

**CORPORATE BOARD DIVERSITY:
AN EMPIRICAL STUDY OF ITS EFFECTS
ON FIRM FINANCIAL PERFORMANCE**

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CHAPTER 1: INTRODUCTION

Following the passage of the Sarbanes-Oxley Act of 2002, a massive piece of legislation that greatly defined and expanded corporate governance requirements, United States companies have faced increased internal and external pressure to introduce a variety of pro-diversity employment measures, including mentoring programs, diversity training, and targeting measures (Dobin 2009 & Kalev et al. 2006). And indeed, modest progress has been made in recent years, with women holding 19.2% of S&P 500 board seats in 2015, up from 17% in 2012 and 14% in 2006 (McDonald 2012, McGregor & Schulte 2015). But with ethnic minorities still only occupying 7% of U.S. board positions, gender, racial, and cultural composition of boards is one of the most significant governance issues currently faced by managers, shareholders, and directors of major corporations (Carter 2003).

Advocates for board diversity, such as Sun Oil's CEO, Robert Campbell, often claim that "what a woman or minority person can bring to the board is some perspective a company has not had before - adding some modern-day reality to the deliberation process. Those perspectives are of great value, and often missing from an all-White, male gathering" (Campbell 1996). And yet, there is current debate between those who believe boards should be more diverse

because it is the right thing to do and those who think boards should be more diverse because it actually enhances value for shareholders. However, as noted by Karen J. Curtin, executive vice president of Bank of America, “Unless we get the second point across and people believe it, we’re only going to have tokenism” (Carter 2010). This greatly explains the motivation behind our empirical study.

Scholars have already been following board of director demographic trends in the hopes of parsing out the effect of diversity on organizational outcomes. The findings, however, have largely remained inconsistent and inconclusive, with some results claiming that diverse boards are more accountable, communicate more effectively, and enjoy greater profitability, while others assert diversity increases conflict, reduces cooperation, and ultimately weakens firm performance (Cook & Glass 2015). As Herman Bulls, director for Comfort Systems USA explains, “When I’m sitting in that boardroom, my fiduciary responsibility is to the shareholders of that company – it’s not social engineering. I can talk about diversity. But there ought to be a business case” (Carter 2010). That sentiment, coupled with the lack of conclusive evidence on the role board ethnic minority and gender diversity plays in firm financial performance, clearly calls for additional research in the field to be conducted.

This study addresses the effects of ethnic minority and gender diversity on firm financial performance, as measured by return on assets (ROA) and Tobin’s

Q, specifically in the post-Great Recession era. While prior studies have asked this question before, none have examined it during this time period. Rather, they have mainly focused on data from 2002 – 2008. And with increased international enthusiasm toward legislation encouraging or mandating greater diversity on boards of directors, leaning on studies of old data to inform current policy decisions is problematic, as corporate governance landscape and board responsibilities have evolved over time.

Additionally, our study takes an unprecedented look at the existence of minority tipping points – a point after which minority density on boards becomes large enough to have consequential effects on firm financial performance. Lastly, by incorporating COMPUSTAT, ISS, and CRSP data in a novel way, we hope to contribute to the existing literature on this subject.

The next chapter of our paper provides general background information on the roles and responsibilities boards of directors are tasked with. The rest of the paper is organized as follows: Chapter 3 presents commonly cited economic cases for board diversity. Chapter 4 offers an overview on notable legislation that has been passed in recent years encouraging or mandating board diversity requirements. Chapter 5 reviews past research conducted on this topic and uses its inconclusiveness as a basis for the development of our own study. Chapter 6 introduces the data used in our study, and Chapter 7 outlines the methodology

with which we conducted analysis on this data, as well as includes justification for each of our model specifications. Chapter 8 presents the results and contains discussion on how these findings should be interpreted. Lastly, Chapter 9 offers concluding remarks, as well as suggestions for further research.

CHAPTER 2: OVERVIEW OF BOARD ROLES AND RESPONSIBILITIES

The board of directors is one of the most influential decision-making bodies in a corporation. Its responsibilities span from making key financial and strategic decisions, such as approving changes in capital structure and mergers and acquisitions, to the difficult task of choosing the company's top executive leadership (Ferreira 2010). The board is often noted as having four key functions: monitoring and controlling managers, providing information and counsel to managers, monitoring compliance with applicable laws and regulations, and linking the corporation to the external environment (Mallin 2004; Monks & Minow 2004).

Management scholars have alternatively defined the board's responsibilities into one of two perspectives: the *agency* perspective and the *resource dependence* perspective. The *agency* perspective focuses on the monitoring nature of boards, company performance oversight, and the reduction of agency costs, whereas the *resource dependence* perspective emphasizes the external benefits boards often provide (Pfeffer & Salancik 1978). The *agency* perspective's monitoring nature is seen as having two key components. The first is monitoring the actions of top management, which can be viewed as a part of the board's duty to be protectors against managerial malfeasance. The second is

determining the intrinsic ability of top executives. The board's role here is most directly displayed by its ability to control the process by which the next top executives are hired, promoted, and assessed (Adams et al. 2010).

In the *resource dependence* arena, directors frequently step into an advisory role, providing key resources to the company, such as advice and counsel garnered from years of outside experience, as well as providing connections to important outside financial, regulatory, and supplier networks (Ferreira 2010). Additionally, boards often consult with company management to aid in the strategic and operational growth of the company. Today, the dual role of boards as monitors and advisers of management has become a mainstream idea in economic literature.

Below is a selection of common advisory and oversight responsibilities borne by corporate boards (Larker 2011):

- Approving corporate strategy
- Testing business models, identifying key performance metrics, and setting timetables for internal performance evaluation
- Identifying key risk areas and overseeing risk management
- Planning for and selecting new executives
- Designing executive compensation packages
- Approving major asset purchases

- Ensuring the integrity of audited, published financial statements
- Representing the interest of shareholders

More broadly, the board serves as a sounding board for the CEO and top management, in particular when the company is facing a decision in which one or more board members share expertise. In rare instances, boards of directors have even been known to step in during crisis situations, such as when a change in CEO becomes necessary (Adams et al. 2010).

It is important to note that boards are expected to be independent, acting as fiduciaries to the company and its stakeholders. For this reason, directors are expected to act solely in the interests of the firm, to be able to take opposing views to management when necessary, and to make decisions free from conflicts that compromise judgment. While independence is defined according to regulatory standards, independence standards often are not so stringent as to coincide with true independence – many board members are former employees of the corporations they represent. Nonetheless, independence standards universally require a careful evaluation of a prospective board member’s biography, experience, previous behavior, and relations to management (Larker 2011).

Both economic and managerial approaches to boards agree that firms choose directors for the characteristics they bring to the board. These characteristics – characteristics that may affect directors’ incentives and abilities

to adequately monitor and counsel managers and executives – are carefully chosen in the hopes of maximizing shareholder value and protecting the interest of executives (Ferreira 2010).

CHAPTER 3: ECONOMIC FOUNDATIONS FOR BOARD DIVERSITY

There are a number of theories that support the economic case for board diversity. In the simplest form, the foundation of the economic case for board diversity lies in the belief that board composition affects the way a board carries out its responsibilities, and that healthy board composition increases the effectiveness of board actions. The board's increased effectiveness, in turn, enhances firm performance and productivity, and thus, shareholder value (Van der Walt & Ingley 2003). From this view, it can be extrapolated that because gender and ethnic minority diversity are a subset of board composition, they may be linked to firm financial performance. While no one theory adequately explains the nature of the linkage between board diversity and firm financial performance, we highlight several salient theories below, drawn from disciplines spanning economics, social psychology, and organization theory (Carter, et al 2010).

3.1: Resource Dependence Theory

Resource Dependence Theory provides the foundation to some of the most compelling theoretical arguments in the economic case for corporate board diversity. The theory focuses primarily on the benefit boards provide to corporations through linkages to external organizations. Pfeffer and Salancik

(1978) point to four key functions such external linkages provide: (1) provision of resources such as information and expertise; (2) communication channels between the corporation and constituents in networks important to the firm; (3) additional support from outside groups or organizations, be they monetary or reputational commitments; and (4) added legitimacy for the firm within environments in which the corporation does not immediately reside. Therefore, theory dictates that by selecting directors with diverse backgrounds and different characteristics, a firm is able to benefit from better access to different resources, and therefore, should have stronger firm performance (Hillman et al. 2000).

Type of diversity therefore seems to be indicative of the types of resources a board can bring to the table. For example, directors with strong political connections can be instrumental in helping firms navigate through new regulatory environments, whereas directors with deep financial experience can connect firms with key investors. Similarly, women and ethnic minority board members can contribute unique benefits and resources, as they tend to have different backgrounds and human capital, which allows them to address different environmental dependencies (Carter et al. 2010).

A study by Folkman and Zenger (2012) concluded that women bring a host of different soft-skill resources to their jobs, in the form of leadership competencies. In the study with data coming from “360 degree evaluations” that

tracked judgment of a leader's peers, bosses, and direct reports, female leaders scored higher than their male counterparts in developing others, building relationships, engaging in self-development, exhibiting integrity, and driving long-term results.

Ethnic and gender diversity on boards therefore will likely provide managers with unique information and skill sets, allowing for better decision making at the corporate level. Furthermore, board gender and ethnic diversity increases access to talent, as it sends positive signals to both product and labor markets. As countries like the United States experience increased growth in ethnic minority groups, the ability for an ethnically diverse board to provide legitimacy for a corporation also grows in importance (Ibid). Additionally, Stephenson (2004) found that diverse boards are better able to attract and retain talented female and minority managers and employees – a finding of particular significance, as over half of the pool of human capital available to a firm is composed of women and minorities.

3.2: Human Capital Theory

Human Capital Theory examines the impact a person's education, skills, and experience can have on the organization that they are influencing. Because Terjesen et al. (2009) asserts that differences in gender result in directors having

unique human capital, it is reasonable to assume that in the same way, the human capital of ethnic minorities would also differ from those of Caucasians.

In Zweigenhaft and Domhoff's 2011 study of women and minority CEOs and directors in the Fortune 500, they concluded that "members of underrepresented groups who made it to the top were consistently better educated" than Caucasian men in similar positions. In particular, minority corporate leaders were more likely than their White male counterparts to have degrees from prestigious academic institutions, suggesting that their educational credentials are more likely to familiarize them with cutting edge practices in the field, including innovation, product development, and sound corporate governance practices. Additionally, minority leaders often bring a different set of perspectives and leadership skills to the table because of their lifelong status as outsiders within (Smith 2005). They are more likely to have experienced barriers and discrimination prior to their ascent, and as a result, they are more likely than Caucasian leaders to place additional weight on strong governance and to promote practices which favor transparency, accountability, fairness, and social responsibility (Cook & Glass 2015).

These assertions, however, are met with conflicting claims on the impact of diverse boards. Some have raised concerns that while the human capital of women and ethnic minorities may be unique relative to Caucasian men, this

unique human capital may not be the ‘right’ human capital needed for directorships. Accordingly, there has been scattered evidence that suggests women are just as well equipped as men in some human capital aspects, such as educational attainment, but that they are less likely than men to have experience in other aspects such as business expertise (Ibid). Additionally, women and African-American board of directors appear to assume different roles on the board relative to Caucasian male directors, though the net effect on financial performance could be either positive or negative (Hillman et al. 2002; Peterson et al. 2007).

3.3: Social Psychological Theory

Social Psychology Theory rests on the belief that diverse groups are less likely to suffer from groupthink, as diverse members are able to prevent directors with majority status from exerting a disproportionate amount of influence in group decisions (Carter et al. 2010). On the opposing end, however, some have suggested that diversity may result in more conflict, less group cohesion, and hindered communication. In this case, it is argued that the development of group *faultlines*, or “hypothetical dividing lines that may split a group into subgroups based on one or more attributes,” may lead to reluctance by majority directors and executives to share information with minority directors, therefore

compromising board effectiveness and thus, financial performance (Lau & Murnighan 1998). This in turn could make decision-making more time-consuming, less accurate, and less effective.

Nonetheless, research overwhelmingly suggests that greater group diversity contributes to the production of more innovative solutions to problems as well as more critical decision-making. In one study, Kim, Burns, and Prescott (2009) find that board diversity is “positively related to the breadth and speed of top management team strategic action capability.” At the most basic level, by disrupting conformity, diversity improves the way people think by prompting individuals in a group to scrutinize existing information, to consider options more deeply, and to develop distinct opinions. Apfelbaum et al. (2014) found that individuals in more diverse groups, when asked to calculate price movements for stimulated stocks, had answers that were 58% closer to the true values of the stocks than individuals who worked in a more homogenous group. Furthermore, the more time they spent interacting in diverse groups, the better their performance.

In these situations requiring analytical thinking, diversity brought the appropriate amount of cognitive friction needed to enhance deliberation, allowing participants to experience improved error detection, to question existing lines of thought, and to avoid speculative behavior. These findings are particularly

significant because they hold true even when minority members do not bring some special knowledge or skillset, suggesting that the mere presence of minority members benefits everyone who experiences it – majority and minority members alike (Levin & Stark 2015). It can therefore be extrapolated that these effects will carry over into board of director dynamics, with firms whose boards boast more ethnic and gender diversity benefiting from improved cognitive performance amongst board members and thus stronger financial outcomes for the firm.

CHAPTER 4: LEGISLATION

Because the day-to-day impact of boards is difficult to observe, it is natural that people question how large a role corporate boards truly play. It is apparent, however, that when things go wrong, the role of corporate boards is brought into the limelight, as was the case in the Enron, Worldcom, and Parmalat scandals (Adams et al. 2010). With evidence on the importance of board diversity mounting over the past decade, legislation passed concerning corporate governance, the role of boards of directors, and board composition has increased in popularity.

4.1: The Sarbanes-Oxley Act and Implications

Following a series of governance failures, the Sarbanes-Oxley Act of 2002 was a massive piece of groundbreaking legislation that greatly heightened awareness on the importance of corporate governance. It has often been heralded as “the most significant piece of federal legislation concerning public corporations since the post-1929 stock market crash legislation creating the SEC” (Monks & Minow 2008). In response to a number of corporate scandals, the act was created in part to modify the behavior of corporate boards through more clearly delineated responsibilities and duties of officers and directors. Two particular points are noteworthy for our discussion: new guidelines reasserting board

independence from corporate management through board composition requirements and criminal penalties for violations as a result of board negligence (Van Ness et al. 2010).

New requirements include expectations that audit committees are comprised entirely of independent directors to guarantee that the company has an adequate system of internal controls, as well as a general board guideline that the majority of directors are independent. Furthermore, the Sarbanes-Oxley Act gave the legal system new clout in the future prosecution of directors who participate in fraud or neglect clearly defined duties, as well as the means to enforce conduct of corporate boards (Ibid).

While no section of the Sarbanes-Oxley Act explicitly specifies requirements for ethnic or gender diversity, the newfound public scrutiny of corporate boards opened up the conversation revolving around the importance of board independence, board roles and responsibilities, and board composition. In fact, Dalton & Dalton (2010) found that in the post-Sarbanes-Oxley era (from 2002 - 2009), female membership on Fortune 500 boards increased nearly 30%, from 12.9% to 16.1%. Furthermore, female leadership on important committees such as compensation, auditing, and nominating committees have increased over 200% in the same time frame, suggesting that the Sarbanes-Oxley Act had a significant impact on boards' composition and governance.

4.2: Recent Legislation Specifying Board Diversity Requirements

While it has been argued that the Sarbanes-Oxley Act missed an important opportunity to substantially integrate women and minorities into corporate boardrooms through explicit diversity requirements, a number of countries have already made movements toward challenging previously accepted standards of board composition. In particular, European nations have championed this cause, with recent years showing a number of legislative breakthroughs supporting women in board positions.

In 2003, Norway ruffled feathers by implementing a harsh gender quota, which required hundreds of major corporations to raise female participation on boards to 40%. The revolutionary mandate was viewed as an exemplary example of progressive policy by other countries, and a number, including Spain, Iceland, Italy, Finland, and France, followed suit (Miller 2014 & Stoll 2015). Despite board affirmative action becoming an increasingly popular idea in Europe, there have been mixed reports on the effectiveness of hard quotas, at least in catalyzing cultural change in the workplace. In Norway, the quotas have not led to an increase in the number of women in executive management positions or a decrease in the gender pay gap (Miller 2014). In fact, a study by Ahern and Dittmar (2012) found that the constraint imposed by a strict quota caused a large

decline in Tobin's Q due to younger, less experienced boards, increases in leverage and acquisitions, and deterioration in operating performance.

Nonetheless, in an attempt to disrupt male monoculture in German firms, in March 2015, Germany's parliament passed a bill requiring large listed companies to fill 30% of corporate boards with female non-executive directors (Torry 2015). Similarly, Great Britain has made recent strides to increase women representation on large corporate boards by setting a new target for FTSE 100 companies to have 33% female board members by 2020 (Kollewe & Hickey 2015). In contrast with Norway, however, the government-backed report from Great Britain's Lord Mervyn Davies does not recommend that quotas be imposed. In 2011, Lord Mervyn Davies championed a movement which pressured corporations to double their female board membership to 25% by 2015, encouraging them to publish annually the proportion of women in top decisions as a part of normal corporate governance checks and balances and to increase transparency in board recruitment processes. Since then, Great Britain has exceeded those targets, suggesting that voluntary compliance may be sufficient and even potentially better than strict quotas in bringing about cultural change at the board level (Wood 2011).

CHAPTER 5: REVIEW OF LITERATURE

While this study uniquely investigates the effect of gender and ethnic diversity of corporate boards on firm financial performance in the post-Great Recession era, the question of this potential relationship is not new. In particular, with the passing of legislation that pushed for increased female board representation internationally, as well as increased public scrutiny of corporate governance practices following a number of scandals in the early 2000s, many have asked if a strong enough relationship between board diversity and firm financial performance exists that the United States should follow suit.

A number of studies have examined the effect of general minority representation, without distinguishing between gender or ethnic minority, on quantifiable firm performance measures. Carter et al. (2003) analyzed publically traded Fortune 1000 companies using 1997 board characteristics obtained from *Significant Data for Directors 1999: Board Policies and Governance Trends*, as well as accounting data from the same COMPUSTAT database used in our study. Carter et al. ultimately found a significant positive relationship between the fraction of women or ethnic minorities on the board and firm value, as measured by Tobin's Q, after controlling for size, industry, and other corporate governance measure. Similarly, Erhardt et al. (2003) found a significant positive relationship between the percentage of ethnic minorities plus the percentage of

females on the board and return on assets for a sample of U.S. firms. In contrast, however, Sahra and Stanton (1988) found no such relationship when examining the linkage between the percentage of ethnic minorities plus the percentage of females on the board and return on assets, though admittedly the data was a bit more dated.

Indeed, the above studies uniformly defined their minority independent variable under the pretense that female and ethnic minority board members add value to the corporation in similar ways. In reality, women and ethnic minorities may bring unique skillsets to the boardroom, affecting firms in different ways because of the gender and race specific resources, skills, and external linkages they provide. Many studies, as a result, have separated out the effects that different board minority groups can have on financial performance.

For example, Alison Cook and Christy Glass (2015) examined the effect of ethnic minority board members on firm performance, as defined by corporate governance and product development/innovation measures. Using an author-constructed dataset and a KLD dataset for corporate governance outcome measures, Cook and Glasses' panel data analysis used time and firm-level fixed effects to show that ethnically diverse boards are in fact positively associated with effective governance and product development.

Admittedly, studies that examine the effect of gender diversity on firm performance are much more plentiful than those that examine the effects of ethnic diversity. Campbell and Minguez-Vera (2008) found a significant positive relationship between gender diversity of boards and financial performance for a sample of Spanish companies. Adams and Ferreira's (2009) research also supports the case for gender diversity in the business context for United States firms. They found that gender diverse board are more attentive in monitoring managers and engage in more sound corporate governance practices. Despite that, however, Adams and Ferreira also found a negative relationship between the proportion of women on the board and firm value as measure by Tobin's Q.

Similarly, Smith et al. (2006) did not find a statistically significant relationship between female representation on Danish corporate boards and several accounting measures of financial performance. Studies by Rose (2007), Farrel and Hersch (2005), and Shrader et al. (1997) also found no evidence that the addition of females to corporate boards influences return on assets or Tobin's Q.

Given the conflicting results presented above, the impact of gender diversity on firm financial performance is difficult to deduce. Not only are results inconsistent, but the statistical methods, the data sources, the settings, and the

time periods examined vary to such an extent that the results are tough to compare.

Pathan and Faff (2012) attempt to explain the mixed results by bifurcating analysis between the pre- and post-Sarbanes-Oxley era. They find that while gender diversity improves bank performance in the pre-Sarbanes-Oxley Act period (1997-2002), this positive linkage disappears in both the post-Sarbanes-Oxley era (2003-2006) and during the Great Recession (2007-2011). This finding suggests that perhaps, in the post-Sarbanes-Oxley era, independent bank directors are chosen not just on the basis of skill. Rather, it may be the case that they are chosen in part *for* diversity considerations, thus potentially diminishing the aggregate skills those particular boards may bring to the table. In fact, Farrell and Hersch (2005) found that companies with a woman on the board were unlikely to appoint another – a finding that may support the the notion that some boards have moved perilously close to a rationing system. While inching in on the Great Recession period, Pathan and Faff still do not analyze the lagged and *post*-Great Recession (2011 – 2014) financial effects of board diversity in the same way our study does.

Nonetheless, when Carter et al.'s (2010) study examined how ethnic and gender board diversity in the pre-Sarbanes-Oxley Act era (1998-2002) affected firm financial performance, as measured by return on assets and Tobin's Q, they

found a significant and positive relationship. Rather than examine how the proportion of minority members affected financial performance, however, Carter et al. used raw counts of female and ethnic minority board members as primary regressors. This study, furthermore, is of particular interest, because it uses the lagged value of Tobin's Q and return on assets in all of its estimations. This model specification was pursued because the authors hypothesized that the effect of board diversity on financial performance would occur over time.

While there has clearly been substantial research conducted investigating the relationship between board diversity and firm financial performance, existing literature has produced mixed results. Many investigations make claims of positive linkages, but others find no relationship or even negative relationships between board diversity and financial performance. The inconclusive nature of the evidence presented so far, coupled with the increased relevancy of topics on corporate governance, beckons for additional research in the field to be done.

There are a number of ways in which this study hopes to contribute to existing literature. First, while prior research has used the COMPUSTAT database as a source of accounting and financial data, we found none that used the merged datasets of COMPUSTAT with Center for Research with Security Prices (CRSP) and Institutional Shareholder Services (ISS) datasets. Secondly, there has not been any research conducted on the financial impact of board ethnic

and gender diversity in the period this study focuses on – the post-Great Recession era (2011-present). Rather than simply examine board composition during the recovery period, we also investigate their lagged financial effects in the following years.

Lastly, this study delves deeper into how gender and ethnic minority status may affect firm financial performance, by moving beyond linear models. In contrast with prior research, this study will investigate whether a “tipping point” – or a point after which gender or ethnic minority composition on a board catalyzes significant effects on financial performance – exists.

CHAPTER 6: DATA AND SUMMARY STATISTICS

This study merges data from three primary data sources: Institutional Shareholder Services (ISS), COMPUSTAT, and Center for Research with Security Prices (CRSP). ISS is a leader in corporate governance data. They deliver to Wharton Research and Data Services four datasets – Historical Governance, Voting Results, Shareholder Proposal, and Historical Directors data – the last of which this study will utilize.

The Historical Directors dataset is relevant to this study, because it contains a range of variables characterizing individual board of directors, including name, age, tenure, gender, committee memberships, board attendance, ethnicity, etc. Included in this data set is the entire universe of the S&P 1500 companies. Data collection of board characteristics began in 1996 and is updated annually up to 2014. In particular, our study uses data on board member ethnicity, gender, compensation, board size, age, dual CEO-role, insider status, tenure, financial expertise, and board attendance. Board member ethnicity and gender were used as our variables of interest, with the remaining variables analyzed for control purposes.

From these individual responses, we collapsed board of director data by company. Our sample includes 1,139 publically traded companies. For each year between 2007 and 2011, a data point was generated for each company reflecting

total board size, $\ln(\text{total board size})$, the number of ethnic minority members on the board, the number of females on the board, the board's percent ethnic minority composition, the board's percent female composition, the average age of board members, the percent of board members who attended greater than 75% of the board meetings, the percent of board members who had insider status (defined as those who were previous employees of the company or held internal ties to the company prior to joining the board), the percent of the board that had past financial expertise, average board term length, and average board compensation.

The 2007-2011 board characteristic time frame does incorporate some decisions made during the Great Recession, but it is not clear that this would bias our outcomes, as there were no studies found showing that board appointments differed in diversity during the Great Recession. Additionally, because it likely takes a few years for board appointments to affect financial performance, our models were run with a 3-year data outcomes lag. By examining 2007-2011 board characteristics, we could analyze these companies' 2010-2014 financial outcomes – performance data that bypasses the financial volatility of the Great Recession years.

For our purposes, the percent ethnic minority composition for a particular company was simply the number of minority (non-White) board members

divided by the total number of members on the board. The percent female composition for a specific company was calculated by dividing the total number of female board representatives by the total number of members on the board. In the same way, the percent minority generalization was calculating by summing the number of board members who were either female or non-White for a given company and dividing that by the total number of members on the board.

Additionally, binary variables for if the board was compensated, if the CEO of the company was also a board member, and minority tipping points for the board were generated. For our study, companies with boards where ethnic minorities made up over 30% of the board were given an “*Ethnic Minority Tipping Point*” value of 1, and those that had boards which were fewer than 30% ethnic minorities were given an “*Ethnic Minority Tipping Point*” value of 0. In a similar vein, boards where female members made up over 30% of the board were given a “*Female Tipping Point*” value of 1, and those that had boards which were fewer than 30% female were given a “*Female Tipping Point*” value of 0.

Our research also analyzes the effect of gender and ethnic minority board representation by allocating S&P 1500 companies to the quartile in which they fell for friendliness toward female and ethnic minority board members. Accordingly, those in the bottom 25% of all companies in terms of female representation on the board (measured as a percentage of the board that is

female) were allocated to “*Female 1*”, those in the 25th- 50th percentile of female-friendliness were allocated to the “*Female 2*” bucket, and so on. The same methodology was applied to companies when distributing them across quartiles that reflected board friendliness toward ethnic minorities, with companies that boasted the highest percentage of ethnically diverse boards falling under the “*Ethnic Minority 4*” bucket.

We also generated an additional minority variable that encompasses the total amount of minority representation on a board, with no regard to whether it is gender or ethnic minority. This is consistent with Carter et al.’s (2003) previous studies, and in particular, it allows for the exploration of the Social Psychology Theory by hypothesizing that the mere presence of diversity may disrupt conformity in a positive, value-producing way. For this variable, members who are either female or non-White are counted as minorities, and the total number of minorities on a company’s board of directors is divided by the company’s board size to create a generalized variable reflecting percent minority. Similar to previously explained diversity variables, each company was then placed into quartiles which embodied how friendly they were to minorities in general, with no regard to if the friendliness was directed toward women or ethnic minorities. This categorization resulted in the variables “*Minority 1*”, “*Minority 2*”, “*Minority 3*”, and “*Minority 4*.” With the exception of the variables of interest

pertaining to ethnic minority and gender diversity, the remaining ISS variables were used as controls in this study. Summary statistics on board of directors characteristics, along with a number of our controls, can be found in Table 1 of the Appendix.

We used CRSP and COMPUSTAT to evaluate financial performance metrics of the companies we examined. The Center for Research in Security Prices (CRSP) is the world's first comprehensive database for historical security prices and returns information. CRSP releases monthly, quarterly, and annual stock market data, beginning from 1926. This study uses end-of-year stock price and number of shares outstanding information to calculate the market value of equity (MVE) for each of the companies in our sample, where

$$MVE = (Share\ Price) \times (Shares\ Outstanding).$$

We then used COMPUSTAT to retrieve the remaining company-level information needed to calculate financial performance metrics, as well as for the inclusion of certain controls. Beginning in 1962, COMPUSTAT has collected annual and quarterly financial data on over 14,650 active companies and over 16,950 inactive companies. The database covers 99% of the world's total market capitalization and makes the data available to bankers, universities, portfolio managers, fixed income markets, etc. Our study utilized COMPUSTAT to calculate firm financial performance metrics as measured by return on assets

(ROA) and Tobin's Q. In order to generate these dependent variables, we utilized COMPUSTAT's data on net income, debt in current liabilities, total long-term debt, and total assets. Coupled with the MVE data point generated using CRSP data, the following calculations were completed for each of our companies:

$$ROA = \frac{Net\ Income}{Total\ Assets}$$

$$Tobin's\ Q = \frac{MVE + Debt}{Total\ Assets}$$

where Debt = (Debt in Current Liabilities) + (Total Long-Term Debt).

While ROA and Tobin's Q are measures commonly used in governance investigations as measures of performance, they are not identical. ROA is often seen as a reflection of a firm's ability to produce "accounting based revenues in excess of actual expenses from a given portfolio of assets measured as amortized historical costs" (Carter 2010). In short, it is an indication of the accounting income that is produced for the shareholders of a company.

Tobin's Q, on the other hand, signals the wealth position of the shareholders and creditors to the firm. For shareholders and creditors who invested in firms with Tobin Q values greater than one, the market value of their investment is greater than the amortized historical cost of the assets. Because of the market-based nature of the Tobin's Q measurement, the metric is a forecast of future cash flows produced by the firm and an embodiment of the investment

opportunity set of the firm. In this way, Tobin's Q is often seen as a more long-term metric, as well as a more complex measure of performance than ROA. So whereas ROA embodies income, Tobin's Q embodies wealth (Ibid). We modeled our Tobin's Q calculation after the approximation used in Fraga and Silva's (2012) study on board diversity and firm performance for Brazilian companies.

Lastly, COMPUSTAT provides information on market capitalization for each of our 1,139 firms (small, mid, and large-cap specifications), as well as industry type classifications (ex. Aerospace & defense, electric utilities, IT consulting, apparel retail, broadcasting, etc.). We incorporated both as firm control variables in our regressions. Additionally, because ISS, CRSP, and COMPUSTAT datasets are all updated annually (if not quarterly and monthly), they are particularly well suited for the same-firm fixed effects regressions we run in our within-firm panel data analysis.

CHAPTER 7: METHODOLOGY

Through this empirical analysis, we seek to estimate the effect of board gender and ethnic diversity on firm financial performance. In our analysis, we attempted to control for two primary concerns. The first is the issue of reverse causality. It is possible that firms with better financial standing may be more likely to have the luxury of pursuing board diversity, or they may have more pressure from a corporate governance perspective to have a board whose composition is a better reflection of their customer pool.

The second concern is one of omitted variables, both in board member characteristics and in time-invariant characteristics of firms. For example, there may be board characteristics which influence how effectively a board operates (and thus, how well the firm performs), which are independent of a board's ethnic minority or gender representation. For instance, a board of director's average term length may play a role in board cohesion, experience, and understanding of the company's goals – all things that should theoretically boost firm financial performance – but this is unlikely to serve as a channel through which board diversity specifically affects financial performance. Additionally, time-invariant characteristics of the firm, such as firm history, as well as time-varying characteristics may affect firm financial performance, and thus, must be accounted for.

Therefore, to address reverse causality and omitted variables, we employed the use of four distinct models in our study. We first estimate a cross-firm model that controls for firm and board composition using OLS regression. The second model we ran was a slight variation on the first, as it also used OLS regression analysis, but controlled for the financial performance outcomes in an earlier time period. Our third model is an OLS model that controls for firm by incorporating firm dummies. Lastly, our fourth model used panel data to estimate within-firm fixed effects. It is our hope that because each specification gives a different, but relevant estimate, the inclusion of all four will tell a more complete story.

7.1: Model 1- Cross-firm OLS without time controls

We first use a simple OLS regression to control for omitted firm and board characteristics using dummy variables. This particular cross-section model gives us a more population-based explanation of how board diversity affects firm financial performance, while incorporating a number of control variables so as to account for exogeneity. This relationship was modeled by the following four equations:

$$ROA_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 X_i + u_i \quad (1a)$$

$$ROA_i = \beta_0 + \beta_1 \text{Percent Female}_i + \beta_2 X_i + u_i \quad (2a)$$

$$ROA_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 \text{Percent Female}_i + \beta_3 X_i + u_i \quad (3a)$$

$$ROA_i = \beta_0 + \beta_1 \text{Percent Minority}_i + \beta_2 X_i + u_i \quad (4a)$$

The subscript i in the above equations refers to the identification number of specific firms being analyzed, with X_i representing their appropriate control variables and u_i representing corresponding error terms. Here, the outcome variable is the firm's return on assets using 2014 financial data. The key variables of interest are diversity measures for a given company's 2011 board composition. Equation 1a examines the effect of ethnic minority representation on boards (calculated as a percent of non-White board members), whereas equation 2a examines the effect of female representation on boards (calculated as a percent of female board members). Because, as noted in this study's overview and review of literature sections, we recognize that females and ethnic minorities may potentially affect board effectiveness in non-identical ways, we chose to run these specifications separately. However, in equation 3a, we include both "*Percent Ethnic Minority*" and "*Percent Female*" as variables of interest, so as to allow for us to see the extent to which the estimates of each hold when including the other. Lastly, equation 4 uses "*Percent Minority*" as our variable of interest, allowing for the potential that the mere presence of a minority member may play a role in firm financial performance. Appropriately, "*Percent Minority*" does not differentiate between ethnic and gender minority status.

This model incorporated a number of control variables at both the firm and board level. Firm size is routinely used as a control variable in the analysis of financial performance, as it is shown to be related to market returns and Tobin's Q (Carter et al. 2010). Carter et al. (2003) show that total assets is also positively related to the percentage of female directors and the percentage of minority directors. Therefore, we included total assets and market capitalization (small, mid, and large-cap classifications) as control variables. Additionally, because growth during this time period may vary dramatically by sector, we included an industry control in our analysis.

At the board level, we controlled for a number of characteristics that may affect board efficiency and effectiveness, independent of ethnic and gender representation. Yermack (1996) finds that board size and Tobin's Q are inversely related, and Adams and Ferreira (2009) find that board size influences board diversity. Thus, we include the natural log of board size in our financial performance equation. Consistent with Carter et. al (2010), we also include the average age of the board, the percentage of board members who are "insiders" (board members who are either executives, employees, or are linked to the firm in some way), and average term length as additional controls. Variables for CEO-board duality, average board compensation, and financial expertise of board members were not included in our control variables, as they were found to not be

statistically and significantly associated with board composition when evaluated alone, and thus, were clearly not important confounders.

In the above equations, we intentionally used 2011 board characteristics, coupled with 2014 financial performance data. Similar to Carter et al. (2010) and Jackling and Johl (2009), we incorporate the lagged value of ROA in our estimations, in order to account for the fact that any effects of a particular company's board composition will not immediately be translated into financial performance. We report regression estimates with a three-year lag. The 2011 – 2014 time period was chosen so that we could examine the effect of board diversity on financial performance in the post Great-Recession era, when firm financial performance had stabilized to some extent.

The same investigation was then conducted with Tobin's Q replacing ROA as the dependent variable:

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 X_i + u_i \quad (5a)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Percent Female}_i + \beta_2 X_i + u_i \quad (6a)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 \text{Percent Female}_i + \beta_3 X_i + u_i \quad (7a)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Percent Minority}_i + \beta_2 X_i + u_i \quad (8a)$$

The equation specifications, including control variables, are consistent with equations 1a-4a.

7.2: Model 2- Cross-firm OLS with time controls

Our second model specification is remarkably similar to the first. While it is also an OLS regression analysis with the same independent, dependent, and control variables, it further incorporates the use of two additional control variables: 2011 firm ROA and 2011 firm Tobin's Q financial performance measures.

$$ROA_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 ROA_{2011i} + \beta_3 \text{Tobin's Q}_{2011i} + \beta_4 X_i + u_i \quad (1b)$$

$$ROA_i = \beta_0 + \beta_1 \text{Percent Female}_i + \beta_2 ROA_{2011i} + \beta_3 \text{Tobin's Q}_{2011i} + \beta_4 X_i + u_i \quad (2b)$$

$$ROA_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 \text{Percent Female}_i + \beta_3 ROA_{2011i} + \beta_4 \text{Tobin's Q}_{2011i} + \beta_5 X_i + u_i \quad (3b)$$

$$ROA_i = \beta_0 + \beta_1 \text{Percent Minority}_i + \beta_2 ROA_{2011i} + \beta_3 \text{Tobin's Q}_{2011i} + \beta_4 X_i + u_i \quad (4b)$$

In these equations, ROA and Tobin's Q is calculated in the same way as the outcome variables, just using 2011 financial data instead. These additional control variables are incorporated to control for the effect that past financial performance may have on both board composition and future financial performance. By controlling for the outcome at an earlier time point, this particular analysis clearly establishes the temporal ordering of events.

Similar to Model 1, analyses examining the effect of gender and ethnic minority composition were also conducted with 2014 Tobin's Q measures as the outcome variable:

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 \text{ROA}_{2011i} + \beta_3 \text{Tobin's } Q_{2011i} + \beta_4 X_i \\ & + u_i \end{aligned} \quad (5b)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Percent Female}_i + \beta_2 \text{ROA}_{2011i} + \beta_3 \text{Tobin's } Q_{2011i} + \beta_4 X_i + u_i \quad (6b)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 \text{Percent Female}_i + \beta_3 \text{ROA}_{2011i} + \\ & \beta_4 \text{Tobin's } Q_{2011i} + \beta_5 X_i + u_i \end{aligned} \quad (7b)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Percent Minority}_i + \beta_2 \text{ROA}_{2011i} + \beta_3 \text{Tobin's } Q_{2011i} + \beta_4 X_i + u_i \\ & \end{aligned} \quad (8b)$$

7.3: Model 3- OLS controlling for firm

Our third model is an OLS analysis that controls for firms, whose equations are identical to those of our first primary model, except that they incorporate a firm dummy variable as an additional control (noted below as F_i).

$$\text{ROA}_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (1c)$$

$$\text{ROA}_i = \beta_0 + \beta_1 \text{Percent Female}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (2c)$$

$$\text{ROA}_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 \text{Percent Female}_i + \beta_3 X_i + \beta_4 F_i + u_i \quad (3c)$$

$$\text{ROA}_i = \beta_0 + \beta_1 \text{Percent Minority}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (4c)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (5c)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Percent Female}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (6c)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Percent Ethnic Minority}_i + \beta_2 \text{Percent Female}_i + \beta_3 X_i + \beta_4 F_i \\ & + u_i \end{aligned} \quad (7c)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Percent Minority}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (8c)$$

This model does not, however, control for time-invariant characteristics in the same way that our subsequent fixed effects analysis in Model 4 does.

Nonetheless, this particular model most fully utilizes the data we have available, while, at the same time, allowing us to focus on changes in firms' financial performance. Similar to Model 1, this specification includes a 3-year financial performance lag, allowing for the effect of board diversity on financial performance to take some time. So, while our right hand and control variables are drawing in data from 2007 – 2011, our outcome variables reflect firm financial performance measures from 2010 – 2014. In this way, 2007 right hand variables correspond with 2010 ROA and Tobin's Q measures, 2008 right hand variables correspond with 2011 ROA and Tobin's Q measures, and so on. This model, however, differs from Model 4, which also accounts for the fact that multiple observations are for the same firm, in that it even analyzes companies that do not change from year to year.

7.4: Model 4- Within-firm fixed effects

Model 4 is the most stringent of the four primary models we explore, as we use panel data to estimate within-firm fixed effects models. This model was conducted to control for all time-invariant characteristics of firms, such as firm history, as well as time-varying characteristics of firms, such as changes in corporate culture, strategy, product offerings, etc. The various equations analyzed in Model 4 are consistent with our specifications for Model 1:

$$ROA_{it} = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_{it} + \beta_2 X_{it} + u_{it} \quad (1d)$$

$$ROA_{it} = \beta_0 + \beta_1 \text{Percent Female}_{it} + \beta_2 X_{it} + u_{it} \quad (2d)$$

$$ROA_{it} = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_{it} + \beta_2 \text{Percent Female}_{it} + \beta_3 X_{it} + u_{it} \quad (3d)$$

$$ROA_{it} = \beta_0 + \beta_1 \text{Percent Minority}_{it} + \beta_2 X_{it} + u_{it} \quad (4d)$$

$$\text{Tobin's } Q_{it} = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_{it} + \beta_2 X_{it} + u_{it} \quad (5d)$$

$$\text{Tobin's } Q_{it} = \beta_0 + \beta_1 \text{Percent Female}_{it} + \beta_2 X_{it} + u_{it} \quad (6d)$$

$$\text{Tobin's } Q_{it} = \beta_0 + \beta_1 \text{Percent Ethnic Minority}_{it} + \beta_2 \text{Percent Female}_{it} + \beta_3 X_{it} + u_{it} \quad (7d)$$

$$\text{Tobin's } Q_{it} = \beta_0 + \beta_1 \text{Percent Minority}_{it} + \beta_2 X_{it} + u_{it} \quad (8d)$$

In the above equations, the subscript i continues to represent the identification numbers of specific firms being analyzed, and the subscript t refers to the observed time period. Similar to our previous models, we incorporated a 3-year outcome lag. It uses as right hand and control variables data from 2007 – 2011 and firm financial performance measures from 2010 – 2014 as outcome

variables. This longitudinal period was chosen so that once again, our analysis would focus on how board of director diversity composition affected Post-Great Recession firm financial performance – a question that has been unexplored by previous literature in the subject.

7.5: Supplementary Models

Because our four primary models use percent diversity measures as our explanatory variables, these models assume a linear association between that and firm financial performance outcomes. In reality, this may be overly restrictive, as past literature and legislation has suggested (though has not adequately explored) the existence of a critical mass mechanism. Therefore, in our supplementary models, we explore specifications with ethnic and gender minority tipping points as our variables of interest. Joeks et al. (2012) indicate, for example, that a relatively low representation of female directors initially has a negative effect on firm performance, which only becomes positive after a critical mass of 30% minority directors is surpassed. And as mentioned in our overview of corporate diversity legislation, a number of European countries have passed policies mandating female board representation to hit at least 25% - 40%. Therefore, in our analysis, we created dummy variables that indicated whether or not boards of directors surpassed an ethnic minority tipping point of 30% and a

female representation tipping point of 30%. To ensure that our analysis did not hinge on a particular percentage, we also evaluated tipping points around the 30% threshold – tipping points of 15%, 20%, and 40%. Because the 30% critical mass yielded the most significant results, we choose to focus on its analysis.

We ran analyses on the 30% ethnic minority tipping point using the four primary model specifications noted above – a simple OLS with no 2011 financial output time controls, an OLS with 2011 financial output time controls, an OLS controlling for firm, and within-firm fixed effects regression. The same regressions were then run for the 30% female representation tipping point:

$$ROA_i = \beta_0 + \beta_1 \text{Ethnic Minority Tipping Point}_i + \beta_2 X_i + u_i \quad (9ai)$$

$$ROA_i = \beta_0 + \beta_1 \text{Ethnic Minority Tipping Point}_i + \beta_2 ROA_{2011i} + \beta_3 \text{Tobin's } Q_{2011i} + \beta_4 X_i + u_i \quad (9bi)$$

$$ROA_i = \beta_0 + \beta_1 \text{Ethnic Minority Tipping Point}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (9ci)$$

$$ROA_{it} = \beta_0 + \beta_1 \text{Ethnic Minority Tipping Point}_{it} + \beta_2 X_{it} + u_{it} \quad (9di)$$

$$ROA_i = \beta_0 + \beta_1 \text{Female Tipping Point}_i + \beta_2 X_i + u_i \quad (9aii)$$

$$ROA_i = \beta_0 + \beta_1 \text{Female Tipping Point}_i + \beta_2 ROA_{2011i} + \beta_3 \text{Tobin's } Q_{2011i} + \beta_4 X_i + u_i \quad (9bii)$$

$$ROA_i = \beta_0 + \beta_1 \text{Female Tipping Point}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (9cii)$$

$$ROA_{it} = \beta_0 + \beta_1 \text{Female Tipping Point}_{it} + \beta_2 X_{it} + u_{it} \quad (9dii)$$

Similar to our primary models, we examined the effects of board diversity tipping points on not just ROA, but on Tobin's Q as well:

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Ethnic Minority Tipping Point}_i + \beta_2 X_i + u_i \quad (10ai)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Ethnic Minority Tipping Point}_i + \beta_2 \text{ROA}_{2011i} + \beta_3 \text{Tobin's } Q_{2011i} + \\ & \beta_4 X_i + u_i \end{aligned} \quad (10bi)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Ethnic Minority Tipping Point}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (10ci)$$

$$\text{Tobin's } Q_{it} = \beta_0 + \beta_1 \text{Ethnic Minority Tipping Point}_{it} + \beta_2 X_{it} + u_{it} \quad (10di)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Female Tipping Point}_i + \beta_2 X_i + u_i \quad (10aai)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Female Tipping Point}_i + \beta_2 \text{ROA}_{2011i} + \beta_3 \text{Tobin's } Q_{2011i} + \beta_4 X_i \\ & + u_i \end{aligned} \quad (10bii)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Female Tipping Point}_i + \beta_2 X_i + \beta_3 F_i + u_i \quad (10cii)$$

$$\text{Tobin's } Q_{it} = \beta_0 + \beta_1 \text{Female Tipping Point}_{it} + \beta_2 X_{it} + u_{it} \quad (10dii)$$

The tipping point thought process rests primarily on the idea that it takes a critical density of diversity for the benefits of the Social Psychology Theory to be redeemed. Put differently, diverse members are only able to prevent directors with majority status from exerting a disproportionate amount of influence in group decisions when there is a large enough contingency of them to become formidable opposition. On the other hand, it is possible that there is a point at which a board of directors may be "too diverse." This is rationalized by the belief that there is a point at which minority representation is so overwhelming that a

board may experience the development of group faultlines, compromising board effectiveness and consequently, financial performance, by making decision-making more time-consuming and less accurate. For this reason, we also examined how board friendliness toward ethnic minorities, females, and minorities in general (with no discrimination toward whether the minority is non-White or female), as measured by the percent representation quartile in which they fell, affected firm ROA:

$$ROA_i = \beta_0 + \beta_1 \text{Ethnic Minority } 2_i + \beta_2 \text{Ethnic Minority } 3_i + \beta_3 \text{Ethnic Minority } 4_i + \beta_4 X_i + u_i \quad (11ai)$$

$$ROA_i = \beta_0 + \beta_1 \text{Female } 2_i + \beta_2 \text{Female } 3_i + \beta_3 \text{Female } 4_i + \beta_4 X_i + u_i \quad (11aii)$$

$$ROA_i = \beta_0 + \beta_1 \text{Minority } 2_i + \beta_2 \text{Minority } 3_i + \beta_3 \text{Minority } 4_i + \beta_4 X_i + u_i \quad (11aiii)$$

$$ROA_i = \beta_0 + \beta_1 \text{Ethnic Minority } 2_i + \beta_2 \text{Ethnic Minority } 3_i + \beta_3 \text{Ethnic Minority } 4_i + \beta_4 ROA_{2011i} + \beta_5 \text{Tobin's } Q_{2011i} + \beta_6 X_i + u_i \quad (11bi)$$

$$ROA_i = \beta_0 + \beta_1 \text{Female } 2_i + \beta_2 \text{Female } 3_i + \beta_3 \text{Female } 4_i + \beta_4 ROA_{2011i} + \beta_5 \text{Tobin's } Q_{2011i} + \beta_6 X_i + u_i \quad (11bii)$$

$$ROA_i = \beta_0 + \beta_1 \text{Minority } 2_i + \beta_2 \text{Minority } 3_i + \beta_3 \text{Minority } 4_i + \beta_4 ROA_{2011i} + \beta_5 \text{Tobin's } Q_{2011i} + \beta_6 X_i + u_i \quad (11biii)$$

$$ROA_i = \beta_0 + \beta_1 \text{Ethnic Minority } 2_i + \beta_2 \text{Ethnic Minority } 3_i + \beta_3 \text{Ethnic Minority } 4_i + \beta_4 X_i + \beta_5 F_i + u_i \quad (11ci)$$

$$ROA_i = \beta_0 + \beta_1 \text{Female } 2_i + \beta_2 \text{Female } 3_i + \beta_3 \text{Female } 4_i + \beta_4 X_i + \beta_5 F_i + u_i \quad (11cii)$$

$$ROA_i = \beta_0 + \beta_1 \text{Minority } 2_i + \beta_2 \text{Minority } 3_i + \beta_3 \text{Minority } 4_i + \beta_4 X_i + \beta_5 F_i + u_i \quad (11ciii)$$

$$ROA_{it} = \beta_0 + \beta_1 \text{Ethnic Minority } 2_{it} + \beta_2 \text{Ethnic Minority } 3_{it} + \beta_3 \text{Ethnic Minority } 4_{it} \\ + \beta_4 X_{it} + u_{it} \quad (11di)$$

$$ROA_{it} = \beta_0 + \beta_1 \text{Female } 2_{it} + \beta_2 \text{Female } 3_{it} + \beta_3 \text{Female } 4_{it} + \beta_4 X_{it} + u_{it} \quad (11dii)$$

$$ROA_{it} = \beta_0 + \beta_1 \text{Minority } 2_{it} + \beta_2 \text{Minority } 3_{it} + \beta_3 \text{Minority } 4_{it} + \beta_4 X_{it} + u_{it} \quad (11diii)$$

In the equations above, the right hand variables are dummy variables indicating the quartile of diversity representation (measured as a percent) in which a firm falls. As is the case for our other supplementary analyses, we examined these effects using cross-firm OLS regression with no time controls (a), cross-firm OLS regression with 2011 financial measure time controls (b), firm-controlled OLS regression (c), and within-firm fixed effects regression (d). Once again, these regressions were then rerun with Tobin's Q as our dependent variable:

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Ethnic Minority } 2_i + \beta_2 \text{Ethnic Minority } 3_i + \beta_3 \text{Ethnic Minority } 4_i \\ + \beta_4 X_i + u_i \quad (12ai)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Female } 2_i + \beta_2 \text{Female } 3_i + \beta_3 \text{Female } 4_i + \beta_4 X_i + u_i \quad (12aii)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Minority } 2_i + \beta_2 \text{Minority } 3_i + \beta_3 \text{Minority } 4_i + \beta_4 X_i + u_i \quad (12aiii)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Ethnic Minority } 2_i + \beta_2 \text{Ethnic Minority } 3_i + \beta_3 \text{Ethnic Minority } 4_i \\ + \beta_4 ROA_{2011i} + \beta_5 \text{Tobin's } Q_{2011i} + \beta_6 X_i + u_i \quad (12bi)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Female } 2_i + \beta_2 \text{Female } 3_i + \beta_3 \text{Female } 4_i + \beta_4 \text{ROA}_{2011i} + \beta_5 \text{Tobin's} \\ & Q_{2011i} + \beta_6 X_i + u_i \end{aligned} \quad (12bii)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Minority } 2_i + \beta_2 \text{Minority } 3_i + \beta_3 \text{Minority } 4_i + \beta_4 \text{ROA}_{2011i} + \\ & \beta_5 \text{Tobin's } Q_{2011i} + \beta_6 X_i + u_i \end{aligned} \quad (12biii)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Ethnic Minority } 2_i + \beta_2 \text{Ethnic Minority } 3_i + \beta_3 \text{Ethnic Minority } 4_i \\ & + \beta_4 X_i + \beta_5 F_i + u_i \end{aligned} \quad (12ci)$$

$$\text{Tobin's } Q_i = \beta_0 + \beta_1 \text{Female } 2_i + \beta_2 \text{Female } 3_i + \beta_3 \text{Female } 4_i + \beta_4 X_i + \beta_5 F_i + u_i \quad (12cii)$$

$$\begin{aligned} \text{Tobin's } Q_i = & \beta_0 + \beta_1 \text{Minority } 2_i + \beta_2 \text{Minority } 3_i + \beta_3 \text{Minority } 4_i + \beta_4 X_i + \beta_5 F_i + u_i \\ & \end{aligned} \quad (12ciii)$$

$$\begin{aligned} \text{Tobin's } Q_{it} = & \beta_0 + \beta_1 \text{Ethnic Minority } 2_{it} + \beta_2 \text{Ethnic Minority } 3_{it} + \beta_3 \text{Ethnic Minority} \\ & 4_{it} + \beta_4 X_{it} + u_{it} \end{aligned} \quad (12di)$$

$$\text{Tobin's } Q_{it} = \beta_0 + \beta_1 \text{Female } 2_{it} + \beta_2 \text{Female } 3_{it} + \beta_3 \text{Female } 4_{it} + \beta_4 X_{it} + u_{it} \quad (12dii)$$

$$\begin{aligned} \text{Tobin's } Q_{it} = & \beta_0 + \beta_1 \text{Minority } 2_{it} + \beta_2 \text{Minority } 3_{it} + \beta_3 \text{Minority } 4_{it} + \beta_4 X_{it} + u_{it} \\ & \end{aligned} \quad (12diii)$$

Cross-tabulated summary statistics for supplementary model data can be found in Table 2. It is our hope that through our supplementary analyses, we may take into account the possibility of diversity variables affecting financial performance in a non-linear fashion, and thus, we will be able to present our readers with a more complete story of our data.

CHAPTER 8: RESULTS AND DISCUSSION

This chapter presents the results of the empirical analysis noted in the previous section. Female representation on boards is found to positively influence firm financial performance, as measured by ROA and Tobin's Q. This finding is consistent across nearly all of our primary model specifications. Additionally, our results suggest that ethnic minority representation may positively affect ROA, but that it negatively affects Tobin's Q performance measures, though the estimate is very small. However, this finding is not entirely conclusive, as it holds true for our OLS model which controls for firm and our within-firm fixed effects model, yet it is not robust across our other models. Lastly, overall minority representation on boards of directors (with no differentiation between gender or ethnic minority members) generally predicts higher ROA and Tobin's Q across our four primary models.

In our study, the minority representation variables, ROA, and Tobin's Q were all expressed as decimal percentages. Therefore, our estimated marginal effects are interpreted as percentage point increases in performance outcomes for each 1% increase in minority representation.

8.1: Ethnic minority representation

The effect of board ethnic minority representation on ROA is positive when controlling for variation between firms through firm fixed effects analysis and OLS analysis controlling for firm. As shown in columns (c) and (d) in Table 3 of the Appendix, a 1% increase in ethnic minority representation on corporate boards results in a .008 percentage point increase in ROA. That is to say, we can expect that a 1% increase in an average board's ethnic minority composition will grow the company's ROA from the average 2014 sample ROA of 4.616% to 4.624%. Because boards of directors on average are around 10 people, for the purposes of explanation, we will display the rest of the results in our study in terms of what a 10% increase in board diversity can do (similar to adding one new minority member). Therefore, column (c) of Table 3 shows that a 10% increase in ethnic minority representation on corporate boards results in a .08 percentage point increase in ROA. For some context, Derfus et al. (2008) found that a 1% growth in industry resulted in a .36 percentage point increase in ROA, and that an increase of 1 firm total action in a given year (defined as actions taken by firm related to pricing, capacity, geographic, marketing, and product introductions) led to a .03 percentage point increase in ROA.

There is no perceived significance, however, when this relationship is evaluated through Models 1 and 2, which use cross-firm data (Table 3 columns

(a) and (b)). This points to the fact that controlling for firm is indeed impactful. And with the fixed-effect model as the most stringent of our specifications, Model 4's results suggest that the fixed-effects model is controlling for time-invariant factors that our cross-firm models do not account for – factors that were suppressing our estimates in Models 1 and 2. There are a couple of potential explanations for this. Though it cannot be determined precisely what time-invariant factors these are, a firm's level of specialization is a possibility. More highly specialized companies have less extraneous assets, and are therefore, "asset light," as they focus their operations more tightly on activities and assets they are best qualified to manage, spinning out all others. Therefore, specialized companies tend to have higher ROA (Hagel et al. 2010). For those same reasons, it would seem that more specialized companies also have less of a need for external networks, and thus pursuing diverse boards would be less of a priority.

When we evaluate the effect of percent ethnic minority on Tobin's Q using our OLS firm-controlled model and our fixed effects model, however, the relationship is negative. As noted in column (d) of Table 7, our fixed effects analysis says that a 10% increase in board ethnic minority representation results in a 1.5 percentage point decrease in a company's Tobin's Q. Put another way, the ratio between the total market value of the firm and total asset value of the firm decreases by .015. Similar to above, Models 1 and 2 show no significant

relationship between percent ethnic minority and Tobin's Q when cross-firm data is analyzed.

These results can be explained in a few ways. First, the OLS firm-controlled and fixed effects models indicating a positive effect on ROA provides positive support for theories, such as the Resource Dependence Theory, the Human Capital Theory, and the Social Psychological Theory, outlined in Chapter 3. In particular, it seems to point to the fact that ethnic diversity on boards improves cognitive performance and decision-making ability, mitigates groupthink, and provides external linkages that increase a firm's network – changes that all should contribute positively to operational efficiency of a company. This, however, must be reconciled with the negative relationship these analyses present between ethnic diversity and Tobin's Q.

In this case, it is important to note again that while ROA expresses operational performance and is an accounting based, short-term measure of financial performance, Tobin's Q expresses growth opportunities, market reactions, and long-term investor expectations. Tobin's Q also includes how the stock market perceives the value of intangible assets such as reputation, goodwill, and brand recognition. Therefore, it seems that ethnic minorities on boards of directors contribute a more accounting based operational value add to the company, but that investors and the market do not seem to recognize the long-

term potential these minorities may provide, possibly because of racial biases present. And indeed, other studies have noted that a single variable may be associated with ROA and Tobin's Q in opposite directions. Crowther et al. (2014), for example, note that firm size, multiple directorships, and managerial ownership variables all affect ROA in the opposite direction that they affect Tobin's Q.

The claim that investors may not perceive the value of ethnic minority board members as positively must then be grappled with the Resource Dependence Theory's assertion that ethnically diverse boards may provide legitimacy to corporations because they may be more representative of a company's actual customer base. However, a Harvard study on race and risk aversion (Brown 2007) shows that not only are Whites significantly more likely to invest in the stock market than Blacks and Hispanics, but low income Whites are significantly more likely to invest in the stock market than high income Blacks and Hispanics. This finding may therefore support the sentiment that investors of a realistic racial composition are less likely to view ethnic minority board additions as favorable to a firm's long-term growth potential, though these biases are likely subconscious in nature. In addition, while there are certain industries that are more female-dominated, such as healthcare or education, for

which female board members may bring unique connections to, the existence of certain ethnic-minority dominated industries are less apparent.

8.2: Female representation

Our results consistently show that increasing female representation on boards has a positive effect on financial performance measures. As shown in Table 4, this finding is robust across all four of our primary models. In particular, our fixed effects model indicates that increasing female representation on a board of directors by 10% results in a .41 percentage point increase in firm ROA. As shown in Table 8, these findings hold up when we replace Tobin's Q as our dependent variable, though analysis using Model 1 does not yield significant results. It therefore seems that addressing issues of reverse causality that may be present in Model 1 by including 2011 financial controls in Model 2, as well as controlling for differences between firms in Model 4, may be necessary. As noted in column (d) of Table 8, a 10% increase in female representation is expected to increase Tobin's Q by 7.0 percentage points. Put another way, a 10% increase in female representation would increase the Tobin's Q of our average firm from 1.46 to 1.53.

These findings suggest that there is validity in recent legislation that has been passed mandating the inclusion of women on the boards of large

corporations. Indeed, it seems that women improve board effectiveness and thus firm financial performance, potentially through providing new external linkages, improved access to unique human capital, and more efficient team strategy. In contrast with our findings in Section 8.1, female representation on boards is positively linked to both ROA and Tobin's Q. This may indicate that investors and the market are simply more receptive and confident in the long-term value women board members can add to a company's growth prospects. And undeniably, this is not difficult to understand, as the unique skills women can bring to the table are more inherently obvious than the unique skills ethnic minorities may bring to the table. As Folkman and Zenger (2012) note, women bring a host of unique soft-skill resources to their jobs – differentiated qualities that are easily recognizable. Therefore, it is not a surprise that the effect of women board members on firm financial performance is more strongly and consistently positive than that of ethnic minority members'.

8.3: Ethnic minority and female representation

As noted in our methodology, for each of our four primary models, we also analyzed the effect of minority representation when both ethnic minority and gender minority board members were included as independent variables in our model equations. The results here are generally consistent with the results we

had when we included only one type of minority in our regression analysis. As noted in Table 5, the inclusion of ethnic minority board members results in higher ROA under our OLS firm-controlled and fixed effects regressions, as does the inclusion of female board members (though the effect is significant in all four models for female board members). Once again, the positive effect gender diversity has on ROA is of greater magnitude than the positive effect ethnic diversity brings – a 10% increase in female members results in a .5 percentage point increase in ROA under the fixed effects model, whereas a 10% increase in ethnic minority members results in a .09 percentage point increase in ROA.

These effects also are consistent with Tobin's Q as our dependent variable. Columns (c) and (d) of Table 9 shows that once again, ethnic minority board composition has a negative effect on Tobin's Q in OLS firm-controlled and firm fixed effect analysis, despite its positive effect on ROA, and gender diversity positively affects both Tobin's Q and ROA (Table 9 columns (c) and (d)). The consistency of these findings with the results we procured in Sections 8.1 and 8.2 gives us better confidence in the robustness of our results.

8.4: General minority representation

In this study, we also examined how board minority status in general, with no differentiation between gender and ethnic minority, affected firm financial

performance. Overwhelmingly, our results support the notion that diversity on board of directors positively influences firm performance, as measured by both ROA and Tobin's Q. All four of our model specifications show a significantly positive relationship ($p < .01$) between board diversity and ROA, with our firm fixed effects regression indicating that a 10% increase in minority representation improves ROA by .12 percentage points (Table 6 column (d)). Furthermore, Models 2, 3 and 4 show a significantly positive relationship between board diversity and Tobin's Q, with fixed effects analysis pointing to a 1.5 percentage point increase in Tobin's Q for every 10% increase in board diversity (Table 10).

One should note that the estimated marginal effects on ROA due to minority representation falls in between the estimated marginal effects of ethnic minority board member and female board member inclusion. Additionally, while our results show a positive linkage between female board members and Tobin's Q and a negative linkage for ethnic minority board members, our results indicate that general minority board members positively affect Tobin's Q (though with a smaller magnitude than what female board members alone boast). This can be explained by the number of female and ethnic minority board members in our sample. As noted in our summary statistics, our sample of 2011 boards is on average 12% female, but only 10% ethnic minority. And furthermore, the magnitude of the marginal effects of female representation is larger than the

magnitude of the marginal effects of ethnic minority representation in our study. So when the minority status of these board members is analyzed in a uniform way, it must be the case that the negative effect of ethnic minority board members on Tobin's Q counteracts, to some extent, the positive effect female board members have on Tobin's Q – this is consistent with our results. The relationship, while smaller in magnitude, remains positive across a number of our model specifications. Overall, this seems to be compelling evidence that diversity as a whole improves accounting based measures of financial performance due to operational efficiency improvements as well as investor perceived growth prospects for the company.

Our analysis also briefly examined whether the mere inclusion of a general minority member on the board had an effect on financial outcomes. Over 90% of our firms had at least one general minority board member, and while we found that this variable (analyzed as a binary variable of whether a firm had *any* female or ethnic minority members on their board) had some limited positive significance on financial outcomes, our results were not robust.

8.5: Supplementary models

Our first supplementary analysis examined whether the existence of a 30% critical mass existed for board minority representation. In addition to the 30%

tipping point, we also examined whether a 15%, 20%, or 40% board diversity tipping point exists. While our results are not entirely robust across all four models, they tell a similar story as our primary models. Because out of the tipping point percentages noted above, the 30% tipping point yielded the most significant results, that is the one we will focus on and the one whose results shall be detailed in this study. As shown in Table 11 column (d), boards of directors with over 30% ethnic minority representation have ROA values that were .005 decimal points (or .5 percentage points) higher than boards with less than 30% ethnic minority membership. This result is significant at a 5% level for OLS-firm controlled and fixed effects firm analysis, though the positive relationship is not statistically significant when examined with cross-firm data in OLS models. Our model specifications also generally show that boards with a composition of over 30% female have significantly higher ROA's than boards with less than 30% female representation.

Our analysis on the effect of 30% gender and ethnic minority tipping points for Tobin's Q performance measures only yielded statistically significant results in our OLS firm-controlled and firm fixed effects analysis (Table 12). According to our firm fixed effects results, boards with over 30% ethnic minority representation were expected to have Tobin's Q values that were .12 points lower,

whereas boards with over 30% female board members had values that were .13 higher. The direction of impact is consistent with our primary model findings.

Additionally, we examined the effect of minority representation on firm performance measures by categorizing companies into quartiles of friendliness toward diversity. Our results, as shown in Table 13, while not entirely robust, do seem to indicate a positive effect of board diversity on ROA. For example, corporations whose boards have the highest quartile of ethnic diversity were expected to have ROA values that were .8 percentage points higher than companies in the bottom quartile (Table 13 column (d)). Additionally, in general, the higher the quartile of diversity-friendliness a company falls in, the more their ROA benefits, as illustrated by our analysis on gender diversity by quartiles. Minority representation by quartile, with no differentiation between ethnic or gender minority, also results in higher ROA, with our firm fixed effects analysis predicting that companies in the highest quartile of minority diversity have ROAs that are 1.1 percentage points higher than companies that in the bottom quartile.

Table 14 illustrates the effect diversity has on Tobin's Q, when companies are once again placed in their respective diversity quartile buckets. Here, our fixed effects analysis shows that companies in the third and fourth quartile of ethnic diversity experience lower Tobin's Q's, and companies in the highest

quartile of gender diversity experience higher Tobin's Q measures, but these effects seem to negate one another when looking at general minority quartiles under firm fixed effects.

In particular, the results of our tipping point supplementary models provides support for more policy action encouraging the inclusion of women on boards of directors, but because of mixed results depending on model specifications and performance measures for ethnicity, no consensus can be reached at the time.

CHAPTER 9: CONCLUSION

As the debate over whether firms should make board diversity a priority continues to grow in significance, an understanding of its effects on firm financial performance and tangible shareholder value becomes increasingly relevant. This study explored the existence of a business case for board diversity by analyzing the effect of board ethnic minority and female representation on a firm's ROA and Tobin's Q. It also provided an overview of the theoretical foundations and prior literature on this topic, and it extensively adds to this literature in several ways.

Our study employed four primary models – two using cross-firm data, one using firm-controlled data, and one using longitudinal within-firm panel data. Our findings were not robust across all model specifications, but overwhelming tell a common story: gender diversity on boards improves both firm ROA and Tobin's Q, whereas ethnic diversity improves a firm's ROA but decreases a firm's Tobin's Q. We rationalize this finding with the assertion that board diversity does in fact contribute to increased operational efficiency, perhaps through the inclusion of new skills, additional network linkages, and groupthink disruption, but that shareholders and investors may not recognize the value ethnic minorities bring to boards in the same way that they recognize the value of female board members. So while accounting based income improves with the inclusion of both

types of diverse board members examined in this study, the market overall reacts positively only to gender diversity as an indication of future growth opportunities. While the magnitude for the effect of ethnic minorities on Tobin's Q is small, an explanation for its direction of significance is not entirely clear. This observation should be replicated and further observed in the future.

Our study's supplementary models also seem to suggest evidence of a tipping point for diversity, though our findings were not robust across all of our model specifications. Our results do show, however, that when this notion is examined through OLS firm-controlled and firm fixed effects analysis, boards with over 30% female board composition tend to experience higher ROA's and Tobin's Q's, and boards with over 30% ethnic minority composition have higher ROA's and lower Tobin's Q's. Because our firm fixed effects model specification is the most stringent model in our analysis, we assert that this gives us reason to believe there may be a critical mass for board diversity. While further research on the existence of diversity tipping points should be conducted, the consistency of these findings with our primary models' analyses provides us with additional confidence in this assertion.

Understanding whether board diversity affects firm financial performance can guide U.S. policymakers as they determine if it's worth following European countries in the pursuit of diversity mandates. Our findings have particularly

strong implications toward future policy action, as they are based on U.S. S&P 1500 companies and post-Great Recession data. Nonetheless, it is worth noting both strengths of our study, as well as limitations and suggestions for future research, so that this particular conversation continues.

Our study has a number of strengths. For one, the comprehensive nature of our data sets allows us to conduct cross-firm, firm-controlled, and within-firm analyses that fully exploit our longitudinal data. Additionally, we delve deep into the effect of board diversity on financial outcomes by examining gender minority status, ethnic minority status, *and* general minority status. Finally, we consider a number of different model specifications, including a tipping point analysis that tests for threshold effects and board diversity quartile analysis that acknowledges board composition may have somewhat non-linear effects.

Nonetheless, much additional work is needed to truly understand how board characteristics interact with firm financial performance measures – measures that need not be limited to ROA and Tobin’s Q. As noted, these financial performance metrics are in no way substitutes of one another, and the inclusion of even more may be necessary to tell a compelling story. And as mentioned, numerous other variables not readily investigated in this study may influence the relationship between board diversity and financial performance. Future studies should investigate the relationship between a variety of other

board diversity variables, such as connections to other boards, educational attainment, voting power, and committee membership. In the same vein, while our supplementary analyses examined the effects of which quartile a firm fell in regards to minority composition, our findings were not entirely robust, so perhaps the question may be investigated with an even less linear approach in the future.

As noted by Ron Lumbra, co-leader of the CEO and board services practice for Russell Reynolds, “Recruiting women and minorities to boards is being slowed because of boards’ unwillingness to look at candidates who have not yet served on boards” (Lublin 2014). With minority recruitment exhibiting a premium on past experience, understanding the true implications of board diversity on firm financial performance only becomes increasingly pressing and relevant.

APPENDIX

Table 1: Summary statistics

VARIABLES	Cross-Firm Mean (N=1,139)	Within-Firm Mean (N=5,367)
% Ethnic minority	.10	.062
% Female	.12	.12
% Minority	.21	.17
<hr/>		
Total assets (\$)	23,743	19,990
Board size (#)	9.37	9.35
Average board age (yrs)	62.40	61.79
Average term length (yrs)	10.60	10.85
2011 ROA control	.048	NA
2011 Tobin's Q Control	1.36	NA
<hr/>		
ROA	.039	.046
Tobin's Q	1.66	1.46
<hr/>		
>30% Female	.054	.045
>30% Ethnic minority	.065	.026

*Mean figures represent proportions unless indicated otherwise

** Within-firm means include same firm data from multiple time points

Table 2: Supplementary Model Summary Statistics

VARIABLES	N	ROA (Mean)	Tobin's Q (Mean)	% Female (Mean)	% Ethnic Minority (Mean)
<=30% Female	1077	.046	1.66	.110	NA
>30% Female	62	.070	1.68	.351	NA
% Female:					
1 st Quart (<5.6%)	311	.035	1.75	0	NA
2 nd Quart [5.6-11.1%)	262	.050	1.53	.098	NA
3 rd Quart [11.1-20%)	353	.051	1.69	.161	NA
4 th Quart (>20%)	213	.046	1.67	.274	NA
<=30% Ethnic Minority	1065	.047	1.66	NA	.076
>30% Ethnic Minority	74	.052	1.75	NA	.440
% Ethnic Minority:					
1 st Quart (<5.6%)	494	.042	1.65	NA	0
2 nd Quart [5.6-9.1)	116	.053	1.37	NA	.083
3 rd Quart [9.1-14.3%)	253	.044	1.72	NA	.116
4 th Quart (>14.3%)	276	.058	1.77	NA	.271
Total	1139	.039	1.66	.12	.10

*Mean figures represent cross-firm proportions unless indicated otherwise

Table 3: Effect of % Ethnic Minority on ROA

VARIABLES	(a)	(b)	(c)	(d)
% Ethnic minority	0.0257 (0.0181)	0.0171 (0.0156)	0.00829*** (0.00308)	0.00845*** (0.00323)
Market cap (\$000)	-.0061*** (.0019)	-.0039** (.0016)	NA NA	NA NA
Industry	0.0166*** (0.00259)	0.00979*** (0.00225)	NA NA	NA NA
Total assets (\$000)	-.000042** (.000019)	-.000014 (.000016)	-.00010** (.0000413)	-.00010** (.000049)
Ln(board size)	0.00774 (0.0100)	0.0314*** (0.00877)	-.000014 (0.0111)	-0.0137 (0.0120)
Average board age	-0.000568 (0.000689)	0.00110* (0.000601)	-0.000563 (0.000569)	-0.000543 (0.000535)
% Insiders	0.00527 (0.0289)	-0.0126 (0.0249)	0.00664 (0.0257)	0.00712 (0.0251)
Average term length	0.00182*** (0.000691)	0.00122** (0.000596)	-0.000110* (0.00063)	-0.000109* (.000062)
2011 ROA	NA	0.212*** (0.0337)	NA	NA
2011 Tobin's Q	NA	0.0274*** (0.00252)	NA	NA
Constant	0.0149 (0.0458)	-0.168*** (0.0410)	0.110*** (0.0427)	0.108*** (0.0418)
Observations	1,139	1,132	5,366	5,367
R-squared	0.058	0.299	0.709	0.004
Unique firms			1,367	1,367

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 % Ethnic Minority on 2014 ROA

(b) Analysis examines the effect of 2011 % Ethnic Minority on 2014 ROA, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 4: Effect of % Female on ROA

VARIABLES	(a)	(b)	(c)	(d)
% Female	0.0895*** (0.0241)	0.0882*** (0.0207)	0.0394* (0.0210)	0.0410* (0.0220)
Market cap (\$000)	-.00610*** (.00186)	-.00402** (.00160)	NA NA	NA NA
Industry	0.0161*** (0.00257)	0.00926*** (0.00223)	NA NA	NA NA
Total assets (\$000)	-.0000423** (.0000189)	-.0000150 (.0000162)	-.000122*** (.0000452)	-.000123** (.0000548)
Ln(board size)	-0.00138 (0.0103)	0.0224** (0.00896)	-0.0150 (0.0111)	-0.0145 (0.0120)
Average board age	-0.000408 (0.000686)	0.00129** (0.000597)	-0.000892 (0.000570)	-0.000878 (0.000548)
% Insiders	0.0126 (0.0288)	-0.00461 (0.0248)	0.0140 (0.0255)	0.0146 (0.0249)
Average term length	0.00189*** (0.000688)	0.00130** (0.000592)	-.0000950 (.0000591)	-.0000935 (.0000593)
2011 ROA	NA	0.212*** (0.0335)	NA	NA
2011 Tobin's Q	NA	0.0276*** (0.00250)	NA	NA
Constant	0.0157 (0.0454)	-0.170*** (0.0405)	0.131*** (0.0422)	0.129*** (0.0416)
Observations	1,139	1,132	5,366	5,367
R-squared	0.067	0.309	0.709	0.003
Unique firms			1,367	1,367

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 % Female on 2014 ROA

(b) Analysis examines the effect of 2011 % Female on 2014 ROA, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 5: Effect of % Ethnic Minority and % Female on ROA

VARIABLES	(a)	(b)	(c)	(d)
% Ethnic minority	0.0203 (0.0180)	0.0118 (0.0155)	0.00910*** (0.00313)	0.00928*** (0.00329)
% Female	0.0872*** (0.0242)	0.0869*** (0.0208)	0.0476** (0.0214)	0.0494** (0.0225)
Market cap (\$000)	-.00637*** (.00187)	-.00418*** (.00162)	NA NA	NA NA
Industry	0.0159*** (0.00258)	0.00912*** (0.00224)	NA NA	NA NA
Total assets (\$000)	-.0000433** (.0000189)	-.0000156 (.0000163)	-.000107** (.0000422)	-.000108** (.0000501)
Ln(board size)	-0.00149 (0.0103)	0.0224** (0.00896)	-0.0142 (0.0111)	-0.0137 (0.0120)
Average board age	-0.000351 (0.000688)	0.00133** (0.000599)	-0.000493 (0.000568)	-0.000470 (0.000529)
% Insiders	0.0137 (0.0288)	-0.00397 (0.0248)	0.00921 (0.0257)	0.00978 (0.0250)
Average term length	0.00192*** (0.000688)	0.00132** (0.000592)	-0.000101 (.0000655)	.0000999 (.0000658)
2011 ROA	NA	0.211*** (0.0335)	NA	NA
2011 Tobin's Q	NA	0.0276*** (0.00250)	NA	NA
Constant	0.0117 (0.0455)	-0.173*** (0.0407)	0.0998** (0.0432)	0.0969** (0.0419)
Observations	1,139	1,132	5,366	5,367
R-squared	0.068	0.310	0.709	0.005
Unique firms			1,367	1,367

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 % Ethnic Minority and % Female on 2014 ROA

(b) Analysis examines the effect of 2011 % Ethnic Minority and % Female on 2014 ROA, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 6: Effect of % Minority (Ethnic or Female) on ROA

VARIABLES	(a)	(b)	(c)	(d)
% Minority	0.0499*** (0.0153)	0.0450*** (0.0132)	0.0114*** (0.00352)	0.0116*** (0.00371)
Market cap (\$000)	-.00661*** (.00187)	-.00445*** (.00162)	NA NA	NA NA
Industry	0.0161*** (0.00258)	0.00927*** (0.00224)	NA NA	NA NA
Total assets (\$000)	-.0000448** (.0000189)	-.0000169 (.0000163)	-.0000975** (.0000407)	-.0000981** (.0000483)
Ln(board size)	0.00343 (0.0101)	0.0276*** (0.00880)	-0.0138 (0.0111)	-0.0133 (0.0120)
Average board age	-0.000389 (0.000689)	0.00128** (0.000600)	-0.000463 (0.000568)	-0.000443 (0.000531)
% Insiders	0.0102 (0.0288)	-0.00753 (0.0248)	0.00602 (0.0257)	0.00650 (0.0250)
Average term length	0.00190*** (0.000689)	0.00130** (0.000594)	-0.000111* (.0000650)	-0.000110* (.0000648)
2011 ROA	NA	0.210*** (0.0336)	NA	NA
2011 Tobin's Q	NA	0.0276*** (0.00251)	NA	NA
Constant	0.00683 (0.0456)	-0.178*** (0.0408)	0.101** (0.0429)	0.0987** (0.0419)
Observations	1,139	1,132	5,366	5,367
R-squared	0.065	0.305	0.709	0.005
Unique firms			1,367	1,367

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 % Minority on 2014 ROA

(b) Analysis examines the effect of 2011 % Minority on 2014 ROA, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 7: Effect of % Ethnic Minority on Tobin's Q

VARIABLES	(a)	(b)	(c)	(d)
% Ethnic minority	0.284 (0.311)	0.215 (0.203)	-0.141*** (0.0303)	-0.147*** (0.0317)
Market cap (\$000)	-0.0175 (.0322)	.0162 (.0211)	NA NA	NA NA
Industry	0.224*** (0.0451)	0.0633** (0.0298)	NA NA	NA NA
Total assets (\$000)	-0.00113*** (.000323)	-0.000397* (.000211)	-0.000771* (.000394)	-0.000787 (.000497)
Ln(board size)	-0.738*** (0.171)	0.0380 (0.114)	-0.0348 (0.0809)	-0.0555 (0.0861)
Average board age	-0.0480*** (0.0119)	0.00225 (0.00783)	0.00600 (0.00583)	0.00534 (0.00615)
% Insiders	0.349 (0.493)	-0.0477 (0.322)	-0.276 (0.216)	-0.264 (0.227)
Average term length	0.0179 (0.0118)	-0.000978 (0.00770)	-0.00259*** (0.000705)	-0.00259*** (0.000567)
2011 ROA	NA	-0.808* (0.437)	NA NA	NA NA
2011 Tobin's Q	NA	1.031*** (0.0326)	NA NA	NA NA
Constant	5.436*** (0.787)	-0.161 (0.532)	1.322*** (0.452)	1.410*** (0.462)
Observations	1,120	1,115	5,332	5,333
R-squared	0.065	0.602	0.873	0.012
Unique firms			1,362	1,362

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 % Ethnic Minority on 2014 Tobin's Q

(b) Analysis examines the effect of 2011 % Ethnic Minority on 2014 Tobin's Q, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 8: Effect of % Female on Tobin's Q

VARIABLES	(a)	(b)	(c)	(d)
% Female	0.279 (0.414)	0.474* (0.269)	0.807*** (0.232)	0.699** (0.283)
Market cap (\$000)	-0.0147 (.0319)	.0174 (.0209)	NA NA	NA NA
Industry	0.226*** (0.0450)	0.0626** (0.0297)	NA NA	NA NA
Total assets (\$000)	-0.00112*** (.000322)	-0.000394* (.000210)	-0.000665* (.000367)	-0.000651 (.000447)
Ln(board size)	-0.762*** (0.177)	-0.00717 (0.117)	-0.0236 (0.0810)	-0.0437 (0.0871)
Average board age	-0.0481*** (0.0119)	0.00300 (0.00784)	0.0128** (0.00550)	0.0123** (0.00592)
% Insiders	0.360 (0.495)	-0.0126 (0.323)	-0.303 (0.215)	-0.301 (0.228)
Average term length	0.0178 (0.0118)	-0.000731 (0.00770)	-0.00256*** (0.000751)	-0.00258*** (0.000627)
2011 ROA	NA	-0.804* (0.436)	NA	NA
2011 Tobin's Q	NA	1.032*** (0.0326)	NA	NA
Constant	5.473*** (0.785)	-0.157 (0.531)	0.721* (0.415)	0.808* (0.434)
Observations	1,120	1,115	5,332	5,333
R-squared	0.065	0.602	0.872	0.007
Unique firms			1,362	1,362

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 % Female on 2014 Tobin's Q

(b) Analysis examines the effect of 2011 % Female on 2014 Tobin's Q, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 9: Effect of % Ethnic Minority and % Female on Tobin's Q

VARIABLES	(a)	(b)	(c)	(d)
% Ethnic minority	0.269 (0.312)	0.188 (0.204)	-0.129*** (0.0293)	-0.137*** (0.0310)
% Female	0.250 (0.415)	0.454* (0.270)	0.687*** (0.224)	0.571** (0.278)
Market cap (\$000)	-.0182 (.0322)	.0151 (.0211)	NA NA	NA NA
Industry	0.222*** (0.0452)	0.0602** (0.0298)	NA NA	NA NA
Total assets (\$000)	-.00113*** (.000323)	-.000404* (.000211)	-.000870 ** (.000400)	-.000870* (.000500)
Ln(board size)	-0.765*** (0.177)	-0.00895 (0.117)	-0.0345 (0.0808)	-0.0553 (0.0862)
Average board age	-0.0474*** (0.0119)	0.00351 (0.00786)	0.00710 (0.00574)	0.00625 (0.00606)
% Insiders	0.373 (0.495)	-0.00283 (0.323)	-0.236 (0.214)	-0.231 (0.224)
Average term length	0.0182 (0.0118)	-0.000405 (0.00770)	-0.00247*** (0.000691)	-0.00248*** (0.000554)
2011 ROA	NA	-0.810* (0.436)	NA	NA
2011 Tobin's Q	NA	1.032*** (0.0326)	NA	NA
Constant	5.422*** (0.787)	-0.191 (0.532)	1.162*** (0.439)	1.276*** (0.452)
Observations	1,120	1,115	5,332	5,333
R-squared	0.065	0.603	0.873	0.014
Unique firms			1,362	1,362

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 % Ethnic Minority and % Female on 2014 Tobin's Q

(b) Analysis examines the effect of 2011 % Ethnic Minority and % Female on 2014 Tobin's Q, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 10: Effect of % Minority (Ethnic or Female) on Tobin's Q

VARIABLES	(a)	(b)	(c)	(d)
% Minority	0.275 (0.264)	0.349** (0.172)	0.142*** (0.0330)	0.150*** (0.0345)
Market cap (\$000)	-.0181 (.0322)	.0136 (.0210)	NA NA	NA NA
Industry	0.223*** (0.0451)	0.0603** (0.0297)	NA NA	NA NA
Total assets (\$000)	-.00141*** (.000323)	-.000412* (.000211)	-.000733* (.000391)	-.000749 (.000492)
Ln(board size)	-0.759*** (0.173)	0.00916 (0.115)	-0.0362 (0.0811)	-0.0571 (0.0865)
Average board age	-0.0474*** (0.0119)	0.00351 (0.00785)	0.00639 (0.00582)	0.00568 (0.00614)
% Insiders	0.367 (0.494)	-0.0144 (0.322)	-0.291 (0.217)	-0.279 (0.229)
Average term length	0.0181 (0.0118)	-0.000443 (0.00770)	-0.00262*** (0.000716)	-0.00261*** (0.000576)
2011 ROA	NA	-0.814* (0.436)	NA	NA
2011 Tobin's Q	NA	1.032*** (0.0326)	NA	NA
Constant	5.415*** (0.788)	-0.221 (0.533)	1.313*** (0.454)	1.405*** (0.464)
Observations	1,120	1,115	5,332	5,333
R-squared	0.065	0.603	0.873	0.010
Unique firms			1,362	1,362

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 % Minority on 2014 Tobin's Q

(b) Analysis examines the effect of 2011 % Minority on 2014 Tobin's Q, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 11: Effect of Minority Tipping Points on ROA

VARIABLES	(a)	(b)	(c)	(d)
>30% Ethnic Minority	.008 (.009)	.005 (.008)	.004** (.002)	.005** (.002)
>30% Female	.026** (.013)	.029** (.013)	.002 (.005)	.002* (.007)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Each row corresponds to a separate model, which includes the variable in the row heading as well as appropriate controls (whose coefficients are not shown). All figures represent coefficients to ROA.

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 diversity tipping points on 2014 ROA

(b) Analysis examines the effect of 2011 diversity tipping points on 2014 ROA, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 12: Effect of Minority Tipping Points on Tobin's Q

VARIABLES	(a)	(b)	(c)	(d)
>30% Ethnic Minority	.033 (.159)	-.012 (.104)	-.119*** (.020)	-.122*** (.020)
>30% Female	-.003 (.169)	.164 (.111)	.133*** (.052)	.133** (.067)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Each row corresponds to a separate model, which includes the variable in the row heading as well as appropriate controls (whose coefficients are not shown). All figures represent coefficients to Tobin's Q.

(a) Simplest cross-firm regression with no time controls. Analysis examines effect of 2011 diversity tipping points on 2014 Tobin's Q

(b) Analysis examines the effect of 2011 diversity tipping points on 2014 Tobin's Q, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 13: Effect of Diversity Quartiles on ROA

VARIABLES	(a)	(b)	(c)	(d)
% Ethnic Minority: 2 nd Quartile	.006 (.009)	.005 (.008)	.004* (.003)	.005** (.002)
% Ethnic Minority: 3 rd Quartile	.003 (.006)	.001 (.005)	.000 (.003)	.000 (.003)
% Ethnic Minority: 4 th Quartile	.014** (.008)	.007 (.005)	.008*** (.003)	.008** (.003)
% Female: 2 nd Quartile	.013* (.007)	.013** (.006)	.006 (.005)	.006 (.005)
% Female: 3 rd Quartile	.013** (.006)	.013** (.006)	.009* (.005)	.009* (.005)
% Female: 4 th Quartile	.022*** (.007)	.020*** (.006)	.010 (.006)	.011* (.006)
% Minority: 2 nd Quartile	.011* (.006)	.005 (.005)	.003 (.003)	.002 (.003)
% Minority: 3 rd Quartile	.021*** (.007)	.010* (.006)	.002 (.003)	.002 (.003)
% Minority: 4 th Quartile	.023*** (.007)	.016*** (.006)	.011*** (.003)	.011*** (.003)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Each section corresponds to a separate model, which includes the variables in the section as well as appropriate controls (whose coefficients are not shown). All figures represent coefficients to ROA, anchored against relative 1st Quartile buckets.

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 diversity quartiles on 2014 ROA

(b) Analysis examines the effect of 2011 diversity quartiles on 2014 ROA, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

Table 14: Effect of Diversity Quartiles on Tobin's Q

VARIABLES	(a)	(b)	(c)	(d)
% Ethnic Minority: 2 nd Quartile	-.017 (.152)	.020 (.099)	-.033 (.026)	-.024 (.029)
% Ethnic Minority: 3 rd Quartile	.091 (.102)	.029 (.066)	-.157*** (.025)	-.167*** (.026)
% Ethnic Minority: 4 th Quartile	.181 (.136)	.092 (.069)	-.096*** (.027)	-.100*** (.028)
% Female: 2 nd Quartile	.021 (.123)	.051 (.080)	.131*** (.049)	.086 (.063)
% Female: 3 rd Quartile	.074 (.110)	.099 (.072)	.1045** (.049)	.066 (.068)
% Female: 4 th Quartile	.069 (.125)	.111 (.082)	.173*** (.056)	.134* (.073)
% Minority: 2 nd Quartile	.231** (.106)	.130* (.069)	.057** (.022)	.010 (.033)
% Minority: 3 rd Quartile	.390*** (.115)	.179** (.075)	.134*** (.025)	.028 (.032)
% Minority: 4 th Quartile	.200* (.119)	.143* (.078)	.097*** (.028)	.016 (.031)

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Each section corresponds to a separate model, which includes the variables in the section as well as appropriate controls (whose coefficients are not shown). All figures represent coefficients to Tobin's Q, anchored against relative 1st Quartile buckets.

(a) Simplest cross-firm OLS regression with no time controls. Analysis examines effect of 2011 diversity quartiles on 2014 Tobin's Q

(b) Analysis examines the effect of 2011 diversity quartiles on 2014 Tobin's Q, with 2011 ROA and 2011 Tobin's Q as financial controls

(c) OLS model controlling for firm

(d) Within-firm fixed effects analysis

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PLEDGE

This paper represents my own work in accordance with University regulations.
