

Diversifying High Tech Sector Boards:
How Women and Racial Minorities on Corporate Boards Affect Firm Value

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Abstract

This paper examines the relationship of gender and racial diversity on corporate boards and firm value for high tech companies. Firm value is measured in an approximation of Tobin's Q and diversity is measured by the percentage or presence of women or minorities on a board. The study looks at the high tech firms that are listed on the Fortune 1000 for 2016. Previous studies on this topic have had relatively positive results, but have no one has specifically looked at the high tech industry. The high tech sector is a nontraditional sector due to its recent rapid growth and large impact on the United State's GDP. The results showed that gender diversity did not have any affect on firm value, while racial diversity had a negative affect.

KEYWORDS: Diversity, Board of Directors, High Tech Sector, Racial Diversity, and Gender Diversity

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1. Introduction

After the 2017 presidential inauguration, protests against Donald Trump and his political views erupted around the United States and the world. Hundreds of thousands gathered to protest the actual inauguration event, while millions gathered the next day to march for a range of reasons from supporting women's rights to concern for the environment and immigration rights. Days and even months after he took office, different groups, organizations, and individuals continued to protest for a multitude of issues. Google in particular, had 2,000 of its employees stage a walk out and protest in late January specifically against Trump's immigration ban (Newton, 2017). Immigration policies are extremely important for many high tech companies such as Google due to their hiring pools and connections outside of the United States. As Farhad Manjoo, a New York Times journalist, explained the United States' high tech sector is the leader in innovation, and therefore, attracts the best of the best from around the world (2017). If companies were not allowed to choose employees as freely as they do now, it could affect the United States' leadership position. Furthermore, some experts believe that the impacts of Trump's travel ban and general hostility to immigrants will have greatest effect on the high tech sector, because of their reliance on immigrant employees and their international campuses and offices (Waddell, 2017).

With all the commotion surrounding immigration and Trump's policies, one would expect the high tech sector in the United States to be a diverse environment. Although, according to the U.S. Equal Employee Opportunity Commission (EEOC) only 31.4 percent of employees are racial minorities as compared to all other

industries who have 36.6 percent of their employees as racial minorities (2016). The EEOC also showed a major gender discrepancy in the high tech sector; only 35.7 percent of employees were women, while all other industries had 48.2 percent of women as employees (2016). Even only at the employee level the high tech sector is far behind than the rest. But there is hope. Manjoo explained that close to 40 percent of Fortune 500 high tech companies were founded by immigrants and many of them immigrants of color (2017). The high tech sector is still largely a male and white dominated space, but it does not necessarily mean it will stay that way. That is why uncovering information about diversity and inclusion is important for a greater understanding of the high tech sector in the United States.

Diversity in American business is increasing but not at the same pace as American society. Today's boards of Fortune 500 companies are seeing record highs of diversity. According to Deloitte's study of diversity on Fortune 500 boards, there is an overall increase of minorities and women on corporate boards, but still 79.8 percent of board members are men with 64.1 percent being white men (2016). This does not compare equally to the current United States population. According to a report from the US Census Bureau 36.2 percent of the American population is made up of racial minorities (2010). By 2050, it is projected that the number of minorities is to change so dramatically that white Americans will only make up 46 percent of the US population, making them the minority (Cordero-Guzman, 2014).

Furthermore, women still make up half of the US population and have become the more educated gender. In fact, younger women outnumber men in having every type of degree (Feeney, 2015). The lack of diversity on corporate boards will only

become a bigger issue as time goes on if women and minorities continue to be under represented. With all of these demographic changes, it is necessary to address how to be mindful of diversity and inclusion on corporate boards in the United States.

Though in the past, promoting diversity or even demonstrating its necessity and significance has proven to be incredibly difficult. Many Americans resist the idea of advocating for diversity, especially in opportunity gaining situations such as work. One reason is that it is unfair to overtly give preference to someone based on his or her race, religion, gender, etc. even if that person were to come from a marginalized background. For example, affirmative action, a set of policies that were put into place to level the playing field between Caucasians and people of color, has been a major form of controversy in United States since its conception. The first forms of affirmative action policies materialized right after the Civil Rights Act of 1964 when the discrimination against people of color and other marginalized groups like women started to become illegal. In the sixties, being black in America meant being subjected to segregation laws and even life threatening situations. Therefore the United States' government put in place affirmative action policies to mitigate those effects. However, as time went on, affirmative action policies seemed to cause more harm than good, because the depth of the policies were forgotten. As Charles Gallagher explains, "black television stars, the media's treatment of the black middle class, and stereotypes of Asians as model minorities have provided young whites with countless nonwhite success stories. For many of them, the 'level playing field' argument has rendered affirmative action policies a form of reverse discrimination and a source of resentment" (Year). Today, many issues regarding

racism and sexism are not always as overtly present as they were in the past, even though in reality, many Americans who readily experience racism and sexism are affected everyday.

Approaching the topic of diversity in general is difficult, but even more so when addressing top-level positions in business. John Graham once wrote in his USA Today article, “the cracks in the Earth’s surface widened as the quakes have come fast and furious with the deposing of great white males throughout Fortune 500 firms” (1993). This hyperbolic view on diversity highlights how some Americans see diversifying as a frightening and unnecessary task. Interestingly enough, Graham’s purpose of the article was based in understanding the white man’s changing role in society and not to denounce diversity. Throughout the article he accepts the changing demographics, and contemplates what the future may hold for all of us. In a larger discussion, Graham’s article points out the reluctance many feel when the topic of diversity is brought up in traditionally white and male dominated spaces like the United States’ high tech sector. Even though Graham’s article was published over twenty years ago, much can be learned about the importance of objectively approaching the issue of diversity and with the intent to make these spaces more inclusive.

With increasing numbers of immigrants, people of color, and women joining the high tech sector, it is in the best interest of these companies to make understanding diversity a priority. It is also in their interest to see how diversity at top-level positions affects their firm. Therefore, this paper will examine whether diversity of the board of directors in top high tech industry companies will affect

their firm value. The paper will start out with a look at previous work in the field as well as reasons why this issue of diversity and specifically diversity in the tech industry is important. It will then delve into previous economic theory and research as well as a set up of mine own model. Lastly, the paper will discuss the results and any concluding remarks.

2. Literature Review

2.1. The Case for U.S. Businesses' Responsibility to Increase Diversity

Despite having one of the most diverse employee populations in the world, the United States' businesses do not do nearly as much as they can or should in regards of addressing diversity. Many American companies have implemented certain practices such as diversity workshops, diversity training and other tools to tackle some parts of the matter (Bezrukova et al., 2012). But in certain instances, the United States, and especially the government, is quite behind on implementing new diversity policies that encourage businesses to diversify. For example, similarly to affirmative action, many European countries introduced bills for gender quotas on corporate boards to encourage more female participation (The Economist, 2014). In South Africa, a country where institutionalized racial segregation- the apartheid- allowed the white population to control most of the wealth while the majority of it's black population lived in poverty, the government introduced several policies to "increase black participation in the SA economy" (Gyapong et al., 2016). One of these policies was specifically designed to encourage companies to appoint more black individuals to corporate boards. In another instance, Sweden introduced a policy in

2010 for parental leave for both the mother and father to allow females with more flexibility at work (The Economist, 2014). The United State's government has not introduced policies like these or similar to address and alleviate issues surrounding diversity. Of course, anti-discrimination laws in the United States exist, but policies pertaining to businesses and diversity are still lacking. Therefore, for the time being, the responsibility for creating a more ethical business environment still largely lies on the individual corporations and their practices.

But as previously mentioned, convincing individuals that diversity is necessary can be difficult. A former executive of Bank of America, Karen J Curtin, explained the situation well when she stated, "there is real debate between those who think we should be more diverse because it is the right thing to do and those who think we should be more diverse because it actually enhances shareholder value. Unless we get the second point across and people believe it, we are only going to have tokenism" (Brancato and Patterson, 1999). As Curtin highlights, convincing businesses that it is in their best interest to increase diversity not only helps with the actual increase of women and racial minorities in businesses, but could make their lives once they get there better as well. All efforts to address diversity will seem frivolous if corporations approach diversity as another task to fulfill and not because they are actually invested in incorporating change.

The issue of diversity in businesses, especially in academic literature, has gained considerable momentum in the past decades. Additionally, economic research on the subject has also seen recent increases. In fact, the first large-scale long term research project on diversity was introduced by BOLD, Business

Opportunities for Leadership Diversity, in 1997. In BOLD's project, multiple studies were conducted on different types of firms to examine how having a diverse workforce affected the company. The study found that, in most instances, there was no real positive impacts of racial and gender diversity, although it also found that there was no negative impacts of racial and gender diversity (Kochan et al., 2003). Other studies on diversity in businesses have varied results. One study, which analyzed the impact of diversity-training programs, especially those with a diverse workforce, suggested that diversity can bring some hurdles, but if addressed correctly could do a lot of good for the firm (Bezrukova et al., 2012). Hurdles or not, this study is especially important since demographic changes are occurring and businesses must start to find ways to address the issues that come with a diverse workforce. Another study suggests employee diversity can actually improve innovation due to a more diversified background of thought (Yang and Konrad, 2011). However, not all studies have shown positive results. One study suggested that global diversification, specifically, can be negative to shareholder value (Doukas and Kan, 2006). All in all, academic discourse and research about diversity in business has increased. Since the discourse is a recent occurrence there is much work that can and should happen in the field. All of this speaks to the significance of diversity in business, and stresses the greater matter of how businesses in the United States are responsible for addressing the issue of diversity.

2.2. Diversity from the Top Down: Why Diverse Corporate Boards Matter

In a company, the board of directors is vital to the performance, structure, and community of that company. The board is generally constructed of the CEO, a chairman of the board, and several directors from both within and outside the company. Moreover, the board role and responsibilities is more critical than most people know. As Carter, Simkins, and Simpson (2003) explain the role of the board is to resolve problems, monitor top management, and please the shareholders. Since a board's role is to oversee all of these aspects of a company, the members are also heavily scrutinized by any mishandling or scandals and take on much of the burden (Arfken et al, 2004). It is true that the board's responsibility is mainly to the shareholder, although their actions affect all members of that company. One study explains how the monitoring role that the board has is one of the most important factors of corporate governance, essentially how a company is directed and controlled (Campbell and Minguez-Vera, 2007). Furthermore, boards have actually been gaining more responsibilities as time goes on. As Arfken, Baller and Helms (2004) explain, "legislation, such as the Sarbanes-Oxley Act... has changed the scope of corporate governance... The CEO no longer controls the board... Board members, for the first time, are independent of the CEO and expected to exert more discipline over fiscal decisions." Westphal and Zajac (1997) have also noticed a trend where the ratio of outsiders to insiders on a board has increased. This these changes in board make up and responsibility shows the increased opportunity and necessity for a more diverse board of directors in companies. The role of the board of

directors is significant and implementing change might seem daunting, but is totally plausible.

From previous literature it is clear that the board's role is important to a company, so understandably the make of up that board is also quite significant. In fact, Jo and Harjoto (2011) show when the board of directors engage in corporate social responsibility (CSR) actions, essentially when companies go beyond what is legally required of them for the good of society, it has a positive affect on firm value. They also explain how the choice to engage in CSR activities is affected by the make up of those boards. On the same note, one study explains how a more diverse board also increases corporate social performance, which is linked to employee rights as well as CSR (Hafsi and Turgut, 2013). Therefore, a more diverse board of directors could lead to benefits for shareholders, employees, and society. Another study examined how boards that are politically connected affected firm value, and found that when it is announced that a politically connected individual was appointed to the board it affects firm value either positively or negatively based on the political party they are associated with (Goldman et al, 2008). Hence, the individuals that make up the board of directors are quite significant to firm value, but in general to other aspects of a company as well.

Lastly, diversity from the top down is much more affective than diversity for diversity sake. As previously mentioned, the board of directors is essential to the function of a company, who is on that board can positively or negatively affect a company's performance, and therefore, diversity from the top down is the best strategy for a company in the United States. This is true for three reasons. First, as

previously mentioned the demographic diversity of the United States naturally means a more diverse workforce and also a continually increasing more diverse workforce. If leadership stays as it has on corporate boards, board members might not be fully equipped with appointing the correct management, which would affect firm value. Now this would only be the case if there were no women or minorities on the board. Second, as Bezrukova, Jehn, and Spell (2012) express as more companies engage in diversity training programs- in regards to both women and minorities- certain problems can and do occur. Therefore, a more diverse board of directors could once again have better insights into either dealing with these internal issues or appoint management that would be better equipped to help the company function more efficiently. Lastly, as Eastman and Santoro (2003) highlight that individuals' values influence their organizational practices, and a diverse set of values throughout a company- managers, employees, shareholders, etc.- is suitable for a company's performance. So once again, diversity needs to be a part not just the workforce and managers, but throughout the entirety of a firm.

2.3. Specific Reasons for Diversity in the Tech Industry

The Tech Industry in the United States is a unique to other sectors due to various reasons. Because of this, there are three main reasons why diversity in the tech industry can be both use and attainable. First, the tech industry is relatively recent in formation as well as has a rapid growth rate. This means a number of CEOs, founders, and other top-level management are much younger than their counterparts in other sectors. Previous literature suggests that a younger age makes

people more open to change. And also there is plenty of academic research that can be done on the industry as a whole. Second, according to Krumsiek and the Calvert Social Research Department (2003) there is a rapidly changing employee setting, where more and more tech companies are hiring international employees to come work in America. Much of this is due to the fact that the American tech industry is bigger and unlike other ones across the globe. Diversity at the board of directors' level can mean a more globally accepting and ethical situation for the entire company. Lastly, because of the rapid growth of the industry and globalization, many tech companies are choosing to manufacture many of their products abroad (Krumsiek et al, 2003). Although this practice cuts down costs for the companies as well as creates jobs for international workers, there is a high level of human rights abuse. Not to mention many of the workers in these situations are young women. A diverse board of directors could mean empathy and awareness to these issues.

3. Theory

3.1. A Two-Stage Least Squares Approach

In order to understand the relationship between firm value and diversity of the board of directors in the United States high tech sector, we must first see if there is a general relationship between firm value and the board of directors. Previous literature, suggests that there is significant connection between board member characteristics and firm value (Hermalin and Weisbach, 1991; Kini et al, 1995; Hillman and Dalziel, 2003; and others). Moreover, previous studies have also shown

a link specifically between the racial and gender diversity of board members and firm value (Gyapong et al, 2016; Carter et al, 2003; Campbell and Minguez-Vera, 2008). Therefore, an equation such as (3.1) is a suitable example of the relationship between firm value and the diversity of the board of directors.

$$\text{Firm Value}_i = \beta_0 + \beta_1 \text{Diversity}_i + \sum \beta_2 X_i + u_i \quad (3.1)$$

Where x represents other control variables and u represents the error term. Though a simple OLS model has proven insufficient when demonstrating the relationship between board diversity and firm value, specifically due to endogeneity (Hermalin and Weisbach, 1991; Carter et al, 2003; Gyapong et al, 2016).

The main endogeneity issue with the relationship between firm value and diversity come from the self-selection bias. As mentioned previously, there is a shortage of women and minorities in the high tech sector. Meaning the available qualified women and minority directors have the flexibility to choose what boards to be on. These directors could choose to be on better performing boards, therefore, affecting the relationship between board diversity and firm value (Ferrel and Hersch, 2005). This self-selection bias and can be mitigated by using instrumental variables and a two-stage least squares (2SLS) model (Gyapong et al, 2016 and Adams and Ferreira, 2009). Therefore, I use a 2SLS model to account for this endogeneity and any other endogeneity issues. Hence, a set of equations such as (3.2) is a better representation of the relationship between firm value and board diversity than a regular OLS.

$$\text{Diversity}_i = \beta_0 + \beta_1 \text{Instruments}_i + \sum \beta_2 X_i + u_i \quad (3.2)$$

$$\text{Firm Value}_i = \alpha_0 + \alpha_1 \text{Diversity}_i + \sum \alpha_2 Z_i + v_i$$

Where X and Z represent a set of control variables. These two sets of variables are the same for each stage. In the first stage, the “Instruments” account for the endogeneity of the “Diversity” variable; while in the second stage the predicted diversity, “^Diversity,” variable is used to see it’s affects on “Firm Value.” Lastly, u and v represent the error terms.

4. Methodology

4.1. Data Collection

The companies selected for analysis are from the Fortune 1000 list for the year 2016. The reason to use Fortune 1000 firms is due to the fact that these companies make up a good portion of the United States’ GDP as well as represent some of biggest and most influential firms. Additionally, I narrowed down the list to the high tech sector by only observing companies Fortune considered part of the technology or telecommunications sector. This left us with 116 companies. Financial information about the firms such as total assets, debt, etc. was gathered through public statements the companies filed to the United State’s government. All of this information is also specific to the year 2016. Due to the nature of the variables, and that Fortune includes both public and privately traded companies, some firms, which are not publicly traded, could not be observed. Other information about the companies such as the make up of the board of directors, CEO duality, etc. was directly gathered from the information the companies provided on their websites.

4.2. Variables and Hypotheses

There are seventeen total variables in all the models. The dependent variable is always firm value (FIRM_VALUE), which is represented by an approximation of Tobin's Q [see Chung and Pruitt (1994)]. The reason to use Tobin's Q to represent firm value is based on two main factors. First, it does a better job representing a firm than other more traditional forms of examining firm value such as returns to equity; Tobin's Q is better for a long-term representation of firm performance (Gyapong et. al, 2016). To account for any information that the ratio might be missing, I have also chosen to include returns to assets (FIRM_ROA) as a control variable. Second, as the creators of the ratio explain, this form of measuring firm value is a "nexus between financial markets and markets of goods and services" (Tobin and Brainard, 1977). Therefore, the Tobin's Q ratio is a good representation tool of a firm's status.

There are four independent diversity variables in the model (Gender, GDIV, Race, and RDIV). These variables are the main focus to understand how diversity affects firm value. These are also the variables that are instrumented due to their endogeneity. Additionally, variables Gender and Race are included in all four regressions, although are only instrumented when that variable is the focus of the regressions. The reason to include Gender and Race in all four regressions is due to the fact that I only collected data that included the number of women and the number of minorities but not them combined. By including the Gender and Race variables we can get a more accurate overall representation on what is affecting firm value.

Table 4.1: Variable Definitions

DEPENDENT VARIABLE	
FIRM_VALUE	An approximation of a Tobin's Q ratio
INDEPENDENT VARIABLES	
Gender	Percentage of women on the board of directors
GDIV	Dummy variable of (1) if women are on the board
Race	Percentage of minorities on the board of directors
RDIV	Dummy variable of (1) if minorities are on the board
CONTROL VARIABLES	
FIRM_SIZE	Natural log of a firm's total assets
FIRM_ROA	A firm's return to assets
BOARD_AVAGE	The average age of all the board members
CEO_DUALITY	Dummy variable of (1) if CEO is also chairman of board
CEO_AGE	The age of the CEO
INSTRUMENTAL VARIABLES	
BOARD_SIZE*	Number of board members
D1_Gender	Dummy variable of if there is one woman on the board
D2_Gender	Dummy variable of if there are two women on the board
D3_Gender	Dummy variable of if there are three or more women on the board
D1_Race	Dummy variable of if there is one minority on the board
D2_Race	Dummy variable of if there are two minorities on the board
D3_Race	Dummy variable of if there are three or more minorities on the board

There are five control variables to represent important general information of the companies. These variables are used in all of the regressions. Much of the reasoning behind using these specific control variables is due to previous literature. For instance, Jo and Harjoto (2011) explain that there is a relationship between firm value and active boards and over confident CEOs. Therefore, I use a dummy variable to represent the duality between the CEO and board chairman (CEO_DUALITY). Also there is some indication that the ages of the board members matter. In specific,

average age of the directors and the age of the CEO has a significant relationship to Tobin's Q (Gyapong et al, 2016 and Carter et al, 2003). Therefore, the average ages of the members (BOARD_AVAGE), and the age of the CEO (CEO_AGE) are some of the control variables. Lastly, there are two control variables to describe firm characteristics-the size of the firm (FIRM_SIZE) and the firm's return to assets (FIRM_ROA). I chose these variables due to their appearance in multiple previous literatures, and that they are good indications of a firm's overall well being that is not covered by the approximation of Tobin's Q.

Lastly, there are seven instrumental variables to mitigate the affects of endogeneity of the diversity variables. First, the number of members on the board (BOARD_SIZE), which Yermack (1996) found a significant negative relationship between the size of a board and Tobin's Q, but also is used as an instrumental variable for diversity in previous studies (Carter et. al, 2003 and Campbell and Minguez-Vera, 2008). BOARD_SIZE is an instrumental variable for both women and minorities. Also there are six instrumental variables that are dummy variables, which indicate the amount of diversity on a board. Three of them indicate whether there is one woman, two women, or three or more women on the board. And the other three indicate whether there is one minority, two minorities, or three or more minorities on the board. Look to Table 1 for a complete list the variables and their descriptions.

Because we are analyzing how diversity might affect the firm value of Fortune 1000 high tech firms the following two hypotheses are important for consideration:

Hypothesis #1

H₀: Having women on the board of directors for top United States High Tech companies will not affect the firm value (Tobin's Q) of a company.

Hypothesis #2

H₀: Having racial minorities on the board of directors for top United States High Tech companies will not affect the firm value (Tobin's Q) of a company.

The model can only be useful if the both the Wald Chi Square tests and Chi Square tests of the entire regression are significant. In order to reject the two null hypotheses the z tests of independent variables must be significant.

5. Analysis and Results

5.1. A Closer Look at the Data

Taking a look at the specific variables gives us a more clear view of the industry on a whole. For instance, the average percentage of women on boards is a little above 20%, while the average percentage of minorities on boards is around 13%. As mentioned earlier, the high tech sector is behind in their diversity practices in comparison to all other industries (EEOC). But with this new information that

Table 5.1: **Descriptive Statistics**

Variable	Median	Mean	Standard Deviation	Min	Max
FIRM_VALUE	1.457	1.889	1.175	0.427	7.462
Gender	20	20.254	9.137	0	42.857
GDIV	1	0.990	0.100	0	1
Race	10.556	12.675	12.232	0	75
RDIV	1	0.710	0.456	0	1
FIRM_SIZE	22.863	23.179	1.426	20.451	27.449
FIRM_ROA	5.31	5.832	7.150	-15.23	35.72
BOARD_SIZE	10	10.074	1.581	5	14
BOARD_AVAGE	61.5	61.114	4.279	43.375	70.3
CEO_DUALITY	0	0.287	0.454	0	1
CEO_AGE	55	54.745	7.553	31	75

only 20% and 13% of people on boards are women and minorities respectively shows that they are also further behind in representation of their own employee population. Not to mention, there was at least one company where there were no women or minorities on their board (GDIV min=0, RDIV min=0). Some good news is that 99% of the companies did have at least one woman on their board and 71% of companies have at least one racial minority on their board. Another interesting fact is that although there were more companies with women on their boards than minorities, the maximum percentage of minorities on a board was 75%, but the maximum percentage of women on a board was only about 43%. Additionally, the ages of the board members are also of interest. The mean of the average age of board members (BOARD_AVAGE) is significantly higher than the CEOs average age (CEO_AGE). This suggests that as previously mentioned notion that many of the high tech sector CEOs are generally younger than other sectors, which is of significance. Furthermore, it also shows that many of the board of directors are not as young in comparison to the CEO.

There are also some important standard deviation and median/mean inconsistencies that are noteworthy. For instance, there is a huge difference between the Race variable's median (10.556) and mean (12.675), which indicates there is a lot of volatility in the percentage of minorities on a board. Looking individually at the data there are many companies that did not have any minorities on their boards (29%) but many of the companies that did have minorities tended to have more than one. Moreover, the standard deviation for Race (12.232) also suggests that there was a lot of fluctuation in the amount of minorities on the board. Although not

as high as Race's standard deviation, Gender's standard deviation (9.137) also shows there is a wide range of percentage of women on boards. Lastly, the standard deviation for CEO_AGE was 7.553, which also shows how even though many CEOs are younger there is great variance there. To see more information about the variables look to Table 2.

There are two significantly high correlations (as seen in Appendix 1) between the variables. One is between the variables Race and RDIV, but since neither of these variables are ever in the same regression this is not of importance to the model. The second is between the variables CEO_AGE and BOARD_AVAGE. The correlation between these two variables is understandable, because the CEO's age plays a part in the board's average age, but since the age of a CEO in the high tech sector is of some significance, and the correlation between the two is 0.5096, which is just on the fence of being a high correlation I decided to leave both of the variables in the model.

5.2. Relationship between Firm Value and Diversity

Four different two-stage least squares (2SLS) regressions were performed with the dependent variable and all the control variables held constant. The differences are in regards to the diversity variables (Gender, GDIV, Race, and RDIV). In each regression, one diversity variable was instrumented with BOARD_SIZE and the three corresponding dummy variables (D1_Gender, D2_Gender, D3_Gender for Gender and GDIV; D1_Race, D2_Race, D3_Race for Race and RDIV). Due to some missing values there were 95 firms being analyzed in the regressions. All four regressions had a low Prob > chi square value, signifying that all four regressions

Table 5.2 2SLS estimates of relationship between firm value and women on the board

Variable	FIRM_VALUE	FIRM_VALUE
Gender	0.0200 (0.0128)	
GDIV		-4.1532 (4.5045)
Race	-0.0179** (0.0089)	-0.0128 (0.0100)
FIRM_SIZE	-0.1323* (0.0796)	-0.1108 (0.0877)
FIRM_ROA	0.0704*** (0.0149)	0.0711*** (0.01649)
BOARD_SIZE		
BOARD_AVAGE	-0.0097 (0.0322)	-0.0463 (0.0454)
CEO_DUALITY	0.3513 (0.2720)	0.4618 (0.3012)
CEO_AGE	-0.0665 (0.0171)	-0.0363 (0.0208)
Constant	6.2494** (2.7700)	12.4443* (6.7438)
Prob > chi2	0.0000	0.0003
R ²	0.2633	0.0988
N	95	95

The numbers next to the variable names represent the coefficients, while the ones in the parenthesis represent their standard errors.

*Significant at level 0.1 **

*Significant at level 0.05 ***

*Significant at level 0.01 ****

did have some explanatory power of firm value at the 99% confidence level.

Unfortunately, the only diversity variable that was significant at all was the Race-

percentage of racial minorities on the board- and it was significant at the 90%

confidence level when being instrumented and the 95% confidence level when not

being instrumented. But unlike previous literature, the relationship between racial

diversity on boards and firm value actually had a negative relationship (-0.0163*

Table 5.3 2SLS estimates of relationship between firm value and minorities on the board

Variable	FIRM_VALUE	FIRM_VALUE
Race	-0.0163* (0.0096)	
RDIV		-0.1038 (0.3486)
Gender	0.0151 (0.0122)	0.0106 (0.0126)
FIRM_SIZE	-0.1292* (0.0795)	-0.1387* (0.0822)
FIRM_ROA	0.0705*** (0.0149)	0.0703*** (0.0155)
BOARD_SIZE		
BOARD_AVAGE	-0.0118 (0.0322)	-0.0107 (0.0331)
CEO_DUALITY	0.3607 (0.2722)	0.2611 (0.2778)
CEO_AGE	-0.0268 (0.0188)	-0.0268 (0.0193)
Constant	6.3911** (2.7649)	6.3747** (2.8405)
Prob > chi2	0.0000	0.0001
R ²	0.2643	0.2269
N	95	95

The numbers next to the variable names represent the coefficients, while the ones in the parenthesis represent their standard errors.

*Significant at level .1 **

*Significant at level .05 ***

*Significant at level .01 ****

and -0.0179**) at both confidence levels. Past the diversity variables, two other variables stood out. First, the return to assets variable (FIRM_ROA) was significant in all four regressions at a 99% confidence level. This is incongruence with previous

literature and shows that a company's firm value is significantly affected by the ROA. Second was the natural log of a firm's assets (FIRM_SIZE). In three regressions at the 90% confidence level, the amount of assets the firm had was significant to firm value. In the three regressions that had significant coefficients they were negative. This information is also incongruence with previous literature.

6. Discussion

In the recent past, much of the research done in the field of economics in regards to board diversity found it to be a positive characteristic. The focus of this paper was to understand diversity, specifically in the United States high tech sector. Would a more gender or racially diverse board of directors would affect a high tech firm's value? Unlike previous literature, I found that gender diversity had no significant affect on firm value, while racial diversity had a negative affect on firm value. These results seem discouraging to those on the side of diversity and representation. But it does not necessarily indicate that racial diversity on boards is harmful. Instead, there is much we can learn from this information and use it to further the diversity practices within the high tech sector.

It is important to note, these results do not indicate that racial minorities are poor directors or unsuitable directors for the high tech sector. Other, larger issues could be at play. For instance, the racial make up or discrimination faced by some in the United States could be a cause for this result. This study was to understand how diversity affects firm value, but with the intention to show we should not discriminate when appointing people to their jobs. But many of the issues that

would cause a racial minority to be bad at a job (i.e. lack of experience) would also be exacerbated by the discrimination they face. Many of the minority directors could have recently joined the firm meaning they lack adequate time or experience to facilitate any good for the company. Additionally, it could have just been a bad year for that company or that director. Furthermore, as Carter et. al (2016) explains many firms who do have women or minority board members do not utilize their directors correctly and simply use them as “window dressings.” This idea is especially possible since out of the 71% of firms that did have racial diversity 48% of them only had one racial minority on their boards. Meaning around 65% of high tech companies observed had no or only one racial minority on their board. If these board members felt they were not being utilized correctly they could easily not do as well as they might. Many of these racial minority directors might also suffer from being the “token,” and therefore, do not do as well as they might. Furthermore, Gyapong et al (2016) suggest how in South Africa racial minorities grew up with fewer opportunities, and therefore are relatively new to the corporate environment. This could also be the case in America, although potentially to a lesser extent, because segregation only ended about fifty years ago, which is still relatively recent. Or many racial minority immigrants’ families did not have the proper resources to enter into the United States corporate setting

Another important factor to point out is that this paper only looked at 95 high tech firms. Many previous studies had far more firms observed. This could have skewed the results of this study. One way to combat that would be to not limit it to firms featured on the Fortune 1000 list and look at all high tech sector firms in the

United States. Even though I focused on understanding the fast changing high tech sector of the United States, one way to further understand how board diversity affects the high tech sector around the world would be to look at all western countries. Especially since many western countries have a history of immigration and colonization causing their population to be more racially diverse.

Lastly, many of this study's limitations came due to only observing board diversity at the year 2016. Because the data was hand collected, the only information that was available was the previous year's board of directors for each company. Therefore, I only observed one year. Some previous studies observed how board diversity affects firm value through a span of multiple years, which was not possible in this case. Many of the issues, such as having a bad year or lack of experience, could have been mitigated with information of past board member information. Also as mentioned previously, both the Race and Gender variable had a large standard deviation meaning that the gender and racial diversity of the boards varied quite a bit. This could have been due to the fact that many companies are in fact engaging in appointing more women or minority directors to boards, while other companies are just not there yet.

Overall, the information from this study has shown that minority directors do not help firm value, but that could be due to a multitude of uncontrolled variables. To better understand how board diversity affects firm value in the high tech sector we would need to better the study. For the future we would need to look at board diversity over a span of time, while also observing more firms. And since gender and race might simultaneously affect board membership, utilizing a different model

might also be helpful. In the mean time, current the high tech sector board members could engage in mentorship programs to better groom women or racial minority directors. As well as encourage for more women and minorities on the board to address certain issues such as being “window dressings” or “tokens” for the board.

7. Conclusion

This study was done to understand how board diversity of high tech sector firms would affect their firm value. This information was found using a 2SLS method where an approximation Tobin’s Q represented firm value and four different diversity variables, which were instrumented due to endogeneity, represented either gender or racial diversity. It was found that gender diversity did not affect firm value where as racial diversity had a negative relationship. This was unlike pervious literature where gender and racial diversity on boards generally positively affected firm value. Although this study did not come away with the same positive results it is the only one that looked specifically into the high tech sector in the United States. Moreover, the information gained from the study does shed some light on the high tech sector on a whole. This information is significant, because it showed that there is some disparity with minority board members. Could this be because of the nature of the sector? And if this is the case, then what are potential ways to solve that issue? Further research needs to be done in this rapidly growing high tech sector to see. In the future, one could do a more large-scale analysis of diversity of board directors in the high tech sector using panel data.

8. References

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