficult to increase the representation to more than 25%.

Table 2.3
Sample distributions

This table provides the distributions of the sample comprised of 973 firms with 5,668 firm years' observations and 22,595 firm quarter' observations. It presents the distribution by year and by industry

Panel A: Sample distribution by Fiscal year							
fiscal year	number of firms	Gender diversity>0		Gender diversity >25%		Total number of female directors	Female directors/Firms
2003	318	179	56.29%	13	4.09%	254	0.799
2004	346	213	61.56%	19	5.49%	305	0.881
2005	358	227	63.41%	19	5.31%	330	0.921
2006	371	234	63.07%	20	5.39%	345	0.930
2007	398	264	66.33%	28	7.04%	407	1.022

(Continued)

Table 2.3 Sample distributions - *Continued*

fiscal year	number of firms	Gender diversity>0		Gender diversity >25%		Total number of female directors	Female directors/Firms
2008	418	268	64.11%	35	8.37%	411	0.983
2009	509	338	66.40%	51	10.02%	547	1.074
2010	525	343	65.33%	51	9.71%	561	1.070
2011	554	373	67.33%	51	9.21%	599	1.081
2012	601	422	70.22%	62	10.32%	687	1.143
2013	625	455	72.80%	83	13.28%	747	1.195
2014	645	479	74.26%	92	14.26%	816	1.265

Panel B: Sample Distribution by Fama-French Industry Classification

Industry description	All firms	Gender diversity>0		Gender diversity>25	
			%		%
Business Equipment	1,466	733	50.00%	82	5.59%
Chemicals and allied products	271	236	87.08%	45	16.61%
Consumer durable	196	141	71.94%	20	10.20%
Consumer nondurable	420	345	82.14%	99	23.57%
Health Care, Medical Equipment, Drugs	628	461	73.41%	35	5.57%
Manufacturing	958	632	65.97%	54	5.64%
Oil, Gas and Coal Extraction and Production	295	159	53.90%	4	1.36%
Others	528	408	77.27%	63	11.93%
Wholesale, Retail and some services	906	680	75.06%	122	13.47%
Total	5,668	3795		524	

2.4.2 Main results

Table 2.4 provides the results from the pooled ordinary least squares regression conducted to test the impact of gender diversity and institutional ownership on firms' abnormal accruals. The dependent variable is the variable y which represents the unsigned abnormal accruals. The independent variables are independent institutional investors with long-term investment and concentrated ownership (ILTIS), gender diversity and the interaction between them. Model 1 includes the financial characteristics as the independent variables. Model 2

includes financial, board and CEO characteristics as the independent variables. In Model 3, I add the holdings characteristics. Finally, model 4 includes the all independent variables.

Table 2.4
Main regressions

This table reports the main regressions. The dependent variable is *abnormal accruals* as measured by Francis, LaFond, Olsson and Schipper (2005). *ILTIS* represent the Chen, Harford and Li (2007) type of institutional investors. *Gender diversity* refers to the percentage of women on the board. The main independent variable is Interaction which refers to the interaction between ILTIS and gender diversity. The control variables include other top 5 holdings, total holdings, board size, the percentage of independent directors, CEO tenure, CEO duality, CEO gender, firm size, book to market ratio, leverage, firm age, return on asset, OCF/asset. Model 1 includes the financial characteristics. Model 2 includes financial, board and CEO characteristics. In Model 3, I add the holdings characteristics. Finally, I add ILTIS, gender diversity and interaction in model 4. *,**,*** indicate p-value less than 0.10, 0.05, 0.01 respectively.

	(1) Abnormal accruals	(2) Abnormal accruals	(3) Abnormal accruals	(4) Abnormal accruals
ILTIS				-2.65e-10***
				(-3.712)
Gender diversity				-0.00030***
				(-4.437)
Interaction				1.57e-11***
				(3.827)
Other top 5 holdings			-2.29e-11	-2.44e-11
			(-0.714)	(-0.756)
Total holdings			2.60e-11***	2.51e-11***
			(8.529)	(8.168)
Board size		-0.0188***	-0.0182***	-0.0166***
		(-7.883)	(-7.632)	(-6.742)
% independent directors		2.24e-06	-1.25e-06	1.36e-05
		(0.0589)	(-0.0329)	(0.357)
CEO tenure		-3.80e-05	-5.24e-05	-7.24e-05
		(-0.582)	(-0.804)	(-1.106)
CEO duality		-0.00234*	-0.00248*	-0.00238*
		(-2.340)	(-2.483)	(-2.381)

(Continued)

Table 2.4 Main regressions - *Continued*

	(1) Abnormal accruals	(2) Abnormal accruals	(3) Abnormal accruals	(4) Abnormal accruals
CEO gender		-0.0155***	-0.0172***	-0.0159***
		(-6.653)	(-7.365)	(-6.692)
Firm size	-0.00336***	-0.00195***	-0.00482***	-0.00424***
	(-8.749)	(-4.559)	(-8.442)	(-6.957)
Book to Market Ratio	-0.0194***	-0.0179***	-0.0210***	-0.0206***
	(-10.72)	(-9.814)	(-11.26)	(-11.01)
Leverage	-0.0373***	-0.0332***	-0.0300***	-0.0295***
	(-11.90)	(-10.37)	(-9.315)	(-9.147)
Firm age	-0.00629***	-0.00457***	-0.00540***	-0.00561***
	(-7.581)	(-5.369)	(-6.320)	(-6.560)
Return on asset	-0.00039**	-0.00040***	-0.00031***	-0.00033***
	(-4.753)	(-4.891)	(-3.793)	(-4.040)
OCF/asset	-0.0124	-0.0130	-0.0149	-0.0138
	(-1.440)	(-1.508)	(-1.743)	(-1.602)
Industry classification	0.00211***	0.00208***	0.00199***	0.00202***
	(14.65)	(14.41)	(13.80)	(13.95)
Constant	0.114***	0.139***	0.161***	0.157***
	(30.39)	(24.66)	(25.60)	(24.09)
Observations	22,595	22,595	22,595	22,595
R-squared	0.036	0.041	0.044	0.045

From model 4, I find that independent institutional investors with long-term investment and concentrated ownership have a significant constraining effect on abnormal accruals. In fact, the results show a negative coefficient of -2.65E-10, significant at 1% for independent institutional investors with long-term investment and concentrated ownership. One standard deviation change in ILTIS reduces abnormal accruals by 5.02% ((-2.65E-10* 13,400,000)/ 0.07066)*100). These results show that the presence of independent institutional investors with long-term investment and concentrated ownership (ILTIS) reduce manipulation of accruals. ILTIS is a strong governance mechanism that can constrain managers' behavior. Thus, Hypothesis 1 is supported.

For gender diversity, I find that women board presence had a direct and significant effect on firms' decision to manipulate accruals (-0.000302, p<1%). In fact, one standard deviation increase in gender diversity reduces accruals manipulations by 4.04% ((0.000302*9.456)/0.07066)*100). This result shows that board gender diversity can significantly constrain firms' manipulations. Next, I test the moderating effect of gender diversity on independent institutional investors with long-term investment and concentrated ownership. I find that the interaction between gender and ILTIS has a significant effect on the firms' manipulations of accruals (p<1%). This result supports Hypothesis 2, which states that Board gender diversity moderates the relationship between independent institutional investors with long-term investment and concentrated ownership and abnormal accruals.

In addition, I find that gender diversity weakens the constraining effect of ILTIS. In fact, there is a positive significant relationship between the interaction of gender diversity and ILTIS and abnormal accruals (1.57E -11, p<1%). One standard deviation increase in the interaction factor increases abnormal accruals by 5.53% ((1.57E-11* 2.49E+08)/ 0.07066)*100). This shows that women board presence did not facilitate the constraining effects of institutional investors. On the contrary, when Board gender diversity is higher, the constraining effect of ILTIS on abnormal accruals is reduced. Thus H3b is supported.

In sum, the main results showed that independent institutional investors with long-term investment and concentrated ownership constraint abnormal accruals in the US. This result is consistent with previous research which shows that ILTIS give more importance to monitoring. Thus, they are more likely to constraint abnormal accruals. In addition, I find that while board gender diversity has a significant constraining effect on abnormal accruals, it significantly lessen the effects of institutional investors on abnormal accruals. Instead of reducing firms'

manipulation of accruals, the presence of gender diversity and ILTIS increases abnormal accruals. This finding shows that while gender diverse board can actively constrain abnormal accruals in firms, they are not able to effectively increase the constraining effects of institutional investors. In contrast, the association of board gender diversity with independent institutional investors with long-term investment and concentrated ownership leads to overmonitoring. The results are similar when I include year fixed effects (Table 2.5).

Table 2.5

Fixed effect regressions

This table reports the fixed effects regressions. The dependent variable is *abnormal accruals* as measured by Francis, LaFond, Olsson and Schipper (2005). *ILTIS* represent the Chen, Harford and Li (2007) type of institutional investors. Gender diversity refers to the percentage of women on the board. *Interaction* refers to the interaction between ILTIS and gender diversity. The control variables include other top 5 holdings, total holdings, board size, the percentage of independent directors, CEO tenure, CEO duality, CEO gender, firm size, book to market ratio, leverage, firm age, return on asset, OCF/asset. Model 1 includes the year and industry fixed effects. Model 2 includes quarter and industry fixed effects. *, **, *** indicate p-value less than 0.10, 0.05 and 0.01 respectively.

	(1)	(2)
Variables	Abnormal accruals	Abnormal accruals
ILTIS	-2.97e-10***	-2.98e-10***
	(-4.160)	(-4.155)
Gender diversity	-0.000256***	-0.000256***
	(-3.718)	(-3.714)
interaction	1.64e-11***	1.64e-11***
	(3.997)	(3.992)
Other top 5 holdings	2.24e-13	2.18e-13
	(0.00694)	(0.00674)
Total holdings	1.99e-11 ***	1.99e-11***
	(6.407)	(6.404)
Board size	-0.0135***	-0.0135***
	(-5.410)	(-5.406)
% independent directors	0.000110**	0.000110**
	(2.668)	(2.666)
CEO tenure	-0.000128	-0.000128
	(-1.950)	(-1.948)

(Continued)

Table 2.5 Fixed effect regressions – *Continued*

	(1) Abnormal accruals	(2) Abnormal accruals
CEO duality	-0.00348***	-0.00348***
	(-3.377)	(-3.374)
CEO gender	-0.0135***	-0.0135***
	(-5.707)	(-5.703)
Firm size	-0.00523***	-0.00523***
	(-8.407)	(-8.399)
Book to Market Ratio	-0.0194***	-0.0194***
	(-9.897)	(-9.889)
Leverage	-0.0281***	-0.0281***
	(-8.554)	(-8.547)
Firm age	-0.00519***	-0.00519***
	(-5.934)	(-5.930)
Return on asset	-0.000264**	-0.000264**
	(-3.111)	(-3.108)
OCF/asset	-0.0157	-0.0157
	(-1.779)	(-1.778)
Constant	0.155***	0.155***
	(22.44)	(22.42)
Year FEs	X	
Quarter FEs		X
Industry FEs	X	X
Observations	22,595	22,595
R-squared	0.055	0.055

2.4.3 Further analysis and robustness checks

To test the robustness of my results, I conducted a couple of robustness checks. First, I use alternative measures of gender diversity to test the validity of the main results. Then, I test if my results are not due to the model used to estimate abnormal accruals. Finally, I test whether board gender diversity still lessens the effect of independent institutional investors with long-

term investment and concentrated ownership (ILTIS) on abnormal accruals after controlling for big 4 auditing firms.

- **Alternate measures of accruals**

Different methods to measures accruals have been developed in the accounting literature. In addition to the model proposed by Francis, LaFond, Olsson and Schipper (2005), the Modified Jones Model (Dechow, Sloan and Sweeney (1995)), the performance adjusted (Kothari, Leone and Wasley (2005)) and the Roychowdhury (2006) model were developed to estimate the discretionary accruals. I retest the hypotheses using these alternative measures of earning quality. Appendix B provides the details about the methodologies used. The results found are consistent with the main results. I find that the association of board gender diversity and independent institutional investors with long-term investment and concentrated ownership (ILTIS) leads to an increase in abnormal accruals. These results support the view that the interactions between gender diversity and ILTIS lead to overmonitoring. In sum, I prove that the results of this study are not due to the methodology used to calculate the discretionary accruals. The results are provided in table 2.6

Table 2.6
Alternative measures of Accruals

This table reports regressions using alternative measures of abnormal accruals. Model 1 and 2 uses the modified Jones model to estimate abnormal accruals. Model 3 and 4 use the performance matched model to estimate abnormal accruals. Model 5 and 6 use the model by Roychowdhury (2006) to estimate abnormal accruals. *ILTIS* represent the Chen, Harford and Li (2007) type of institutional investors. *Gender diversity* is measured as the percentage of women on board. Interaction refers to the interaction between ILTIS and each indicator of gender diversity. The control variables include other top 5 holdings, total holdings, board size, the percentage of independent directors, CEO tenure, CEO duality, CEO gender, firm size, book to market ratio, leverage, firm age, return on asset, and OCF/asset. Model 1, 3, 5 includes the year and industry fixed effects. Model 2, 4,6 includes quarter and industry fixed effects. *, **, *** indicate p-value less than 0.10, 0.05, and 0.01 respectively.

Table 2.6 Alternative measures of Accruals - *Continued*

	(1) Modified jones	(2) Modified jones	(3) Performance matched	(4) Performance matched	(5) Roychowdhury (2006)	(6) Roychowdhury (2006)
ILTIS	-3.97e-10***	-3.97e-10***	-3.35e-10***	-3.35e-10***	-3.09e-10**	-3.09e-10**
	(-4.163)	(-4.160)	(-4.386)	(-4.382)	(-3.092)	(-3.090)
Gender diversity	-0.000185*	-0.000185*	-0.000147*	-0.000147*	-0.0000559	-0.0000561
	(-2.012)	(-2.012)	(-1.999)	(-1.997)	(-0.581)	(-0.582)
Interaction	2 e-11 ***	2e-11***	2e-11***	2e-11***	2e-11***	2e-11***
	(3.367)	(3.366)	(4.183)	(4.179)	(3.304)	(3.303)
Other top 5 holdings	-2e-10***	-2e-10***	-4.1e-11	-4.1e-11	-1.3e-10**	-1.3e-10**
	(-4.425)	(-4.424)	(-1.187)	(-1.186)	(-2.888)	(-2.887)
Total holdings	5 e-11***	5 e-11***	2 e-11***	2 e-11***	4 e-11***	4 e-11***
	(11.530)	(11.520)	(6.073)	(6.069)	(9.353)	(9.346)
Board size	-0.00118	-0.00118	-0.0151***	-0.0151***	-0.00418	-0.00418
	(-0.353)	(-0.352)	(-5.640)	(-5.636)	(-1.195)	(-1.194)
% independent directors	0.00008	0.00008	0.00007	0.00007	0.00008	0.00008
	(1.466)	(1.464)	(1.582)	(1.580)	(1.369)	(1.368)
CEO tenure	-0.0003***	-0.0003***	0.0004	0.0004	-0.0002*	-0.0002*
	(-3.769)	(-3.766)	(0.517)	(0.516)	(-2.462)	(-2.460)
CEO duality	0.000156	0.000156	-0.00327**	-0.00327**	-0.000699	-0.000698
	-0.113	-0.113	(-2.963)	(-2.961)	(-0.485)	(-0.484)
CEO gender	0.00371	0.00371	-0.00527*	-0.00527*	0.00162	0.00162
	(1.175)	(1.174)	(-2.079)	(-2.077)	(0.489)	(0.488)

(Continued)

Table 2.6 Alternative measures of Accruals - *Continued*

	(1) Modified jones	(2) Modified jones	(3) Performance matched	(4) Performance matched	(5) Roychowdhury (2006)	(6) Roychowdhury (2006)
Firm size	-0.0056***	-0.0056***	-0.0042***	-0.0042***	-0.0047***	-0.0047***
	(-6.776)	(-6.769)	(-6.370)	(-6.365)	(-5.354)	(-5.348)
Book to Market	0.00369	0.00369	-0.0174***	-0.0174***	0.00433	0.00433
Ratio	-1.413	-1.412	(-8.316)	(-8.309)	(-1.584)	(-1.582
Leverage	-0.00213	-0.00213	-0.0267***	-0.0267***	-0.00896	-0.00896
	(-0.487)	(-0.486)	(-7.592)	(-7.586)	(-1.950)	(-1.948)
Firm age	-0.00740***	-0.00740***	-0.00731***	-0.00731***	-0.00857***	-0.00857***
	(-6.348)	(-6.343)	(-7.811)	(-7.805)	(-7.007)	(-7.001)
Return on asset	-0.000356**	-0.000356**	-0.000333***	-0.000333***	-0.000421***	-0.000421***
	(-3.143)	(-3.141)	(-3.663)	(-3.660)	(-3.546)	(-3.543)
OCF/asset	0.0503***	0.0503***	-0.0268**	-0.0268**	0.0449***	0.0449***
	(4.261)	(4.258)	(-2.833)	(-2.831)	(3.629)	(3.626)
Constant	0.121***	0.121***	0.152***	0.152***	0.116***	0.116***
	(13.14)	(13.13)	(20.64)	(20.62)	(12.04)	(12.03)
year FEs	X		X		X	
quarter FEs		X		X		X
industry FEs	X	X	X	X	X	X
Obs.	22,543	22,543	22,595	22,595	22,543	22,543
R-squared	0.037	0.037	0.051	0.051	0.03	0.03

- **Alternate measures of gender diversity**

There are different measures used in the corporate governance to proxy for board gender diversity. There is a possibility that the results might be different based on the measures used. To mitigate this concern, I construct dichotomous measures of gender diversity following Srinidhi, Gul and Tsui (2011). I construct indicators that are equal to one when there are at least one, two, three or four women on the board and zero otherwise. For example, gender diversity=1 if the number of women equals two and more, and gender diversity=0 if the number of women is equal to one or zero. Table 2.7 panel A provides the results of these regressions.

In Panel B, I construct indicators that take one, two, three or four women and no woman otherwise. For example, gender diversity=1 if the number of women is equal to two and more, and gender diversity=0 if the number of women is equal to zero and I drop boards with one woman. Results from both panels are qualitatively similar to the main results. In fact, I find that board gender diversity associated with independent institutional investors with long-term investment and concentrated ownership leads to overmonitoring. However, since the sample becomes small when more than four women are included on the board, I do not find significant results when there are more than 4 women on the board.

- **Does overmonitoring exist when the firm auditor is a big auditing firm?**

High-quality auditing firms are associated with increased informativeness of firm financial reporting. They reduce the ability for managers to manage accruals. They enhance the ability to detect any accruals management. Thus, firms that are audited by high-quality firms will have lower abnormal accruals. Therefore, the interaction between gender diversity and stronger governance will not have a significant impact on abnormal accruals. To ensure that the results are not affected by the presence of high-quality auditors, I include one more control variables.

Table 2.7

Alternative measures of gender diversity

This table reports regressions using alternative measures of gender diversity. The dependent variable is abnormal accruals as measured by Francis et al. (2005). *ILTIS* represent the Chen, Harford and Li (2007) type of institutional investors. In panel A, I construct indicators that are equal to one when there is at least one, two, three or four women on the board and Zero otherwise. For example, gender diversity=1 if the number of women equals two and more, and gender diversity=0 if the number of women is equal to one or zero. In Panel B, I construct indicators that take one, two, three or four women and no women otherwise. For example, gender diversity=1 if the number of women is equal to two and more, and gender diversity=0 if the number of women is equal to zero and I drop boards with one woman. *Interaction* refers to the interaction between ILTIS and each indicator of gender diversity. The control variables include other top 5 holdings, total holdings, board size, and percentage of independent directors, CEO tenure, CEO duality, CEO gender, firm size, and book to market ratio, leverage, firm age, and return on asset, OCF/asset. Panel A model 1, 3, 5, 7 and Panel B model 1, 3, 5 includes the year and industry fixed effects. Panel A model 2,4,6,8 and Panel B model 2, 4, 6 includes quarter and industry fixed effects. *, **, *** indicate p-value less than 0.10, 0.05, and 0.01 respectively.

Panel A: sample split at the number of female directors								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	at least one woman		at least two women		at least three women		at least four women	
ILTIS	-2.4e-10***	-2.4e-10***	-1.3e-10**	-1.3e-10**	-1.0e-10*	-1.0e-10*	-6.1e-11	-6.1e-11
	(-3.354)	(-3.351)	(-2.739)	(-2.737)	(-2.496)	(-2.494)	(-1.529)	(-1.529)
Gender diversity	-0.001	-0.001	-0.006***	-0.006***	-0.002	-0.002	-7.29e-05	-7.45e-05
	(-1.154)	(-1.153)	(-4.735)	(-4.731)	(-1.018)	(-1.017)	(-0.0178)	(-0.0182)
Interaction	1.80e-10**	1.80e-10**	1.28e-10*	1.28e-10*	2.08e-10**	2.08e-10**	1.48e-11	1.49e-11
	(3.009)	(3.005)	(2.538)	(2.535)	(2.870)	(2.866)	(0.111)	(0.112)
Other top 5 holdings	1.40e-12	1.41e-12	1.48e-12	1.50e-12	-9.58e-13	-9.44e-13	-1.59e-12	-1.61e-12
	(0.0433)	(0.0436)	(0.0459)	(0.0463)	(-0.0296)	(-0.0291)	(-0.0492)	(-0.0498)
Total holdings	1.9e-11***	1.9e-11***	2.1e-11***	2.1e-11***	2.0e-11***	2.0e-11 ***	2.1e-11 ***	2.1e-11***
	(5.901)	(5.898)	(6.584)	(6.581)	(6.463)	(6.460)	(6.802)	(6.806)

(Continued)

Table 2.7 Alternative measures of gender diversity - *Continued*

Panel A: sample split at the number of female directors								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	at least one woman		at least two women		at least three women		at least four women	
Board size	-0.015***	-0.015***	-0.011***	-0.011***	-0.015***	-0.015***	-0.014***	-0.014***
	(-5.590)	(-5.585)	(-4.494)	(-4.490)	(-5.926)	(-5.921)	(-5.909)	(-5.914)
% independent directors	0.0001*	0.0001*	0.0001**	0.0001**	0.0001*	0.0001*	0.0001*	0.0001*
	(2.486)	(2.484)	(2.926)	(2.923)	(2.460)	(2.458)	(2.492)	(2.494)
CEO tenure	-0.00012	-0.00012	-0.00013*	-0.00013*	-0.00011	-0.00011	-0.00011	-0.00011
	(-1.793)	(-1.791)	(-2.051)	(-2.050)	(-1.734)	(-1.732)	(-1.749)	(-1.751)
CEO duality	-0.0036***	-0.0036***	-0.0035***	-0.0035***	-0.0037***	-0.0037***	-0.0036***	-0.0036***
	(-3.500)	(-3.497)	(-3.355)	(-3.352)	(-3.556)	(-3.554)	(-3.510)	(-3.513)
CEO gender	-0.014***	-0.014***	-0.013***	-0.013***	-0.015***	-0.015***	-0.014***	-0.014***
	(-6.043)	(-6.038)	(-5.734)	(-5.730)	(-6.263)	(-6.258)	(-6.131)	(-6.136)
Firm size	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.006***	-0.006***
	(-8.432)	(-8.425)	(-8.461)	(-8.454)	(-8.724)	(-8.717)	(-9.023)	(-9.030)
Book to Market Ratio	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***	-0.02***
	(-9.903)	(-9.895)	(-10.12)	(-10.11)	(-10.03)	(-10.02)	(-10.03)	(-10.04)
Leverage	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.028***	-0.029***	-0.029***
	(-8.630)	(-8.623)	(-8.574)	(-8.567)	(-8.647)	(-8.640)	(-8.656)	(-8.663)
Firm age	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***	-0.005***
	(-5.766)	(-5.761)	(-5.812)	(-5.808)	(-5.832)	(-5.828)	(-5.747)	(-5.752)
Return on asset	-0.0003**	-0.0003**	-0.0003**	-0.0003**	-0.0003**	-0.0003**	-0.0003**	-0.0003**
	(-3.056)	(-3.053)	(-3.168)	(-3.166)	(-3.059)	(-3.056)	(-2.923)	(-2.926)
OCF/asset	-0.0161	-0.0161	-0.0162	-0.0162	-0.0163	-0.0163	-0.0167	-0.0167
	(-1.820)	(-1.819)	(-1.830)	(-1.829)	(-1.839)	(-1.837)	(-1.885)	(-1.886)
Constant	0.156***	0.156***	0.150***	0.150***	0.156***	0.156***	0.157***	0.157***
	(22.02)	(22.01)	(21.34)	(21.32)	(22.74)	(22.72)	(22.84)	(22.86)
Year FEs	X		X		X		X	
Quarters FEs		X		X		X		X
Industry FEs	X	X	X	X	X	X	X	X

(Continued)

Table 2.7 Alternative measures of gender diversity - *Continued*

Panel A: sample split at the number of female directors

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	at least one woman		at least two women		at least three women		at least four women	
Obs.	22,595	22,595	22,595	22,595	22,595	22,595	22,595	22,595
R-squared	0.054	0.054	0.055	0.055	0.054	0.054	0.054	0.054

Panel B: Multiple female directors versus no female directors

	(1)	(2)	(3)	(4)	(5)	(6)
	two women vs 0		three women vs 0		four women vs 0	
ILTIS	-3.65e-10***	-3.65e-10***	-1.81e-10*	-1.81e-10*	-1.73e-10	-1.73e-10
	(-4.061)	(-4.056)	(-1.809)	(-1.804)	(-1.609)	(-1.605)
Gender diversity	-0.00589**	-0.00589**	-0.00406	-0.00407	-0.00607	-0.00607
	(-3.093)	(-3.089)	(-1.186)	(-1.187)	(-1.100)	(-1.097)
Interaction	3.79e-10***	3.79e-10***	4.27e-10**	4.28e-10**	1.09e-10	1.09e-10
	(3.807)	(3.800)	(3.260)	(3.256)	(0.525)	(0.523)
Other top 5 holdings	-0.000	-0.000	1.47e-10*	1.47e-10*	1.16e-10	1.16e-10
	(-0.828)	(-0.829)	(2.538)	(2.534)	(1.343)	(1.341)
Total holdings	0.000***	0.000***	0.000*	0.000*	0.000*	0.000*
	(5.701)	(5.694)	(2.067)	(2.062)	(2.380)	(2.374)
Board size	-0.0201***	-0.0201***	-0.0154***	-0.0154***	-0.0150**	-0.0150**
	(-5.837)	(-5.830)	(-3.540)	(-3.533)	(-3.200)	(-3.193)
% independent directors	0.000122*	0.000122*	7.63e-05	7.63e-05	0.000125	0.000125
	(2.390)	(2.387)	(1.162)	(1.160)	(1.768)	(1.763)
CEO tenure	-4.45e-05	-4.45e-05	-0.000240*	-0.000240*	-0.000230*	-0.000230*
	(-0.543)	(-0.542)	(-2.449)	(-2.444)	(-2.178)	(-2.173)
CEO duality	-0.00297*	-0.00297*	-0.00112	-0.00112	-0.000237	-0.000237
	(-2.343)	(-2.340)	(-0.669)	(-0.668)	(-0.130)	(-0.130)
CEO gender	-0.0122***	-0.0122***	-0.0133**	-0.0133**	-0.00516	-0.00516
	(-4.125)	(-4.120)	(-2.916)	(-2.910)	(-0.761)	(-0.759)

(Continued)

Table 2.7 Alternative measures of gender diversity - *Continued*

Panel B: Multiple female directors versus no female directors						
	(1)	(2)	(3)	(4)	(5)	(6)
	two women vs 0		three women vs 0		four women vs 0	
Firm size	-0.00374***	-0.00374***	-0.00668***	-0.00668***	-0.00818***	-0.00819***
	(-4.740)	(-4.732)	(-6.043)	(-6.031)	(-6.420)	(-6.405)
Book to Market Ratio	-0.0176***	-0.0176***	-0.0186***	-0.0186***	-0.0200***	-0.0200***
	(-7.203)	(-7.194)	(-5.826)	(-5.815)	(-5.572)	(-5.559)
Leverage	-0.0347***	-0.0347***	-0.0399***	-0.0399***	-0.0353***	-0.0353***
	(-8.589)	(-8.578)	(-7.272)	(-7.257)	(-5.822)	(-5.808)
Firm age	-0.00588***	-0.00588***	-0.00418**	-0.00418**	-0.00190	-0.00190
	(-5.419)	(-5.412)	(-2.815)	(-2.809)	(-1.115)	(-1.113)
Return on asset	-0.000258*	-0.000258*	-7.03e-05	-7.02e-05	-6.70e-05	-6.70e-05
	(-2.506)	(-2.503)	(-0.543)	(-0.541)	(-0.481)	(-0.479)
OCF/asset	-0.0308**	-0.0308**	-0.0597***	-0.0597***	-0.0535***	-0.0535***
	(-2.871)	(-2.868)	(-4.383)	(-4.374)	(-3.597)	(-3.588)
Constant	0.160***	0.160***	0.174***	0.174***	0.176***	0.176***
	(17.86)	(17.83)	(14.53)	(14.50)	(13.07)	(13.03)
Year FEs	X		X		X	
Quarters FEs		X		X		X
Industry FEs	X	X	X	X	X	X
Observations	14,192	14,192	9,042	9,042	7,905	7,905
R-squared	0.060	0.060	0.053	0.053	0.047	0.047

The control variable is big 4 auditing firms, a dummy variable that takes one if the firm's auditing firm is a big 4 auditing firm and zero otherwise. I report the results of this analysis in table 2.8. I find that the association of gender diversity with independent institutional investors with long-term investment and concentrated ownership had a similar effect on abnormal accruals and the effect is significant at 1%. I find that firms with gender-diverse boards and strong governance lead to overmonitoring. In addition, the effect of high-quality auditing firms is insignificant.

Table 2.8
Controlling for Big 4 Auditing firms

This table reports regressions when I control for big 4 auditing firms. *big 4 auditing firms* is a dummy variable that takes one if the firm's auditing firm is a big 4 auditing firm and zero otherwise. The dependent variable is *abnormal accruals* as measured by Francis, LaFond, Olsson and Schipper ((2005)). *ILTIS* represent Chen, Harford and Li (2007) type of institutional investors. *Gender diversity* refers to the percentage of women on the board. *Interaction* refers to the interaction between ILTIS and gender diversity The control variables include other top 5 holdings, total holdings, board size, the percentage of independent directors, CEO tenure, CEO duality, CEO gender, firm size, book to market ratio, leverage, firm age, return on asset, OCF/asset. Model 1 includes the year and industry fixed effects. Model 2 includes quarter and industry fixed effects. *,**,*** indicate p-value less than 0.10, 0.05, 0.01 respectively.

	(1) Abnormal accruals	(2) Abnormal accruals
ILTIS	-3.01e-10***	-3.01e-10***
	(-4.211)	(-4.207)
Gender diversity	-0.000266***	-0.000265***
	(-3.841)	(-3.837)
Interaction	1.67e-11***	1.67e-11***
	(4.064)	(4.059)
Other top 5 holdings	3.80e-13	3.76e-13
	(0.0118)	(0.0116)
Total holdings	2.02e-11***	2.02e-11***
	(6.487)	(6.483)
Board size	-0.0139***	-0.0139***
	(-5.545)	(-5.540)
% independent directors	0.000106*	0.000106*
	(2.557)	(2.555)
CEO tenure	-0.000121	-0.000121

(Continued)

Table 2.8 Controlling for Big 4 Auditing firms - *Continued*

	(1) Abnormal accruals	(2) Abnormal accruals
	(-1.842)	(-1.841)
CEO duality	-0.00345***	-0.00345***
	(-3.341)	(-3.338)
CEO gender	-0.0134***	-0.0134***
	(-5.628)	(-5.623)
Firm size	-0.00535***	-0.00535***
	(-8.537)	(-8.529)
Book to Market Ratio	-0.0194***	-0.0194***
	(-9.888)	(-9.880)
Leverage	-0.0285***	-0.0285***
	(-8.654)	(-8.647)
Firm age	-0.00508***	-0.00508***
	(-5.782)	(-5.778)
Return on asset	-0.000260**	-0.000260**
	(-3.062)	(-3.059)
OCF/asset	-0.0156	-0.0156
	(-1.759)	(-1.758)
Big 4 auditing firms	0.00321	0.00321
	(1.573)	(1.571)
Constant	0.154***	0.154***
	(22.14)	(22.12)
Year FEs	X	
Quarter FEs		X
Industry FEs	X	X
Observations	22,595	22,595
R-squared	0.055	0.055

2.5 Conclusion

This essay investigates the relationship between institutional investors and abnormal accruals and tested the moderating effect of board gender diversity. Based on the existing literature in corporate governance and agency theory, I test the impact of gender-diverse boards and institutional investors independently. Then, I test the moderating effect of board gender diversity on the relationship between institutional investors and abnormal accruals.

The main assumption of the study is that the association of board gender diversity with independent institutional investors leads to overmonitoring, which affects abnormal accruals. Since, research on institutional investors find that not all institutional investors are interested in monitoring, I focus on the independent institutional investors with long-term investment and concentrated ownership (ILTIS). Chen, Harford and Li (2007) find that this type of institutional investors will prefer monitoring to trading.

The findings of this essay show that both board gender diversity and independent institutional investors with long-term investment and concentrated ownership (ILTIS) have significant constraining effects on abnormal accruals. In fact, abnormal accruals are lower when you have a gender diverse board or independent institutional investors with long-term investment and concentrated ownership (ILTIS). However, abnormal accruals increase when firms have both gender-diverse boards and independent institutional investors with long-term investment and concentrated ownership (ILTIS).

These results show that while board gender diversity and independent institutional investors with long-term investment and concentrated ownership (ILTIS) are strong governance mechanisms, their association will lead an increase of manager's misbehavior instead of reducing it. Thus, while board gender diversity is an important governance mechanism, it might not be beneficial for all the firms. In fact, firms with strong governance will not profit for the monitoring effects of board gender diversity.

This essay has plural implications for researchers, policy makers, managers and investors. For research, it further enhances the understanding of gender diversity by showing that board gender diversity might not be an effective governance mechanism for some firms. For

policymakers, managers and investors, this essay shows that firms need to be given the opportunity to choose the board gender composition that fits best with their structure.

CHAPTER III

TEAM GENDER DIVERSITY AND FUND FLOWS: EVIDENCE FROM SOCIALLY CONSCIOUS MUTUAL FUNDS

3.1 Introduction

Investment in socially conscious mutual funds has grown at a rapid pace in recent years. A socially conscious mutual fund uses the environment, social and governance requirement to screen their investments (SIF (2014)). In the United States, socially conscious mutual funds represent around 11% of the professionally managed assets (Riedl and Smeets (2017)). Along with the growth in the market share, the number of funds increased by more than 200% in the last 17 years. In 1997, fifty-five (55) socially conscious mutual funds existed and they represented a value of $12 billion. Years later, in 2014 the number of funds reached 925 with a value of $4.31 trillion (SIF (2014)). However, despite the increase in investments in socially conscious mutual funds, there are still mixed results concerning the reasons why investors choose this type of fund.

Existing literature in this area of research has focused on determining if socially conscious investors will invest in socially conscious funds based on their performance or nonfinancial attributes. While, Bollen (2007) argues that investors will invest in socially conscious funds because of their past performance, Renneboog, Ter Horst and Zhang (2011) find that socially conscious investors are more interested in the type of screening used by socially conscious mutual funds. They invest more in funds which invest in firms with social and ethical values. However, these two views do not integrate the effect of the fund managers attributes in the investors' decisions making process.

In this study, I propose to test the impact of gender diversity of the management team on socially conscious investors' decision making. The main question I attempt to answer is whether socially conscious investors differentiate between funds based on gender diversity in the management team? My main assumption is that socially conscious investors will be sensitive to gender diversity in the management team because gender diversity affects management team decision making, risk aversion and investment style (Atkinson, Baird and Frye (2003) and Niessen and Ruenzi(2006)). However, the direction of the relationship will depend on whether or not the socially conscious investors are different from conventional investors. If socially conscious investors invest in mutual funds base on the value they prone, they will not be affected by gender stereotyping and will invest more in funds with a gender-diverse management team. In contrary, if socially conscious investors are similar to conventional investors, they will be affected by gender stereotyping and will invest less in funds with a gender-diverse management team.

To implement this analysis, I collect data on socially conscious funds from Sustainable & Responsible Mutual Fund Chart available on The Forum for Sustainable and Responsible Investment. Then, I merge the dataset with CRSP to get the fund characteristics and returns. Using the matched dataset, I collect data on gender diversity by looking at the fund's profile available on Morningstar Investment Research center. The dataset is comprised of a total of 763 fund year observations. Since at least 66% of the mutual funds under analysis are identified as the team managed or has more than one manager, I measure gender diversity as the percentage of female managers in a team. This approach allows me to analyze both team-managed and single-managed mutual funds.

My findings show that gender diversity in the management team significantly affects socially conscious investors. However, socially conscious investors invest less in the socially conscious mutual funds with a gender-diverse management team. Fund inflows are lower for socially conscious funds with gender-diverse management teams. My results are significant after controlling for measurement biases and the financial crisis of 2008. I successfully show that while investors choose to invest in socially conscious funds because of the values that they support. They are also significantly affected by gender stereotyping.

My results make important contributions for research and investors. For research, I supplement the existing literature on the determinants of socially conscious investors' behavior by showing that socially conscious investors do not apply some of the social values, such as diversity and equal employment diversity, when they invest into socially conscious funds. For investors, this study shows that investors do not need to discriminate between socially conscious mutual funds based on gender, since socially conscious funds with gender-diverse management have better performance. They can stay true to their values and promote diversity by investing in funds with gender-diverse management teams.

The essay is organized as follows. The next section discusses the theory, framework used, and hypotheses development. The third section discusses the methodology used to test the hypotheses and data collection. The fourth section presents the results of the analysis. Finally, the fifth section draws the conclusion.

3.2 Literature reviews and hypotheses development

In this section, I present the theoretical predictions that motivate this empirical analysis. First I provide a brief overview of the characteristics of socially conscious mutual funds and how these characteristics affect fund flows. Then, I discuss the effects of gender diversity on investor

choice of socially conscious mutual funds. Especially, I outline the theoretical predictions concerning the impact of gender diversity on socially conscious mutual funds flow. Finally, I develop two hypotheses to test these predictions.

3.2.1 Socially conscious mutual funds

Sustainable and responsible investment (SRI) is defined by Social Investment Forum (SIF) as "an investment discipline that considers environmental, social and corporate governance (ESG) criteria to generate long-term competitive financial returns and positive societal impact" (SIF (2014)). Socially conscious mutual funds are a type of SRI. These funds invest only in firms that engage in socially responsible activities such as diversity and equal employment diversity. They are prioritized by investors who believe that their investments will contribute to the good of society. To maintain the ESG criteria, socially conscious mutual funds must go through a tight screening process. They must carefully evaluate if the firms, they are investing in, are socially responsible. However, this requirement restricts the investment portfolio of socially conscious mutual funds and can have a significant impact on the fund flow.

There are two views concerning the impact of socially responsible screening on fund flows. The first view assumes that socially conscious investors are rational investors and they only invest in socially conscious mutual funds with good performance. Thus, they do not differ from the conventional investors. Bollen (2007) finds that cash inflows or outflows in socially conscious mutual funds are due to the past performance of the funds. Thus, the socially responsible screens did not affect investors' decision to invest in socially conscious funds. The second view assumes that socially conscious investors' decision to invest is due to the socially responsible screens that they use. Renneboog, Ter Horst and Zhang (2011) find that investors

differentiate between socially conscious mutual funds based on the type of screens that the funds use. Investors invest more in funds with social and ethical screens.

However, these two views did not integrate the impact of the management team' skills in the investors' decisions making process. The mutual fund literature shows that managerial skills have important effects on investors' decision making and they have a significant impact on fund flow (Chevalier and Ellison (1999); Niessen-Ruenzi and Ruenzi (2015); Niessen and Ruenzi (2006)). One of the attributes studied in the literature is Gender diversity. Looking at fixed income mutual funds, Atkinson, Baird and Frye (2003) find that managers' attributes like gender play an important role in investors' decision making. They find that fund inflow is lower when there is a woman on the management team. Similarly, this essay test if gender has significant on socially conscious investors' decision making. I investigate whether socially conscious investors differentiate between funds based on the gender composition of the management team. In the following section, I discuss how gender diversity affects investors' choice of socially conscious mutual funds.

3.2.2 The impact of gender diversity on investor choice of socially conscious mutual funds

There are two possible views on the effect of gender diversity on investors' choice of socially conscious mutual funds. The first view is based on the assumption that socially conscious investors and conventional investors are alike. Thus, they will follow similar investment strategies. Based on this assumption, I can assume that socially conscious investors will invest less in female-managed funds. In fact, research on mutual funds management discusses that investors invest less in female-managed funds. Investors' fund selection is affected by stereotypes and behavioral bias like gender stereotypes (Bailey, Kumar and Ng (2011)). Research finds that investors have a prejudice against female-managers and this explains the low

number of female-managed mutual funds (Niessen-Ruenzi and Ruenzi (2015)). This prejudice is demonstrated by their low investment in female-managed mutual funds (Niessen and Ruenzi (2006)). Thus, I propose the following hypothesis:

Hypothesis 1a: Team gender diversity is negatively associated with investors' decision to invest in socially conscious mutual funds

Another assumption is that socially conscious investors differ from the conventional investors. Investors choose to invest in socially conscious mutual funds because they believe that their investments will benefit society as a whole. They believe in the values advocated by these funds. Since one of these values is diversity and equal employment opportunity, I can assume that socially conscious investors will be more likely to promote and foster gender diversity in funds' team management. Thus, I propose the following hypothesis:

Hypothesis 1b: Team gender diversity is positively associated with investors' decision to invest in socially conscious mutual funds

3.3 Data and methodology

To test the previous hypotheses, I generate a sample of socially conscious mutual funds matched with the team management, funds and family funds characteristics. In this part, I describe the process I use to select the socially conscious mutual funds. Then, I discuss the sample construction and the sources of the data collected. Next, I present the methodology used to test the hypotheses. Finally, I discuss the measurements of the variables used in the analysis.

3.3.1 Data Sources

For this analysis, the data are collected on gender diversity in the management team, funds management characteristics, fund style, turnover ratio, fund and managers' fees, fund flow, and total net assets. The data sources are Morningstar Investment Research Center, the Center for

Research in Security Prices (CRSP) survivor-bias-free US mutual funds database, and Kenneth French website.

Morningstar Investment Research Center provides comprehensive financial data on thousands of mutual funds. Its fund screener allows me to identify the socially conscious mutual funds as of September 2015. The socially conscious mutual funds identified are merged with CRSP survivor-bias-free US mutual funds database for the period of 2007 to 2014. Following Niessen and Ruenzi (2006), I only include equity mutual funds. I identify these funds using the Lipper Fund Classifications. I obtain 763 fund year observations for the period 2007 to 2014. These observations come from a total of 135 distinct funds.

Using the matched sample, I collect funds management characteristics like gender, career experience, age, education and team size from the funds' profiles provided by the Morningstar Investment Research Center database. The other fund's characteristics are collected from CRSP Survivor-bias-free US mutual funds database. It provides me with the fund returns, the net asset values, fund style, turnover ratio, fund's fees, management's fees and fund flow. Control data on CRSP Survivor-bias-free US mutual funds database are collected from the period of 2006 to 2013. I collect market, size, value and momentum factors used to compute Carhart four-factor alpha from Kenneth French website. To control for the family-specific effects on fund flows, I compute the fund's family flow and size. Finally, I also compute the fund style flow to capture factors due to the fund style.

3.3.2 Methodology and variables description

I conduct an OLS regression to test the effects of gender diversity on the fund inflow. I test if investor decision to invest is affected by gender bias. The model is expressed as follows:

$$\text{Flow}_{i,t} = \beta_0 + \beta_1 \text{ Gender diversity}_{i,t-1} + \sum_{j=2}^{6} \beta_j \text{ fund management characteristics}_{i,t-1}$$

$$+ \sum_{k=7}^{15} \beta_k \text{fund characteristics}_{i,t-1} + \sum_{l=15}^{17} \beta_p \text{family characteristics}_{i,\,t-1}$$

$$+ \beta_{18} \text{ fund style flow}_{t-1} + \varepsilon_{i,t} \qquad (6)$$

The dependent variable is the fund inflows $\text{Flow}_{i,t}$ for each fund i during year t. It measures the flow of investment into the funds using the methodology proposed by Sirri and Tufano (1998). $\text{Flow}_{i,t}$ is computed as the difference between funds return and the growth rate of the total net value of the asset.

$$\text{Flow}_{i,t} = \left(\frac{\text{TNA}_{i,t} - \text{TNA}_{i,t-1}}{\text{TNA}_{i,t-1}} \right) - r_{i,t} \qquad (7)$$

Where $\text{TNA}_{i,t}$ is the size in million USD of fund i for year t measured. And $r_{i,t}$ is the return for fund i in year t.

The primary independent variable is the gender diversity variable measured as the percentage of women on the managing team. The higher the percentage of female managers, the more diverse it is. I determine the gender of the managers using the fund profile provided by Morningstar Investment Research Center database. First, using CRSP mutual fund data, I determine the name of each manager or whether the mutual funds were team managed. Next, using the Morningstar Investment Research Center, I determine who the managers for each team are. Morningstar Investment Research Center also provides a short bio for each manager, which discusses their experience, education and the start date for each manager. Based on the pronoun used to describe each manager, I manually identified the gender of each manager and the number

of female managers in each managing team. Then, I divide it by the total number of managers to compute the percentage of female managers.

To investigate the impact of gender diversity on fund flow, I control for fund and fund management characteristics following prior literature (Ding and Wermers (2012); Fang and Wang (2015); Niessen-Ruenzi and Ruenzi (2015); Niessen and Ruenzi (2006); Qian (2006)). I also control for fund family characteristics and style flow. Finally, I control for fund risk and fund performance. Following exiting research on fund flows, I use a one year lag for gender diversity, fund management characteristics, funds characteristics, family characteristics and style flow because this study assumes that investors use prior knowledge (Bollen (2007); Renneboog, Ter Horst and Zhang (2011); Sirri and Tufano (1998)).

The fund management characteristics represent the characteristics of the managing teams. Following Fang and Wang (2015), I control for tenure, career experience, manager age, team size, CFA dummy, CPA dummy, MBA/Master dummy and Ph.D. dummy. Tenure is measured as the average of the length of time since each manager started managing funds i. To compute career experience, I first determine the length of time since each manager first became a portfolio manager. For manager age, I take the log of manager age in years. Manager age in years is computed as manager career experience plus 23 years (Fang and Wang (2015); Niessen-Ruenzi and Ruenzi (2015)). Then, I measure the manager tenure, career experience and age at the team level using the coefficient of variation of the team members' age, career experience, and tenure (Bär, Kempf and Ruenzi (2010); Karagiannidis (2012)). For the education-related variables I use dummy variables. CFA dummy takes one if at least one manager has the CFA and zero otherwise. CPA dummy takes one if at least one manager has the CPA and zero otherwise. MBA/Master dummy takes one if the highest degree in the team is an MBA or master and zero

otherwise. A Ph.D. dummy that takes one if the highest degree in the team is a Ph.D. Team size refers to the number of managers on a managing team.

The fund characteristics refer to the different characteristics of the funds. Following Qian (2006), I control for fund age, fund size, turnover ratio, management fees, 12b1 fees, the rear fees load, the front fees load, fund style, expense ratio, and institutional dummy. A complete description of these variables is available in Appendix A. Following Niessen and Ruenzi (2006), I also control for family characteristics and style flow. The family characteristics I look at are the family size and family flow. Family size is computed as the sum of the total net assets of all funds inside a family. Family flow is measured as the flow of money inside a family. I also control for the flow of money in each fund style.

Since Niessen and Ruenzi (2006) find that fund risk has an important impact on fund inflow, I control for fund risk by controlling for the firm systematic risk. I also control for past performance of funds. However, to control for the nonlinear relationship between performance and flow, I include the square of past Carhart alpha (Fang and Wang (2015)). Finally, I control for the fund flow of investment from the previous year.

3.4 Results

This section presents the results from the empirical analysis. First, I provide a summary of the sample characteristics. Then, I show the main results of the test. Finally, I present the results from the robustness checks done to ensure the validity of the main results.

3.4.1 Descriptive Statistics

The dataset is composed of 763 fund year observations for 2007 to 2014. In this dataset, I have 225 fund year observations with at least one woman in the management team. These observations come from a total of 135 distinct funds. Figure 3 provides the graphical

representation of the total number of female and male managers over the period of 2007 to 2014. In the graph, I see an important increase in the number of female managers over the sampled period. However, the number of female managers is significantly lower compared to the number of male managers. In general, the number of female managers represents one-third of the number of male managers.

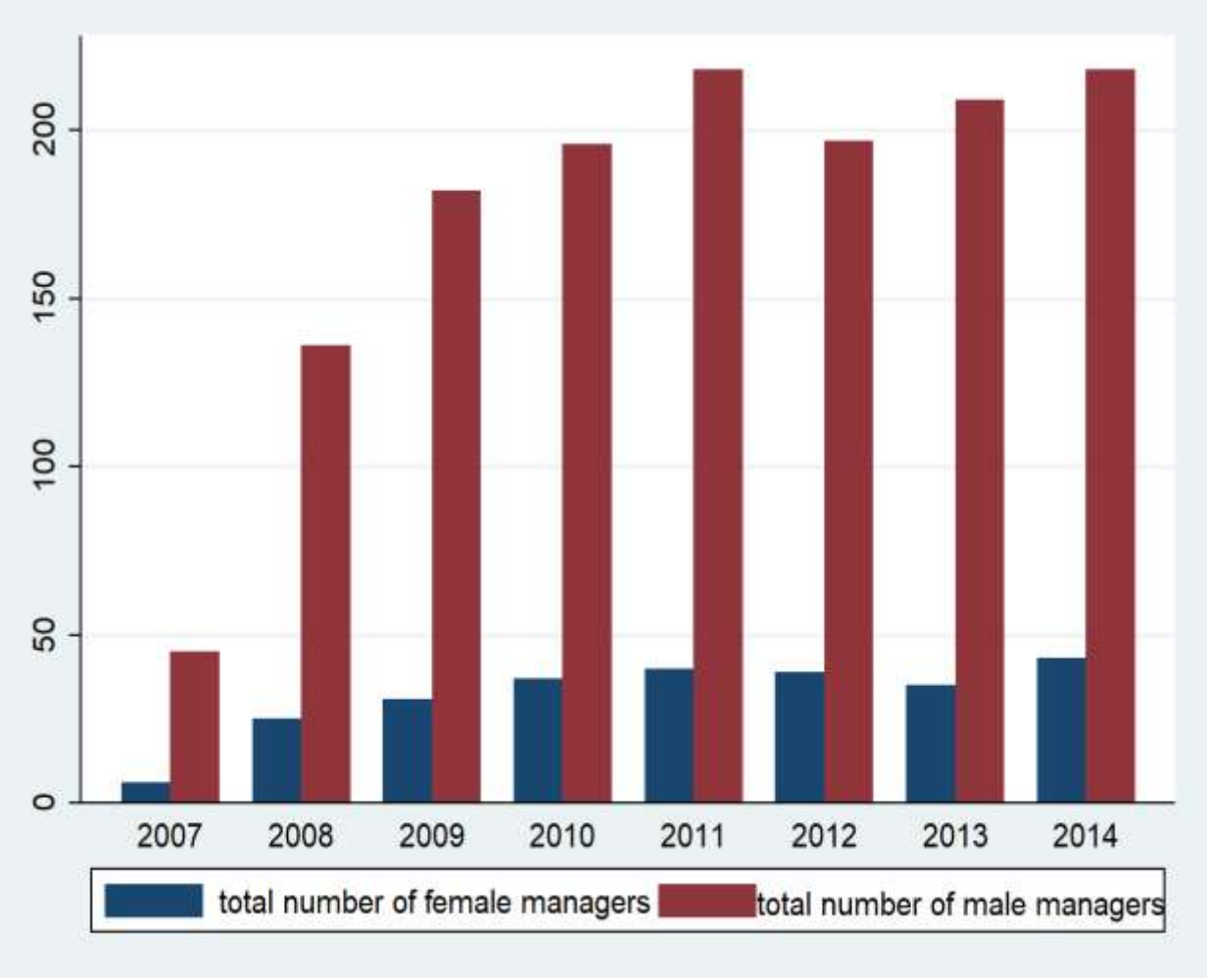

Figure 3: Graphical representation of the total number of female and male managers over the period of 2007 to 2014. Figure 3 provides the graphical representation of the total number of female and male managers over the period of 2007 to 2014. It shows an increase in the total number of female managers over the sample period. However, the number of female managers is significantly lower compared to the number of male managers.

Looking at the descriptive statistics for the dataset in Table 3.1, I find that on average funds have at least 16.131% of women on a managing team. While reporting this percentage to the average team management size, I find that on average funds have zero to one woman in the managing team (16.131%* 2.172). These statistics show that while the number of female managers has increased, there are not many funds that have more than 1 woman on the managing team. However, in the sample I also have funds that have 100% women representation on the managing team because these funds only have one manager. They only represent 7 distinct funds.

Table 3.1
Descriptive statistics

This table reports the descriptive statistics for the sample of socially conscious mutual funds merged with fund, family, style and fund management characteristics. It contains the data for 763 fund year observations for the period of 2007 to 2014. Note that except for fund flow, all the other variables are collected for the previous year. The table provides the summary statistics for all the variables used in the analysis. The fund characteristics refer to fund flow, Carhart alpha, fund age, fund size, turnover ratio, management fees, 12b1 fee, the rear fees, the front fees, expense ratio, fee, fund risk, fund style and institutional dummy. *Fund flow* is measured following Sirri and Tufano (1998). It is computed as the difference between funds return and the growth rate of the total net value of the asset. *Carhart Alpha* is measured using the four-factor model of Carhart(1997). The family and style characteristics are family size, family flow and fund style flow. The fund management characteristics include career experience, managers' age, team size, CFA dummy, CPA dummy, MBA/Master dummy Ph.D. dummy and The main independent variable which is gender diversity. *Gender diversity* is measured as the percentage of women on the management team.

Variable	Obs.	Mean	SD	Min	Max
Fund characteristics					
Fund flow	763	0.639	1.940	-0.642	13.228
Carhart alpha	763	3.21e-05	1.87e-04	-0.001	0.001
Turnover ratio	763	0.607	0.587	0.000	4.870
Fund size	763	3.610	2.069	-2.303	8.745
Fund age	763	1.862	0.868	0.000	4.111
Fund style	763	3.393	1.082	1.000	6.000
Twelveb1 fee	763	0.003	0.003	0.000	0.010
Management fee	763	0.253	2.722	-57.330	3.194
Rear fee	763	0.010	0.022	0.000	0.150
Front fee	763	0.026	0.072	0.000	0.534

(Continued)

Table 3.1 Descriptive statistics - *Continued*

Variable	Obs.	Mean	SD	Min	Max
Expense ratio	763	0.012	0.006	0.001	0.028
Fee	763	0.018	0.012	0.001	0.086
Fund risk	763	0.030	0.010	0.015	0.068
Institutional funds dummy	763	0.307	0.491	0.000	1.000
Family and Style characteristics					
Family flow	763	448.921	2801.366	-3120.870	41031.140
Family size	763	65637.360	253705.600	1.600	2659757.000
Fund style flow	763	4389.970	7928.404	-2419.200	31740.100
Fund Management Characteristics					
Team size	763	2.172	1.887	1.000	20.000
Managers age	763	3.625	0.205	3.178	4.404
Career experience	763	15.344	8.208	1.000	59.000
PhD	763	0.043	0.204	0.000	1.000
MBA	763	0.784	0.412	0.000	1.000
CPA	763	0.033	0.178	0.000	1.000
CFA	763	0.683	0.466	0.000	1.000
Tenure	763	4.695	3.983	0.000	29.000
Gender diversity	763	16.131	29.586	0.000	100.000

Table 3.2 provides the distribution of the sample by year. From the yearly distribution, I observe a significant increase in the number of socially conscious funds for the period of 2007 to 2014. In fact, the number of socially conscious funds increased from 29 to 122 during a period of 7 years. This distribution is consistent with the report from the forum for sustainable and responsible investment, which shows that socially responsible investments increased dramatically from 2007 to 2014.

The increase in the number of socially conscious mutual funds is associated with a significant increase in the number of funds with at least one female manager. In fact, I see that the percentage of funds with at least one female manager has nearly doubled from 2007 to 2014. The percentage increases from 17% to 32% from 2007 to 2014. I see a similar progression in the total number of female managers for each year. The number of female managers increases from

6 to 43. Also, the percentage of funds with 50% gender diversity has almost doubled during the 7 years. However, the average number of female managers per funds is less than 2 from 2007 to 2014.

Finally, I compare socially conscious funds based on gender diversity. Table 3.3 provides the summary statistics of some funds' characteristics for socially conscious funds based on gender diversity. I report the average fund size, age, expense ratio and total loads for funds

Table 3.2:
Sample distribution

This table provides the distribution of the sample by year. Panel A provides the number of funds per year. It also shows the number of funds with gender diversity higher than 0% and the number of funds with gender diversity higher than 50%. Panel B provides the number of managers per year. I also show how many managers were men or women and the average number of women per funds for funds with women in the managing team.

Panel A: Number of funds by year

Year	Number of funds	Number of funds with gender diversity>0%		Number of funds with gender diversity> 50%	
			%		%
2007	29	5	17	4	14
2008	73	21	29	10	14
2009	94	27	29	16	17
2010	104	31	30	19	18
2011	114	34	30	24	21
2012	111	33	30	23	21
2013	116	35	30	25	22
2014	122	39	32	28	23
Total	763	225		149	

Panel B: Number of managers by years

Year	Number of Managers	Number of Female Managers	Number of Male Managers	Female Managers/Funds (for funds female in the managing team)
2007	51	6	45	1.2000
2008	161	25	136	1.1905
2009	213	31	182	1.1481
2010	233	37	196	1.1935
2011	258	40	218	1.1765
2012	236	39	197	1.1818
2013	244	35	209	1.0000
2014	261	43	218	1.1026
Total	1657	256	1401	

with at least 50% gender diversity and funds with more than 50% gender diversity. I find significant differences based on age and size. Table 3.3 shows that funds with at least 50% gender diversity are smaller and older. On average, these funds are $189 million smaller compared to funds with less than 50% gender diversity (Significant at 1). They are also 1.5 years older than funds with less than 50% gender diversity (Significant at 1%).

In sum, the descriptive statistics show that socially conscious mutual funds have increased considerably from 2007 to 2014. This increase is associated with an increase in female managers. However, only smaller and older funds were able to have at least 50% gender diversity in their managing team.

Table 3.3
Average fund characteristics

The table presents the summary statistics of some fund characteristics for socially conscious funds based on gender diversity. It reports the average fund size, fund age, expense ratio and total loads for funds with team gender diversity higher than 50% and team gender diversity lower than 50%. I use the t-test to examine whether the means of the two groups are statistically different. *, **, *** indicate that the p-value is less than 0.10, 0.05, 0.01 respectively.

	Gender diversity >50%	Gender diversity <50%	difference
Fund size (in millions)	113.7980	206.6148	188.4894***
Fund age (in years)	10.2953	8.7850	-1.5103***
Expense ratio (in %)	1.2463	1.2296	0.1659
Total loads (in %)	4.4044	3.4396	-0.9647532

3.4.2 Main results

Table 3.4 presents the results from the ordinary least squares regression conducted to test the impact of gender diversity on socially conscious mutual funds' inflow of money. The dependent variable is the measure of fund flow, computed following Sirri and Tufano (1998). The main independent variable is gender diversity. Model 1 includes the funds' characteristics as

independent variables. Model 2 includes the fund and managers' characteristics. Finally, Model 3 includes the family, fund and managers' characteristics.

Looking at funds 'characteristics, I see that fund age, fund size, management fees and fund flow from the previous year have a significant impact on a fund inflow. I find that larger and older funds have lower fund inflow compared to smaller and younger funds. One standard deviation increase in fund size reduces fund inflow by 0.01493% ((-0.00014*2.068976)/ 1.94032) *100, $p<0.05$) while fund age reduces inflow by 0.79% ((-0.01762* 0.86811/ 1.94032)*100, $p<0.01$). I also find that funds with lower management fees and higher previous fund flow have higher fund inflow. Looking at management and family fund characteristics, I see that having a Ph.D. and family fund inflow have a significant positive impact on fund flow. In fact, fund inflow increases when the manager is a PhD holder (1.19863, $p<0.05$). One standard deviation increase in family fund inflow increases Fund inflow also by 8.66% (((0.00006* 2801.36600)/ 1.94032)*100, $p<0.05$).

Table 3.4
Main regressions

This table presents the results of the OLS regression conducted to test the impact of gender diversity on socially conscious mutual funds' flow. The dependent variable is the measure of *fund inflow* provided by Sirri and Tufano (1998).. The main independent variable is *gender diversity*. Model 1 includes the fund's characteristics as independent variables. Model 2 includes the fund and fund management characteristics. Finally, Model 3 includes the fund management, fund, family and style characteristics. The fund management characteristics include career experience, manager age, team size, CFA dummy, CPA dummy, MBA/Master dummy and PhD dummy. The fund characteristics refer to fund age, fund size, turnover ratio, management fees, 12b1 fee, the rear fees, the front fees, fund style, expense ratio, and institutional dummy. the family characteristics are the family size and family flow. I control for fund risk by controlling for the firm systematic risk. I also control for past performance of funds and square of past Carhart alpha (Fang & Wang 2015). Finally, I control for the fund flow of investment from the previous year. t-statistics are reported in parentheses. *, **, *** indicate that the p-value is less than 0.10, 0.05, 0.01 respectively.

Table 3.4 Main regressions - *Continued*

	(1) Fund flow	(2) Fund flow	(3) Fund flow
Gender Diversity	-0.00280***	-0.00248**	-0.00240**
	(-2.81450)	(-1.97844)	(-2.00110)
Fund Age	-0.01762***	-0.01593***	-0.01705***
	(-3.46225)	(-3.11897)	(-3.28231)
Fund Size	-0.00014**	-0.00014**	-0.00009
	(-2.13359)	(-2.00597)	(-1.45195)
Turnover Ratio	0.00408	0.00051	-0.00004
	(0.96577)	(0.18342)	(-0.01463)
Management Fee	-0.19953***	-0.19647***	-0.19683***
	(-7.29695)	(-7.26007)	(-7.21362)
Twelveb1 Fee	-0.00005	-0.00011	-0.00009
	(-0.08777)	(-0.18284)	(-0.14881)
Fund Style	-0.03177	-0.02799	-0.02163
	(-0.97575)	(-0.89707)	(-0.68803)
Institutional Funds Dummy	0.11822	0.11262	0.13973
	(1.01847)	(0.88931)	(1.07709)
Fund risk	5.78405	3.61844	2.79478
	(0.74555)	(0.42832)	(0.30841)
Previous fund flow	0.09770**	0.08030*	0.07691*
	(2.33465)	(1.86658)	(1.76704)
Past performance	526.68768	508.92564	422.04050
	(1.32680)	(1.24669)	(1.04401)
Past performance squared	-5,586.59	111441.43	176718.76
	(-0.00552)	(0.11032)	(0.17406)
Fee	-0.00342	0.00530	0.00428
	(-0.50971)	(0.38646)	(0.31449)
Manager Experience		-0.01377	-0.01205
		(-0.57930)	(-0.52214)
Manager Age		0.19224	0.16259
		(0.16781)	(0.14731)

(Continued)

Table 3.4 Main regressions - *Continued*

	(1) Fund flow	(2) Fund flow	(3) Fund flow
CFA		0.05621	0.01004
		(0.47116)	(0.08332)
CPA		-0.08759	-0.12457
		(-1.05151)	(-1.36408)
MBA		-0.06415	0.04945
		(-0.36938)	(0.26389)
PhD		1.19863**	1.17341**
		(2.19180)	(2.16625)
Team Management Size		-0.03054	-0.03003
		(-1.18877)	(-1.16688)
Tenure		0.00722	0.00618
		(0.68683)	(0.60682)
Family funds size			-0.03739
			(-1.63114)
Family fund flow			0.00006**
			(2.29744)
Fund style flow			0.00000
			(0.51079)
Constant	0.73161***	0.24747	0.50987
	(3.58884)	(0.06529)	(0.13835)
Observations	763	763	763
R-squared	0.20978	0.23531	0.24810

Finally, I look at the main independent variable. I find that there is a negative relationship between gender diversity and fund flow. This result is significant for the three models. Using the coefficient from model 3, I see that one standard deviation increase in gender diversity reduces fund flow by 3.66% ((-0.00240* 29.58556)/ 1.94032)*100, $p<0.05$)). This finding shows that investors are reluctant to invest in socially conscious funds that include women in the managing team. This provides support to hypothesis Ha which states that Gender diversity in fund management negatively affects investors' decision to invest in socially conscious mutual funds.

In sum, I find support for hypothesis 1a. The results show that socially conscious investors behave similarly to conventional investors toward funds that include women in the managing team. They also invest less in these funds. I find that socially conscious investors do not trust gender-diverse management team enough to be willing to invest in socially conscious funds with higher gender diversity in the managing team.

3.4.3 Further analysis and robustness check

In this section, I attempt to further analyze and test the robustness of the impact of gender diversity on fund flow of socially conscious mutual funds.

- **Gender stereotyping is still strong when controlling for the 2008 financial crisis**

In this part, I test the effects of the 2008 financial crisis on the analysis. I conduct the regression analysis for the period before, during and after the crisis. The financial crisis was a period of great turbulence for the financial market and also for mutual funds. However, research shows that financial crises have a significant effect on the performance of Socially conscious funds in general. In fact looking at different crises, Nofsinger and Varma (2014) find that socially conscious funds have better performance during financial crises compared to conventional mutual funds. However, this better performance was due to funds that use positive screens. In this section, I see if the financial crisis has a significant effect on socially conscious mutual funds that include women on the managing team. Table 3.5 provides the results of the impact of the 2008 financial crisis for funds' flow.

I find that negative relationship between gender diversity and fund inflow is consistent for the period prior and after the financial crisis. In fact, investors are reluctant to invest in socially conscious mutual funds with high gender diversity in the period pre, post-crisis. In fact, the

coefficient for gender diversity is respectively -0.005434 and -0.00339 for the pre-crisis and post-crisis ($p<0.01$ and $p<0.05$). However, the coefficient is insignificant during the crisis.

Table 3.5

Gender diversity and financial crisis

This table presents the results of the OLS regression conducted to test the impact of gender diversity on socially conscious mutual funds' flow for the period before, during and after the financial crisis. The dependent variable is the measure of *fund inflow* provided by Sirri and Tufano (1998). The main independent variable is *gender diversity*. Model 1 shows the results for the period before the financial crisis. Model 2 shows the results of the financial crisis. Finally, Model 3 shows the results for the period after the financial crisis. The controls variables include the fund management, fund, family and segment characteristics. The fund management characteristics include career experience, manager age, team size, CFA dummy, CPA dummy, MBA/Master dummy and PhD dummy. The fund characteristics refer to fund age, fund size, turnover ratio, management fees, 12b1 fee, the rear fees, the front fees, fund style, expense ratio, and institutional dummy. the family characteristics are the family size and family flow. I control for fund risk by controlling for the firm systematic risk. I also control for past performance of funds and square of past Carhart alpha (Fang & Wang 2015). Finally, I control for the fund flow of investment from the previous year. t-statistics are reported in parentheses. *, **, *** indicate that the p-value is less than 0.10, 0.05, 0.01 respectively.

	(1) pre-crisis	(2) crisis	(3) post-crisis
Gender Diversity	-0.054***	0.002	-0.003**
	(-5.109)	(0.436)	(-2.566)
Fund Age	0.016	-0.025**	-0.012**
	(1.461)	(-2.042)	(-2.273)
Fund Size	-0.003***	-0.0003	-0.0001
	(-8.982)	(-1.332)	(-1.602)
Turnover Ratio	-0.191	-0.099	-0.0008
	(-0.385)	(-0.244)	(-0.356)
Management Fee	0.596	-0.293***	-0.176***
	(1.120)	(-7.252)	(-6.322)
Twelveb1 Fee	0.001	-0.003	-0.0004
	(0.288)	(-0.305)	(-0.592)
Fund Style	1.028**	-0.045	0.017
	(2.980)	(-0.419)	(0.500)
Institutional Funds Dummy	-0.157	-0.206	0.141
	(-0.344)	(-0.565)	(0.968)

(Continued)

Table 3.5 Gender diversity and financial crisis - *Continued*

	(1) pre-crisis	(2) crisis	(3) post-crisis
Fund risk	84.535	33.444**	-26.323**
	(0.842)	(2.002)	(-2.002)
Previous fund flow	-0.259**	-0.029	0.148**
	(-2.710)	(-1.343)	(2.474)
Past performance	15,407.8***	2,584.5**	353.4
	(4.432)	(2.296)	(0.995)
Past performance squared	3.534e+07**	6.433e+06***	-2.388e+06***
	(3.329)	(2.661)	(-3.077)
Fee	-0.189**	-0.016	-0.006
	(-3.691)	(-0.310)	(-0.435)
Manager Experience	-0.202*	-0.034	0.005
	(-2.050)	(-0.532)	(0.230)
Manager Age	8.539	1.416	-0.990
	(1.814)	(0.514)	(-0.975)
CFA	0.751	-0.389	0.167
	(1.823)	(-1.029)	(1.593)
CPA		-0.559	-0.102
		(-0.841)	(-0.973)
MBA	-2.558***	0.771*	-0.085
	(-6.160)	(1.828)	(-0.405)
PHD	-0.348	0.6678	1.307*
	(-0.282)	(1.585)	(1.887)
Team Management Size	-0.147	-0.040	-0.025
	(-1.020)	(-0.777)	(-0.804)
Tenure	-0.017	-0.009	0.017*
	(-0.243)	(-0.260)	(1.777)
Family funds size	0.331*	-0.022	-0.039
	(2.501)	(-0.560)	(-1.512)
Family fund flow	0.008***	-0.00004	0.00006**
	(7.946)	(-0.707)	(2.137)
Fund style flow	0.00012**	-0.00003	-0.00000
	(3.009)	(-0.710)	(-0.388)
Constant	-34.024*	-4.413	4.610
	(-2.359)	(-0.497)	(1.354)
Observations	29	167	567
R-squared	0.941	0.513	0.289

In sum, these results show that socially conscious mutual funds with high gender diversity have a significant impact on fund investors. In fact, I support for hypothesis 1a even after controlling for the financial crisis. I find that socially conscious investors are reluctant to invest in socially conscious mutual funds with gender diversity. In this sense, they do not differ from conventional investors. They are also affected by gender stereotypes despite the values they prone.

- **The gender stereotype is stronger when using alternative measurements of gender diversity**

In this section, I attempt to mitigate concerns that my results are driven by errors in measurement in gender diversity. I construct 4 dichotomous measures of gender diversity. I construct an indicator that is equal to one when there is at least one woman on the team and an indicator that takes 1 if gender diversity is higher than 25%. I also generated an indicator that is equal to one if gender diversity is higher than 50%. Finally, I construct an indicator that takes 1 if gender diversity is higher than the mean. I find that all the results are qualitatively similar to the main results. In fact, I find that gender diversity reduces fund inflow. The results are provided in table 3.6.

- **Fixed effects regressions**

In this section, I attempt to mitigate concerns that the results are driven by time-invariant variables. I rerun the main regression using two-way fixed effects regressions. I include time and fund style dummies variables. I find that all the results are qualitatively similar to the main results. Gender diversity in the team management is associated with lower fund inflow The effect of gender diversity on fund inflow is still negative and significant.. The results are provided in table 3.7

Table 3.6
Alternative measures of gender diversity

This table presents the results of the OLS regression conducted to test the impact of gender diversity on socially conscious mutual funds' flow using alternative measurements of gender diversity. The dependent variable is *fund flow* as measure by Sirri and Tufano (1998). The main independent variable is *gender diversity* which represents the percentage of women in a management team. Model 1 shows the results for an indicator that is equal to one when there is at least one woman on the team. Model 2 shows the results for an indicator that takes 1 if gender diversity is higher than 25%. Model 3 shows the results for an indicator that is equal to one if gender diversity is higher than 50%. Model 4 shows the results for an indicator that takes 1 if gender diversity is higher than the mean. The controls variables include the fund management, fund, family and style characteristics. The fund management characteristics include career experience, manager age, team size, CFA dummy, CPA dummy, MBA/Master dummy and Ph.D. dummy. The fund characteristics refer to fund age, fund size, turnover ratio, management fees, 12b1 fee, the rear fees, the front fees, fund style, expense ratio, and institutional dummy. The family characteristics are the family size and family flow. I control for fund risk by controlling for the firm systematic risk. I also control for past performance of funds and square of past Carhart alpha (Fang &Wang 2015). Finally, I control for the fund flow of investment from the previous year. t-statistics are reported in parentheses. *, **, *** indicate that the p-value is less than 0.10, 0.05, and 0.01 respectively.

	(1) Fund flow	(2) Fund flow	(3) Fund flow	(4) Fund flow
gender diversity> 0	-0.12951*			
	(-1.69086)			
gender diversity>25%		-0.07986*		
		(-1.89583)		
gender diversity>50%			-0.21356***	
			(-2.77098)	
gender diversity> mean				-0.09958*
				(-1.71075)
Fund Age	-0.01734***	-0.01762***	-0.01687***	-0.01750***
	(-3.26478)	(-3.27261)	(-3.22538)	(-3.27135)
Fund Size	-0.00008	-0.00008	-0.00009	-0.00008
	(-1.37800)	(-1.31481)	(-1.46092)	(-1.34505)
Turnover Ratio	-0.00005	-0.00013	0.00002	-0.00009
	(-0.01922)	(-0.04838)	(0.00886)	(-0.03564)
Management Fee	-0.19746***	-0.19707***	-0.19872***	-0.19718***
	(-7.18745)	(-7.14626)	(-7.26641)	(-7.16253)
Twelveb1 Fee	-0.00009	-0.00009	-0.00007	-0.00009
	(-0.13925)	(-0.14974)	(-0.10875)	(-0.14219)
Fund Style	-0.02506	-0.02590	-0.02201	-0.02561
	(-0.79275)	(-0.81589)	(-0.69590)	(-0.80868)

(*Continued)*

Table 3.6 Alternative measures of gender diversity - *Continued*

	(1)	(2)	(3)	(4)
	Fund flow	Fund flow	Fund flow	Fund flow
Institutional Funds Dummy	0.14776	0.14742	0.14559	0.14794
	(1.14760)	(1.14145)	(1.13435)	(1.14804)
Fund risk	3.31810	3.64112	2.70244	3.55928
	(0.36778)	(0.40582)	(0.30055)	(0.39643)
fee	0.00413	0.00334	0.00480	0.00361
	(0.29766)	(0.23919)	(0.35187)	(0.25881)
Past performance	425.87960	422.39684	416.34008	426.08284
	(1.05503)	(1.04580)	(1.03124)	(1.05448)
Past performance squared	179964.35	222677.49	179302.53	209367.71
	(0.17889)	(0.22078)	(0.17681)	(0.20789)
Previous fund flow	0.07743*	0.07772*	0.07641*	0.07756*
	(1.77796)	(1.78801)	(1.76332)	(1.78197)
Manager Experience	-0.01740	-0.01880	-0.01412	-0.01840
	(-0.76890)	(-0.83481)	(-0.63273)	(-0.81693)
Manager Age	0.42171	0.49981	0.27934	0.47582
	(0.39485)	(0.47282)	(0.26560)	(0.44965)
CFA	0.02478	0.02342	0.02811	0.02569
	(0.20442)	(0.19259)	(0.23234)	(0.21132)
CPA	-0.13722	-0.11686	-0.12555	-0.12410
	(-1.37799)	(-1.20113)	(-1.41189)	(-1.26284)
MBA	0.03777	0.03144	0.05482	0.03609
	(0.20368)	(0.17081)	(0.29720)	(0.19514)
PHD	1.18810**	1.19311**	1.18709**	1.19142**
	(2.17543)	(2.17247)	(2.15845)	(2.17515)
Team Management Size	-0.02083	-0.02877	-0.03780	-0.02762
	(-0.86642)	(-1.14164)	(-1.42743)	(-1.10231)
Family funds size	-0.03919*	-0.03956*	-0.03725	-0.03956*
	(-1.70245)	(-1.71293)	(-1.61945)	(-1.71337)
Family fund flow	0.00006**	0.00006**	0.00006**	0.00006**
	(2.29746)	(2.27713)	(2.31127)	(2.28328)
Fund style flow	0.00000	0.00000	0.00000	0.00000
	(0.55281)	(0.59975)	(0.47982)	(0.58766)
Tenure	0.00704	0.00737	0.00659	0.00720
	(0.69114)	(0.72075)	(0.65383)	(0.70360)
Constant	-0.35640	-0.61328	0.11894	-0.53253
	(-0.10037)	(-0.17464)	(0.03404)	(-0.15146)
Observations	763	763	763	763
R-squared	0.24759	0.24694	0.24898	0.24719

Table 3.7
Fixed effects regressions

This table presents the results from the fixed effects regressions for the effects of gender diversity on the fund flow for socially conscious mutual funds. The dependent variable is *fund flow* as measure by Sirri and Tufano (1998). The main independent variable is *Gender diversity*, which represents the percentage of women in a management team. The controls variables include the fund management, fund, family and segment characteristics. The fund management characteristics include career experience, manager age, team size, CFA dummy, CPA dummy, MBA/Master dummy and PhD dummy. The fund characteristics refer to fund age, fund size, turnover ratio, management fees, 12b1 fee, the rear fees, the front fees, fund style, expense ratio, and institutional dummy. The family characteristics are the family size and family flow. I control for fund risk by controlling for the firm systematic risk. I also control for past performance of funds and square of past Carhart alpha (Fang & Wang 2015). Finally, I control for the fund flow of investment from the previous year. I also include funds style and year fixed effects. t-statistics are reported in parentheses. *, **, *** indicate that the p-value is less than 0.10, 0.05, 0.01 respectively.

	(1) Fund flow
Gender Diversity	-0.00295*
	(-1.69677)
Fund Age	-0.02000***
	(-2.61161)
Fund Size	-0.00012
	(-0.91902)
Turnover Ratio	-0.00089
	(-0.09246)
Management Fee	-0.18632***
	(-9.19498)
Twelveb1 Fee	-0.00009
	(-0.15067)
Institutional Funds Dummy	0.09654
	(0.79631)
Fund risk	19.07357
	(0.62140)
fee	-0.00105
	(-0.03739)
Past performance	594.85540**
	(2.05564)
Past performance squared	133277.65951
	(0.20943)
Previous fund flow	0.07678***

(Continued)

Table 3.7 Fixed effects regressions - *Continued*

	(1) Fund flow
	(3.62948)
Manager Experience	-0.00901
	(-0.22490)
Manager Age	-0.11610
	(-0.06982)
CFA	-0.00532
	(-0.04062)
CPA	-0.24578
	(-0.84873)
MBA	0.09477
	(0.60195)
PhD	1.08709***
	(4.15586)
Team Management Size	-0.02615
	(-0.85622)
Family funds size	-0.04216*
	(-1.78751)
Family fund flow	0.00007***
	(3.47910)
Fund style flow	0.00000
	(0.44775)
Tenure	0.00899
	(0.55423)
Constant	1.13323
	(0.20722)
Fund style FEs	X
Year FEs	X
Observations	763
R-squared	0.25729

- **The gender stereotype is still strong after controlling for conventional funds**

In this section, I compare gender stereotype of socially conscious mutual funds to conventional funds. Using the original sample, I match the socially conscious mutual funds with

conventional mutual funds using the closest match based on the total net asset value for the year 2007. The number of observations for the matched sample is 1,100 fund year observations.

Table 3.8 reports the results of the analysis. Consistent with Niessen and Ruenzi (2006), I find investors invest less in funds with gender diverse board. In fact, I find a negative relationship between gender diversity and funds flow for the overall sample, significant at 10%. In addition, I find that the flow for socially conscious mutual funds is not significantly different from the flow for conventional funds of the same size. However, when I look at the interaction term, I see a negative and significant relationship between socially conscious mutual funds flow and team gender diversity ($p<0.05$). These results are consistent with the previous findings that socially conscious investors do not differ from conventional investors in their decision making when there are women on the management team. They invest less in mutual funds managed by gender-diverse teams. Table 3.8 shows that socially conscious investors invest in mutual funds with gender diverse team management even less.

Table 3.8
Socially conscious versus conventional mutual funds

This table presents the regressions for the effects of gender diversity on the fund flow for the matched sample. The dependent variable is *fund flow* as measure by Sirri and Tufano (1998). *Gender diversity* represents the percentage of women in a management team. *Social conscious dummy* is a dichotomous variable that takes 1 if the fund is a socially conscious fund or zero otherwise. The main independent variable is *Gender diversity X Social conscious dummy* and represents the interaction between gender diversity and social conscious dummy. The controls variables include the fund management, fund, family and segment characteristics. The fund management characteristics include career experience, manager age, team size, CFA dummy, CPA dummy, MBA/Master dummy and PhD dummy. The fund characteristics refer to fund age, fund size, turnover ratio, management fees, 12b1 fee, the rear fees, the front fees, fund style, expense ratio, and institutional dummy. The family characteristics are the family size and family flow. I control for fund risk by controlling for the firm systematic risk. I also control for past performance of funds and square of past Carhart alpha (Fang & Wang (2015). Finally, I control for the fund flow of investment from the previous year. I also include funds style and year fixed effects. t-statistics are reported in parentheses. *, **, *** indicate that the p-value is less than 0.10, 0.05, 0.01 respectively.

Table 3.8 Socially conscious versus conventional mutual funds - *Continued*

Variables	(1) Fund flow
Gender Diversity	-0.00309*
	(-1.70396)
Social conscious dummy	0.01553
	(0.18690)
Gender Diversity X Social conscious dummy	-0.00469**
	(-1.98342)
Fund Age	-0.01377***
	(-2.66501)
Fund Size	-0.00014
	(-1.63284)
Turnover Ratio	0.00101
	(0.14045)
Management Fee	-0.28607***
	(-10.33667)
Twelveb1 Fee	-0.00089
	(-0.98681)
Institutional Funds Dummy	0.18217*
	(1.92856)
Fund risk	-28.29162
	(-1.44837)
Fee	-5.70943
	(-0.84682)
Past performance	221.80480
	(1.15236)
Past performance squared	-3,414.72046
	(-0.21618)
Previous fund flow	-0.00070
	(-0.14241)
Manager Experience	0.00203
	(0.07931)
Manager Age	-0.05269
	(-0.05027)
CFA	0.01174
	(0.14828)
CPA	-0.03738
	(-0.26997)
MBA	0.06096

(Continued)

Table 3.8 Socially conscious versus conventional mutual funds - *Continued*

	(1)
Variables	Fund flow
MBA	0.06096
	(0.62442)
PhD	-0.21922*
	(-1.66441)
Team Management Size	-0.00570
	(-0.31248)
Family funds size	-0.01599
	(-1.03801)
Family fund flow	0.00001
	(1.56840)
Fund style flow	0.00001*
	(1.65891)
Tenure	-0.00268
	(-0.28634)
Constant	1.81765
	(0.52563)
Fund style FEs	X
Year FEs	X
Observations	1,100
R-squared	0.15577

- **Socially Conscious Mutual fund performance and gender stereotype**

The main assumption of this essay is that as conventional investors, socially conscious investors are biased toward gender diverse team management. They use stereotypes and trust less in gender-diverse management teams. An alternate explanation could be that the inclusion of women in the management team will add an additional constraint to the diversification of socially conscious mutual funds and affect their performance.

As stated above, socially conscious mutual funds invest only in firms that engage in socially responsible activities. To select these firms, they use a tight screening process that limits their ability to diversify and affect their performance(Barnett and Salomon (2006); Goldreyer and Diltz (1999)). A gender diverse management team might further reduce their ability to diversify

because they take less risk, follow less extreme investment styles and trade less (Niessen and Ruenzi (2006)). Thus, socially conscious mutual funds with gender-diverse management team might actually perform poorly. In this case, it will be rational for socially conscious investors to invest less in socially conscious mutual funds.

To test this assumption, I rerun the main regressions with performance as the main dependent variable. I measure performance using the alpha from the four-factor model of Carhart (1997). A detailed explanation of the process used to compute Carhart alpha is provided in the Appendix C. I also use the matched sample. Table 3.9 shows the results of the regression. I find that socially conscious mutual funds with gender diverse team management do not perform poorly compared to conventional funds with gender diverse team management. Socially conscious mutual funds perform better than conventional mutual funds, significant at 10%. These results show that socially conscious investors are biased against funds that include women in the managing team. In fact, they invest less in these funds even though socially conscious funds with gender diverse team management perform better.

3.5 Conclusion

With the continuous increase in socially conscious mutual funds, researchers have focused on studying the determinants of socially conscious investors' decision making. They studied the flow-performance relationship and the nonfinancial attribute of socially conscious mutual funds. In this essay, I supplement the literature on socially conscious mutual funds by looking at the impact of managers' skills. Specifically, I look at gender diversity of the team management. Testing the impact of gender diversity on investors' decision making allows me to directly test if the investors apply the socially responsible screens when they invest.

My results show that socially conscious investors invest less in mutual funds with a gender-

Table 3.9

Performance of socially conscious and conventional mutual funds

This table presents the results for the effects of gender diversity on the performance of socially conscious and conventional mutual funds. Model 1 shows the results for the socially conscious mutual funds. Model 2 provides the results for the conventional mutual funds. Performance is measured using *Carhart alpha* and represents the main dependent variable. The main independent variable is *Gender diversity* which represents the percentage of women in a management team. The controls variables include the fund management, fund, family and segment characteristics. The fund management characteristics include career experience, manager age, team size, CFA dummy, CPA dummy, MBA/Master dummy and PhD dummy. The fund characteristics refer to fund age, fund size, turnover ratio, management fees, 12b1 fee, the rear fees, the front fees, fund style, expense ratio, and institutional dummy. The family characteristics are the family size and family flow. I control for fund risk by controlling for the firm systematic risk. I also control for past performance of funds and square of past Carhart alpha (Fang & Wang 2015). Finally, I control for the fund flow of investment from the previous year. I also include funds style and year fixed effects. t-statistics are reported in parentheses. *, **, *** indicate that the p-value is less than 0.10, 0.05, 0.01 respectively.

	(1) Socially conscious funds flow	(2) Conventional funds flow
Gender Diversity	4.46e-07 * (1.73576)	-5.52e-07 (-1.50388)
Fund Age	1.38e-06 (1.40568)	-7.67e-07 (-0.37531)
Fund Size	3.90e-09 (0.23538)	-5.17e-08 (-1.50356)
Turnover Ratio	-1.36e-06 (-1.21125)	0.00004** (2.07017)
Management Fee	-0.00003*** (-6.08599)	-0.00003 (-1.06050)
Twelveb1 Fee	-1.01e-06 (-1.22024)	-7.67e-07 (0.12929)
Institutional Funds Dummy	4.59e-06 (0.20146)	-5.52e-07 (-0.08392)
Fund risk	-0.00524 (-1.27456)	-0.01283** (-2.28620)
fee	-0.00306** (-2.05422)	-0.00319 (-1.41790)
Past performance	-0.06734* (-1.77454)	-0.11568*** (-3.15878)
Previous fund flow	-4.67e-06 (-1.00263)	-2.15e-06 (-0.22044)
Manager Experience	-0.00000 (-0.90495)	0.00001 (0.75733)

(Continued)

Table 3.9 Performance of socially conscious and conventional mutual funds – *Continued*

	(1) Socially conscious funds flow	(2) Conventional funds flow
Manager Age	0.00032	-0.00022
	(1.46370)	(-0.65427)
CFA	-0.00004**	2.47e-06
	(-2.01073)	(0.10653)
CPA	-0.00005	-0.00002
	(-1.19817)	(-0.50209)
MBA	0.00002	0.00002
	(0.93200)	(0.78503)
PHD	-0.00013***	0.00002
	(-2.60647)	(0.76980)
Team Management Size	0.00001	-0.00000
	(1.33200)	(-0.80370)
Tenure	-3.40e-06	0.00000*
	(-1.60890)	(1.65025)
Constant	-0.00210***	-0.00032
	(-2.88869)	(-0.29334)
Fund style FEs	X	X
year FEs	X	X
Observations	567	533
R-squared	0.16897	0.05501

diverse management team. They are reluctant to invest in socially conscious funds with high gender diversity. I find similar results after controlling for measurement errors, the 2008 financial crisis and conventional mutual funds. I also find that while socially conscious mutual funds with gender-diverse management teams actually have better performance, they are significantly affected by gender stereotyping. In fact, my results show that socially conscious investors' reluctance to invest in socially conscious mutual funds with gender diversity does not depend on their performance.

This study highlights the importance of fund management characteristics, like gender, on socially conscious mutual funds. It shows that in addition to performance and non-financial characteristics, gender diversity of management team affects socially conscious investors'

decision making. The main limitation of the paper is that I matched the socially conscious mutual funds using the closest match based on total net asset value. Future research can use the most recent matching method like the propensity score matching to match the samples.

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APPENDICES

A. VARIABLES DESCRIPTION

VARIABLES DESCRIPTION FOR CHAPTER 1		
Variables	**Sources**	**Definition**
Bond terms and Bond characteristics		
Abnormal bond returns	Trace, Bloomberg	The firm-level bond abnormal returns are computed following the methodology used by Bessembinder, Kahle, Maxwell and Xu (2009) and revised by Ederington, Guan and Yang (2013).
Yield	TRACE, Bloomberg, Federal Reserve	Measured at the firm level by taking the weighted average yield spread with the weight being the amount outstanding of each bond divided by the total amount outstanding for all the bonds of a firm. Individual bond yield is measured by subtracting the yield to maturity from the yield of a Treasury security with same time to maturity.
Maturity	TRACE	years to maturity
Bond ratings	Bloomberg	Measured at firm level by taking the average of rating of all the bonds of a firm. Bond ratings measured using Moody's and S&P ratings The ratings were converted into numerical ratings using the following values: (6 for Aaa and Aa ratings 5 for A ratings 4 for Baa ratings 3 for Ba ratings 2 for B ratings 1 for below B ratings)
Investment Grade	TRACE	a dummy variable with a value of 1 if the average firm rating is Baa or higher and 0 otherwise
Bond Age	TRACE, Bloomberg	Weighted age of bonds for each firm for each year. Age of bond is the difference between the observation date and the date of the original bond issue. The weight is the amount outstanding of each bond divided by the total amount outstanding for all the bonds of a firm.
Issue size (log of firm-level bond size)	Bloomberg	log of the average of all bond issue size (in millions) for a firm
Board characteristics		

Gender diversity	ISS	Percentage of female board members on board
Board size	ISS	Total number of directors on the board
Independent directors (%)	ISS	percentage of directors with no direct link with the firm (Independent Directors)
Directors with tenure> 15 years (%)	ISS	Percentage of directors with more than 15 years of service
Directors with >4 board (%)	ISS	Percentage of directors with more than four other board appointments
Percentage of independent female directors (%)	ISS	Percentage of independent female directors on the board
Gender diversity>25%	ISS	Equal 1 if the percentage of female board members is higher than 25% and 0 otherwise
Gender diversity dummy	ISS	Equal 1 if the percentage of female board members is higher than 0 and 0 otherwise
Director with zero ownership (%)	ISS	Percentage of directors with no ownership in the firm
CEO characteristics		
CEO total compensation	Execucomp	total compensation including the value of granted options, salary and bonus
CEO ownership (%)	Execucomp	Percentage of CEO ownership
CEO salary and bonus	Execucomp	total current compensation comprised of salary and bonus (Thousands of dollars)
CEO Duality	ISS	Equal 1 if the CEO is also the Chairman of the board and 0 otherwise
CEO option granted	Execucomp	value of options granted as reported by the company in dollars
Financial characteristics		
Leverage	Compustat	The ratio of total debt to total assets
Book to Market ratio	Compustat	the ratio of book value of long-term debt to market value of common equity
Firm size (log of the total asset)	Compustat	Natural logarithm of total assets
3-year sales growth	Execucomp	The growth rate in sale for the last three years
Standard deviation of returns	CRSP	the standard deviation of CRSP daily stock returns for each firm
Abnormal accruals	Compustat	Abnormal accruals are measured using the model by Francis, LaFond, Olsson and Schipper (2005)
Margin	Compustat	income before extraordinary items divided by total assets

Return on Assets	Compustat	The ratio of net income to total assets
Other variables		
Big 4 auditing firms	Compustat	equals 1 if the primary auditor is PricewaterhouseCoopers, Ernst & Young, Deloitte & Touche or KPMG and 0 otherwise
Critical mass	Execucomp	Dummy variable equals 1 if there are at least 3 women on the board
Blau index	Execucomp	Measured as $1- \text{Gender Diversity}^2 - (1- \text{Gender Diversity})^2$

VARIABLES DESCRIPTION FOR CHAPTER 2		
Variable	**Sources**	**Definition**
Main variables		
Abnormal accruals	Compustat	Abnormal accruals are measured using the model by Francis, LaFond, Olsson and Schipper (2005)
ILTIS	13F	Chen, Harford and Li (2007) type of institutional investors.
Gender diversity	ISS	Percentage of female board members on board
Interaction		the interaction between gender diversity and ILTIS
Holdings characteristics		
Other top 5 holdings	13F	top 5 institutional investors refer to institutional investors that are among the top 5 but do not satisfy Chen typology
Total holdings	13F	Total holding refers to the total number of shares outstanding for each firm
Board and CEO characteristics		
Board size	ISS	Total number of directors on the board
% independent directors	ISS	percentage of directors with no direct link with the firm (Independent Directors)
CEO duality	ISS	Equal 1 if the CEO is also the Chairman of the board and 0 otherwise
CEO tenure	Execucomp	number of years the CEO has been the CEO of a firm
Gender diversity dummy	ISS	Equal 1 if the percentage of female board members is higher than 0 and 0 otherwise
Gender diversity>25%	ISS	Equal 1 if the percentage of female board members is higher than 25% and 0 otherwise
CEO gender	Execucomp	equal 1 if the CEO is a woman and 0 otherwise
Financial Characteristics		

Firm size	Compustat	Natural logarithm of total assets
Firm age	CRSP	Number of years a stock has been in CRSP database
Leverage	Compustat	The ratio of total debt to total assets
Return on asset	Compustat	The ratio of net income to total assets
OCF/asset	Compustat	the ratio of the operating cash flow to total assets
Book to Market Ratio	Compustat	the ratio of book value of long-term debt to market value of common equity

VARIABLES DESCRIPTION FOR CHAPTER 3		
Variable	**Sources**	**Definition**
Fund Characteristics		
Fund flow	CRSP Mutual funds	$\text{Flow}_{i,t} = \left(\frac{\text{TNA}_{i,t} - \text{TNA}_{i,t-1}}{\text{TNA}_{i,t-1}}\right) - r_{i,t}$
Carhart alpha	CRSP Mutual funds	Alpha from the four-factor model of Carhart
Turnover ratio	CRSP Mutual funds	percentage of a mutual fund's holdings that have been replaced in a given year
Fund Size	CRSP Mutual funds	log of TNA of a fund
Fund Age	CRSP Mutual funds	log of the difference between the current year and the year the fund was organized +1
Fund style	CRSP Mutual funds	Eight styles of funds are identified by their objective code. They are: growth, income, balance, government, money market, global, sector, and others
Twelveb1 fee	CRSP Mutual funds	Fees paid by investors for service provided by financial advisors on the sales side, as a percentage of TNA.
Management fees	CRSP Mutual funds	A charge paid to managers of a mutual fund for their services. It can be offset using fee waivers and reimbursement. These reimbursements can lead to negative Fees.
Rear load	CRSP Mutual funds	Charges applied at redemption as a percentage of TNA.
Front load	CRSP Mutual funds	Sales charges applied at the initial purchase time, measured in the percentage of the purchase
Expense ratio	CRSP Mutual funds	Total fund operating expenses, as a percentage of TNA.
Fee		the sum of the total expense ratio and 1/7 of the total load fees for every year
Fund risk	CRSP Mutual funds	the factor loading on the market factor in the Carhart

		model
Institutional funds dummy	CRSP Mutual funds	Equal 1, if the fund is identified as an institutional fund, otherwise 0.
Social Conscious Dummy	Morningstar	Equal 1, if the fund is identified as a socially conscious fund, otherwise 0
Family and segment characteristics		
Family flow	CRSP Mutual funds	the flow of money inside a family
Family Size	CRSP Mutual funds	Log of the sum of the total net asset of all socially conscious funds inside a family
Fund style flow	CRSP Mutual funds	the flow of money in each fund style
Managers characteristics		
Team management size	Morningstar	Total number of managers on a team
Manager Age	Morningstar	approximate the manager age, by adding 23 years to the manager experience (Fang and Wang (2015))
Manager Career experience	Morningstar	The average length of time since managers first becomes portfolio managers(Ding and Wermers (2012))
PhD	Morningstar	Equal 1, if at least one manager has a PhD
MBA	Morningstar	Equal 1, if at least one manager has an MBA or Master
CPA	Morningstar	Equal 1, if at least one manager has a CPA
CFA	Morningstar	Equal 1, if at least one manager has a CFA
Tenure	Morningstar and CRSP	The average length of time since the manager starting managing a fund
Gender diversity	Morningstar	Percentage of women on the management team

B. ALTERNATIVE MEASUREMENT OF ABNORMAL ACCRUALS

Modified Jones model: I estimate an alternative measure of the abnormal accruals, using the Modified Jones model proposed by Dechow, Sloan and Sweeney (1995). In the first step, I run the following regression:

$$\frac{TA}{ASSETS_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{ASSETS_{i,t-1}} + \frac{\alpha_2 \Delta SALES_{i,t}}{ASSETS_{i,t-1}} + \frac{\alpha_3 PPE_{it}}{ASSETS_{i,t-1}} + \varepsilon_{i,t} \qquad (8)$$

Where TA= income before extraordinary items-net operating cash flow = firm i's total accruals. $\Delta SALES_{i,t}$=firm i's change in sales between year t-1 and year t. PPE_{it} is the gross value of property, plant and equipment in year t. $ASSETS_{i,t-1}$= lag of total assets.

In the second step, I use the coefficient from the regression to estimate abnormal accruals using the following model:

$$\frac{TA}{ASSETS_{i,t-1}} = \alpha_0 + \alpha_1 \frac{1}{ASSETS_{i,t-1}} + \frac{\alpha_2 (\Delta SALES_{i,t} - \Delta Receivables_{i,t})}{ASSETS_{i,t-1}} + \frac{\alpha_3 PPE_{it}}{ASSETS_{i,t-1}} + \varepsilon_{i,t} \qquad (9)$$

Performance-matched Model: I also used the performance matched model by Kothari, Leone and Wasley (2005) to construct another alternative measure of abnormal accruals. I followed the same step than the modified jones, but I included return on asset (ROA) into the first regression.

Model by Roychowdhury (2006): Finally, following Roychowdhury (2006), I measured abnormal accruals as the residual of the first stage regression used in the modified jones.

C. CARHART ALPHA

I measure performance using the alpha from the four-factor model of Carhart (1997). The model includes the three-factor of Fama and French (1993) and the momentum factor of Jegadeesh and Titman (1993). I estimate using the following regression:

$$R_{i,m,t}-Rf_{m,t}=\alpha_{i,t}+\beta M_{it}\left(RM_{i,m,t}-Rf_{m,t}\right)+\beta_{i,S,t}SMB_{m,t}+\beta_{i,H,t}HML_{m,t}+\beta_{i,t}MOM_{m,t}+\varepsilon_{i,m,t} \quad (10)$$

where $(R_{i,m,t}-Rf_{m,t})$ is the excess return of the portfolio of fund i over the month m of year t, $\left(RM_{i,m,t}-Rf_{m,t}\right)$ is the excess return of the market over the month m of year t, $SMB_{m,t}$ is the size factor for the month m of year t $HML_{m,t}$ is the value factor for the month m of year t and portfolios. $MOM_{m,t}$ is the momentum factor for the month m of year t. $\alpha_{i,t}$ is the measure of performance for the fund i in the year t.

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