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The Effect of Increased Regulation on Option Use Within the Information Technology Industry

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CLAREMONT McKENNA COLLEGE

**THE EFFECT OF INCREASED REGULATION ON OPTION USE
WITHIN THE INFORMATION TECHNOLOGY INDUSTRY**

SUBMITTED TO

PROFESSOR LISA K. MUELBROEK

BY

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FOR

SENIOR THESIS

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Abstract

Exorbitant executive compensation packages have drawn large criticism from the public eye and with the recent financial crisis and the previous tech bubble opinion on executive incentives has forced government institutions to respond. Over the past two decades the SEC and FASB have aimed to respond to the public and with three large regulation changes in the 2000s, pay for performance compensation has gone through many changes. In this study I build on previous work in an attempt to answer whether or not executives within the Information Technology industry have seen a larger decline in option compensation when compared to executives outside of the industry. Previous studies have indicated that option use has been consistently higher in the IT industry and in addition another study has showed that option use across all companies has decreased dramatically due to regulation changes. In this study I find that option use has dramatically decreased over the past decade due to regulation and that option use in the IT industry has remained consistently higher than others. I find that there is little significant evidence suggesting regulation changes have affected the IT industry at a larger rate than others. I would argue that the industry is less sensitive to regulation changes regarding option use but I do find significant evidence that the industry has seen larger decreases in option use in 2013 when compared to other industries.

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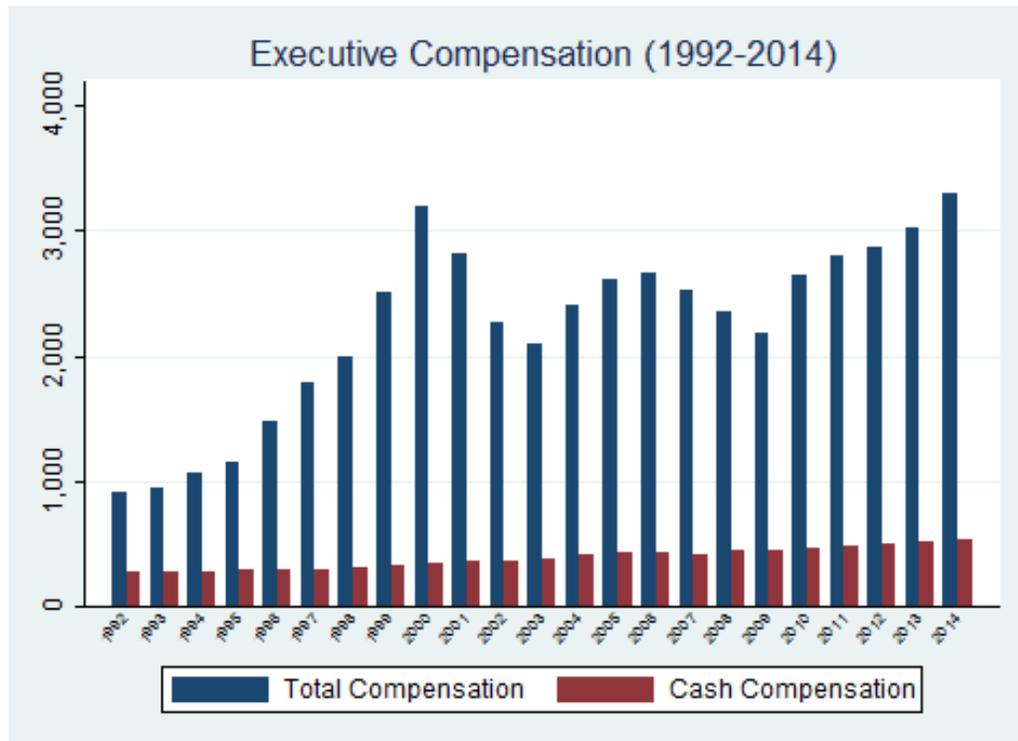
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I. Introduction

When selecting compensation strategies for top executives a company uses a portfolio of company assets in creating a compensation package for their executives. The total value of the assets in these packages vary based on what kind resources are used as well as their fair market value at the time. These portfolios generally consist of a variety of assets, including Cash, Stock Options, Retirement Packages, Inside Debt and other Long-Term Incentive Plans (LTIPS) (Investopedia.com). The company uses all these payment types in an effort to encourage high performance. Since these assets are affected by market prices a company encourages performance by tying the value of company prices to compensation value. This pay for performance strategy incentivizes top executives to increase performance and help build value at the firm company. For example, stock options are more valuable when a company has a high stock price, this would mean any executive who is compensated with company stock would be encouraged to increase company stock performance and subsequently raise his own compensation value. Other types of assets such as Cash payments are not a type of pay for performance instrument but are instead in compensation packages as a preventative measure against executives who might be making high risk decisions in hopes of increasing compensation value.

In 1992 the average CEO of an S&P500 firm earned \$2.7 million in compensation and by 2000 the average pay had increased to over \$14 million in compensation. This meant that CEOs were being paid 82 times the earning of an average worker and by 2005 CEOs were being paid 369 times the earning amount of an average worker. Under the accounting guidelines at the time companies did not have to incur an accounting charge

for options, and other payment methods, on their financial statements (Gine 2007 & Anderson, Banker and Ravindran 2000).



In the graph above we can see that the mean of CFO and CEO executive compensation reached an all time high in 2000 and was drastically increasing in the nine years prior. The average compensation these executives were receiving was larger than \$3 million in 2000 and has now reached the same level once again in 2014. Even with these expansive compensation packages, salary payments to CEOs and CFOs were miniscule compared to other compensation methods.

It is safe to say that these exorbitant payments were met with large opposition in the public eye. In the modern day where data is shared through a large amount of

¹ This graph and all others were created using Execucomp Data from the years 1992 – 2014. The data was limited to only CEO and CFO compensation. The graph represents the mean of total compensation and the mean of cash compensation of these two executives during the past 22 years. Specific data summaries will be provided later in this paper.

mediums the average worker can easily find the amounts CEOs and other executives are paid. Public opinion became so influential companies started to adjust their structure of executive compensation packages in response to the outlash. Even the largest of companies succumbed to this pressure; in 2009 Goldman Sachs acknowledged that public anger about high executive compensation constrained the pay of its top five executives (Kuhnen 2012). The Dot-Com bubble and the recent financial crisis have brought light to exorbitant compensation packages and public opinion has begun to harshly criticize companies for their large pay regardless of executive performance.

"...The truth is that boards of directors and compensation committees have adopted the modern standard of behavior: What's acceptable is what you can get away with. The executive-pay system is rigged. It has become an incestuous daisy chain of mutual greed and payoffs. Whether executives perform well or poorly, they rake in the riches. Heads they win, tails they win. For every executive who truly deserves his millions, a hundred others are ripping off their companies and shareholders..."(Gilmor 1997)

Government involvement in this issue has increased over the past two decades. Several measures such as the Dodd Frank Act and the Sarbanes-Oxley Act as well as several accounting standards have been passed over this time frame in an attempt to increase visibility of just how much executives are making. The Financial Accounting Standards Board (FASB) passed one of these measures in 2004 and required companies to expense equity based compensation and reflect it in the financial statements based on the fair value of the awarded assets (Gine 2007 and FASB 2004). FAS 123 (r), as the standard is codified, also required all compensation information to be reported, under DEF14A, in 6 new tables, which covered everything from a summary of compensation to any outstanding awards. By responding to the public and creating these new guidelines

the SEC and FASB have helped increase the visibility of compensation over recent years and brought to light the true extent of pay for performance methods. But have these regulations affected certain industries more than others? Have the new accounting regulations of expensing these awards made it hard for capital-intensive industries to continue using stock options as well as other pay for performance methods?

A. Executive Compensation in Technology

One industry in particular has been known to use stock options as well as other pay for performance methods more than any other, the information technology industry. Focused largely in Silicon Valley the IT industry has revolved all compensation around stock options and has been known to do so for quite some time. “From Intel in the 1960s to Apple in the 1970s to Silicon Graphics in the 1980s to Netscape and a host of others in the 1990s, enough Silicon Valley companies have delivered enough stock option jackpots to enough employees to create an entirely new business culture” (Fox 1997). Culture in Silicon Valley is very important to success in the industry and in this study we will assess whether companies in the area have seen a larger amount of change due to the recent regulation changes than others. There are two large incentives for tech companies to use forms of payment aside from cash. The first incentive is the greater retention they can create with stock and the second is to keep cash on hand. In the IT industry stock options are even used in compensating entry-level employees, especially in startups where the cost to compensate in cash is much higher due to increased competitiveness with mature companies.

The motivation behind this paper is to assess whether the aforementioned regulation changes have had a larger negative impact on companies within the

Information Technology industry as a whole when compared to other industries. By formulating a regression that factors in variables associated with option use I will be able to quantify the changes regulation have had on option use and I will also be able to identify the differences in option use between the IT industry and companies outside of it.

II. Literature Review

In this section I will cover the respective regulations that have been passed within the previous two decades as well as their possible effects on compensation within various industries. I will also cover previous literature that pertains to the matter of executive compensation as well as previous works that pertain to compensation within the technology industry. Finally, I will conclude with any works that pertain to variable choices and common practices in which compensation is valued and assessed. Most research in this area delves into the specific compensation forms but does not cover the changes across specific industries nor does it cover as long of a time period as this study. The increased visibility of executive compensation in recent years and the new regulatory changes have affected company reporting, expensing, and compensating behavior and social issues along with recent crises have led to an increase in the discussion about executive compensation in recent years.

A. Regulation

In the past two decades we have seen three large reforms, which changed the transparency of compensation in addition to changing company incentives regarding the various forms of compensation awards. In this section I will cover these three different regulations, their history, their specific requirements and their realized effects as well as any possible effects they may have had.

Sarbanes-Oxley Act

The first of these regulations is the Sarbanes-Oxley Act and is commonly known as SOX. Signed into law by President Bush in 2002, this piece of regulation was intended to control the conditions and cultural influences that lead to multiple fraudulent business practices in the year 2000-2002. The fall of Enron, WorldCom and Tyco uncovered the large internal conflicts companies faced as well as the compensation methods that encouraged executives into riskier business practices (Farrell 2007). Although the Act did little to impact executive compensation transparency directly, the act did contain one strong provision which had the potential to have a large impact on compensation practices. Section 304 of the Sarbanes-Oxley Act gave the SEC unprecedented power over compensation. The specifics of the section and the specific regulation is as follows:

“If an issuer is required to prepare an accounting restatement due to the material noncompliance of the issuer, as a result of misconduct, with any financial reporting requirement under the securities laws, the chief executive officer and chief financial officer of the issuer shall reimburse the issuer for –

- (1) any bonus or other incentive-based or equity-based compensation received by that person from the issuer during the 12-month period following the first public issuance or filing with the Commission (whichever occurs) of the financial document embodying such financial reporting requirement; and
- (2) any profits realized from the sale of securities of the issuer during that 12-month period.”(SOXCPA 2009).

As we can see from the above cases, this section of that act clearly gives the SEC the power to control executive compensation and even force the forfeiture of bonuses and profits that any CEO or CFO has received within a given year if fraudulent business practices are exposed. Unfortunately the act may not be perceived as being effective. The first instance of the section’s use was in 2007 and up until December of 2013 the section has only been used 31 times (Morgenson 2013). Much of this can be attributed to the threat these clawbacks have posed to the executives. The time as well as monetarily consuming litigation have forced companies to tighten on their reporting and has led to a decrease in the financial errors in reporting and a fall in financial restatements since its passing (Morgenson 2013). For the purpose of this study we should not expect a large change in compensation value or any component value of compensation

packages in the year of 2002 or any the following years whether we are focusing on the IT industry or outside of it.²

FAS123(R)

In 2005, the Financial Accounting Standards Board (FASB), under pressure from the SEC, modified FAS123, a standard that previously required disclosure of stock option positions but did not require any income statement expensing. FASB revised FAS123 to require the expensing of stock options when granted. The expensing of these options under rule FAS123(R) is required and is to be prepared “using a fair-value-based method that is similar in most respects to the fair-value-based method established in Statement 123” (FASB 2004). The fair-value based rule that was established in FAS123(R) has now changed to require all companies to use the Black-Scholes Method of stock option valuation to determine expense costs (FASB 2004).

This new rule implemented by the FASB has the largest realizable change of the three regulations mentioned in this section. Expensing of compensation outside Salary has not been required up until 2004. This meant that one of the largest sections of total compensation was left out. I predict that the largest change in compensation, specifically stock option compensation, will come in the year following this accounting change. The expensing of options will incentivize companies to reduce this form of compensation in order to keep a larger share of income.

A study conducted in 2012 by Hayes Lemmon and Qiu (2010) observed “firms dramatically reduce their usage of stock options after the adoption of FAS123R and that

² This study uses dummies in years following regulation changes in order to assess the affects these laws have had in the following year. This law does not directly impact option share use, regardless of industry, and does not have any significant results to compensation change.

the decline in option use is strongly associated with a proxy for accounting costs.”³ In this study we will observe these changes on the IT industry and specifically whether the usage of stock options has decreased more than other industries.

Dodd-Frank Act

The last of these regulatory changes is the Dodd Frank Act, which was passed in 2010. Included in the act are five sections, which required more oversight on executive compensation and shareholder acknowledgment of compensation. The sections are as follows:

- Section 951: Requires advisory votes of shareholders about executive compensation and parachutes. Also requires institutional investment managers to report their voting on advisory shareholder votes.
- Section 952: Requires disclosure about the role of, and potential conflicts involving, compensation consultants. This statute also requires the Commission to direct that the exchanges adopt listing standards that include certain enhanced independence requirements for members of issuers’ compensation committees. The Commission is also directed to establish competitively neutral independence factors for all who are retained to advise compensation committees.
- Section 953: Requires additional disclosure about certain compensation matters, including pay-for-performance and the ratio between the CEO’s total compensation and the median total compensation for all other company employees.

³ A second component of this study was to observe FAS123R affects on risky investment practices and found no significant results.

- Section 954: Requires the Commission to direct the exchanges to prohibit the listing of securities of issuers that have not developed and implemented compensation claw-back policies.
- Section 955: Requires additional disclosure about whether directors and employees are permitted to hedge any decrease in market value of the company's stock (SEC 2015).

Over the course of five years the SEC has gradually voted on these sections and within the past few years only a few have been signed into law. There are two reasons we should expect this new act to have an insignificant affect on executive compensation in recent years. The first of these reasons is due to the directness of the act towards the financial industry. Taking place right after the financial crisis these rules were created to target large financial institutions and help increase transparency within the organizations. Secondly, the recent changes in regulation have not all been in effect during our data range. Ending at 2014, Execucomp data will be unable to capture how all of these changes have affected compensation with the exception of the first two sections, which pertain to disclosure. Section 951 and 952 of the act are the only sections of the five which have been adopted by the SEC. Section 951 was adopted in January of 2011 and Section 952 was adopted in June of 2012 (SEC 2015). I do not predict that the value of options awarded to executives will change in the final year of our study due to the limited number of sections in implementation at the time of this study. In addition the increasing disclosures and transparency of compensation does not have a direct affect on compensation incentives as the previous two regulations mentioned.

B. “Executive Compensation in the Information Technology Industry“

Written by Mark C. Anderson, Rajiv D. Banker, and Sury Ravindran, this paper is the only recent analysis of executive compensation, and in specific, compensation within the information technology industry. Conducted in 2000 this study takes a look at the aggressive use of employee stock options in Silicon Valley. This is the only paper which analyzes and develops a regression which differentiates between the use of compensation in the IT industry and outside of it. The study indicated executives at IT firms “received a greater portion of their total compensation in the form of stock options” even after controlling for economic factors. The regression used in this study takes into account many of the economic factors as well as local company factors in determining the effect IT culture has on option compensation (Anderson, Banker and Ravindran 2000).

However, the paper does not suggest or analyze any changes in compensation throughout specific time periods. Although the paper used Execucomp data, only four years of data (1992-1996) was used in the study and no time variable was accounted for. In my analysis I will use a similar regression as in this paper but will focus on time trends as well as focusing on changes within specific years due to the regulation introductions. Company size is also a determining factor when it comes to sensitivity on compensation and in my analysis I will differentiate companies based on their market value.⁴

C. Compensation Regulation

Previous studies have observed the affect regulation has had on compensation. In 1992 the SEC and Congress passed legislation under the Internal Revenue Code Section

⁴ All variables mentioned in this study and used in regression analysis can be found in Table 2 along with their descriptions

162(m), which required disclosure of compensation levels for top executives. Analysis showed that increased transparency helped reduce compensation growth rates and even reduced compensation in some companies (Perry and Zenner 2001). In addition to this disclosure, Congress deemed any “pay above \$1 million that is not tied to performance [to be] deemed ‘excessive’ and [not] eligible to be deducted from corporate income for tax purposes”(Dew-Becker 2009). An even larger change occurred in 2006 when the SEC required all companies to disclose all forms of compensation (Dew-Becker 2009). These regulations show that companies respond significantly to regulation changes and as a whole tend to adjust compensation based on the incentive changes. As mentioned earlier Hayes Lemmon and Qiu (2010) observed drastic changes to compensation packages following regulation changes. In my study the goal is to differentiate these regulation change effects on the IT industry.

D. Performance Based Compensation

Over the years many scholars have addressed and attempted to explain the theories behind compensation and specifically the relation between performance and the payoff executives should receive. Holmstrom (1979) stated that there “has long been recognized that a problem of moral hazard may arise when individuals engage in risk sharing under conditions such that their privately taken actions affect the probability distribution of the outcome.” Holmstrom (1979) argues that this “moral hazard” is solved over time when the availability of information allows principals to renegotiate contracts information asymmetry is reduced. However, in order to compensate for issues surrounding asymmetric information firms choose to tie current and future performance to compensation of managers in order to incentivize strong performance and attract

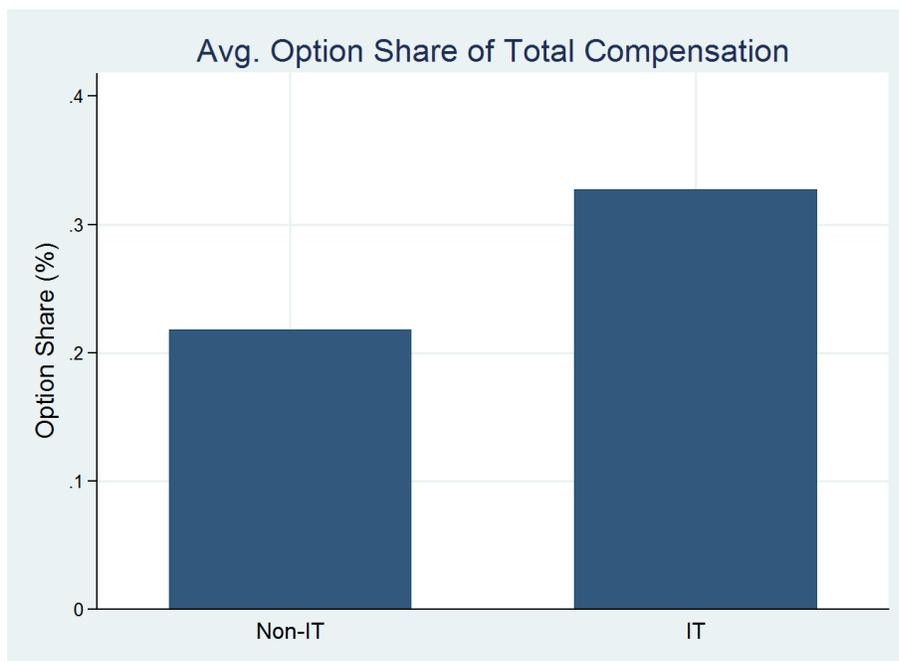
managers with similar objectives (Rothschild and Stiglitz 1976). Not only do these studies relate pay to performance, they also relate performance to pay. Boschen and Smith argue that the performance of a company relies heavily on the pay managers receive as pay is directly correlated with the firm's expectation of the manager's ability, thus the higher the pay the more experienced and successful the manager is likely to be (Boschen and Smith 1995). In this study I will not take a look into pay for performance metrics or incentives. Instead, I will focus solely on the effects these regulation changes have had on compensation.

III. Methodology & Theory

In this section my primary objective is to outline a framework that will allow me to investigate time differences in the value and components of executive compensation and more specifically between IT firms and other firms. By identifying the key drivers that affect option use I can regress a model that will correctly identify the correlation between time and industry location in the effect of option use.

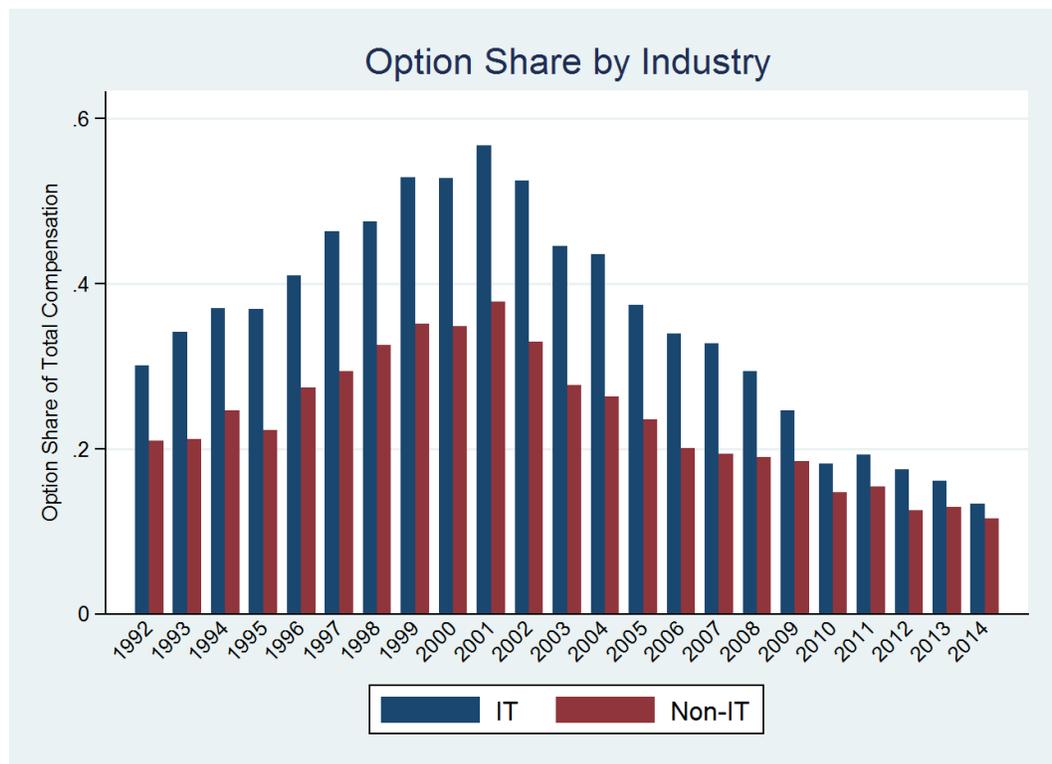
A. Endogenous Variable

The primary objective of this study is to observe the change in use of alternative forms of compensation over the past 22 years and determine whether regulation has had a large effect on firm use of options and bonuses in compensation packages to CEOs and CFOs in the Information Technology industry. *OptionShare*⁵ is the specific endogenous variable we will observe in the analysis.



⁵ The description for calculation of Option Share is found in Table 2

I will try to understand how time has played a role in the use of options as well as determining which regulations had the largest affect and whether or not option use was affected in the IT industry at a greater rate than others. As you can see above, the average amount of *OptionShare* as a percentage of total compensation is over 10% larger for executives within the Information Technology industry vs. those outside of the industry. A general trend can be observed within *OptionShare* data by taking a look at the changes this in this variable over time.



The graph above depicts the trend *OptionShares* have followed over the past 22 years. It is clear the firms in the IT industry have always been more aggressive in the use of this form of compensation in their packages, however it is intriguing to note that within the past five years the mean *OptionShare* within the industry has fallen at a

greater rate than that of other industries and the difference is very small in the year 2014. If we look at the respective means of the IT and non-IT industries we find that on average the *OptionShare* for an executive in the IT industry is over 10% higher than in non-IT industries (32.75% vs. 21.82%).⁶ If we take a look at median *OptionShare* the story is the same, with executives in the IT industry earning more than 24% of their compensation through options vs. 14.46% for non-IT executives. In 2014 option share in IT companies was less than 2% more than non-IT companies (13.35% vs. 11.55%). Both mean and median differences for *OptionShare* are significant under a P-value evaluation of under .05. This falls in line with my hypothesis that the IT industry has been affected by the changing regulations at a larger amount than other industries in North America. We can see that in the year 2006, following the passing of the revised law of FAS 123R option use within the IT industry continued to fall for the following three years while the use of options in other industries seems to be marginally decreasing over the same time period.

B. Economic Factors

In order to correctly account for *OptionShare* correlation in the regression I will also need to factor in economic factors that have played a role in compensation levels over time. Generally compensation is based on company performance and to account for this performance I will identify three variables, which can be used to account and proxy for economic factors that influence option use as well as value. These three proxies will

⁶ You can find specific mean and median averages, as well as p-value calculations for all variables spoken about in this section on Table 5

account for changes in growth opportunities as well as the different objective timelines that companies focus on.

The first of these variables is the *Book-to-Market* ratio. The *Book-to-Market* ratio is used in multiple previous studies to represent the number growth opportunities a firm has (Gaver and Gaver 1993). Essentially a company that has more growth opportunities will trade at a higher market value than the book value of the assets in the company. Companies will trade at a larger excess over book value if the investment opportunities of the firm are larger (Myers 1997). In addition this variable will also take into account the effect of debt riskiness in company strategy (Myers 1977). The book to market ratios between IT firms and non-IT firms are fairly similar as we can see in Table 6. On average IT companies have a slightly higher mean but this does not fall under a significant difference in a p-value calculation. In addition, upon calculating the median *Book-to-Market* ratios we find that non-IT firms have a slightly higher median but it is also not indicative of any true difference between industries.

The second factor which affects compensation is company performance and in this study I will compensate for this correlation using *Return* on stock price as well as a *Lagged Return* variable. As done by Anderson, Banker and Ravindran (2000) a lagged Return variable is used because a portion of compensation is dependent on previous year performance in addition to current year performance (Murphy 1985). In primary observations we can see that the difference in mean values of *Return* and *Lagged Return* between IT and non-IT industries is insignificant and due to large outlier influences it is more reasonable to compare median observations. Looking at our median values we can

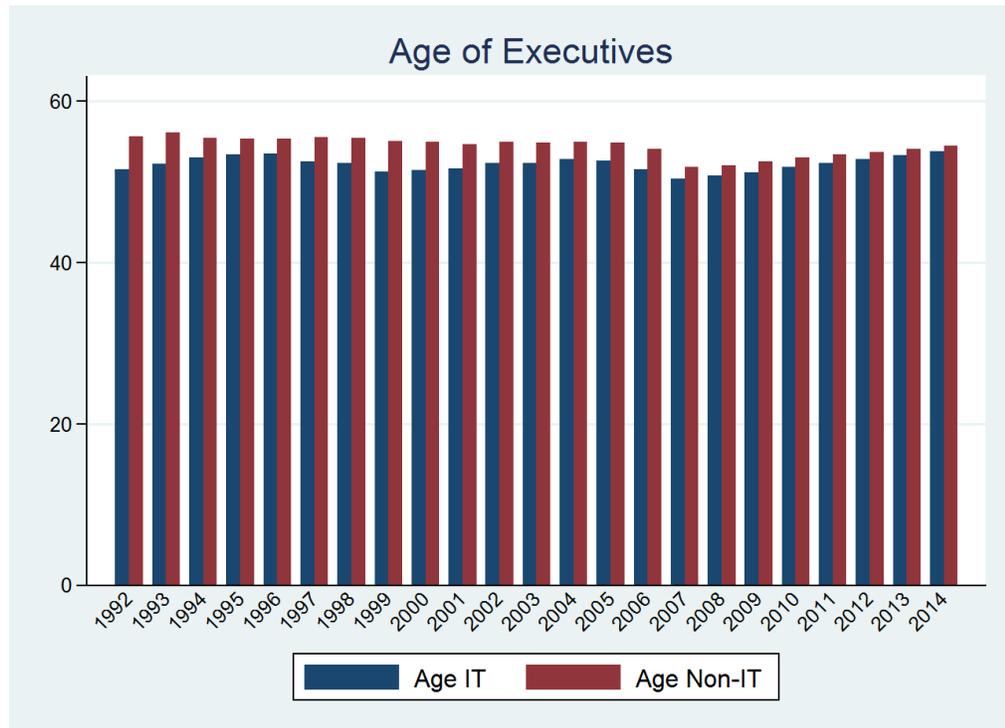
see that the non-IT industries have a slightly higher *Return* as well as *Lagged Return* when compared to IT companies.

Finally the dividend rate can be used to account for economic factors. Companies which do not payout dividends are likely to reinvest the income for future growth opportunities while companies that do not have many opportunities are more likely to pay dividends to shareholders (Gaver and Gaver 1995). These three variables will compensate for any growth factors, which play a role in use of compensation components as well as compensation component values (Anderson, Banker and Ravindran 2000). From Table 6 we can see that companies in the IT industry, on average, pay fewer dividends to shareholders and this falls in line with the hypothesis that IT companies tend to pay fewer dividends because of greater investment opportunities.

C. Age

Age is a variable that can be used as a proxy for multiple factors. First of all age can provide companies with information pertaining to executive ability (Murphy 1986). In addition to more experience, a manager with a longer track record will reduce information asymmetry regardless of whether previous performance was positive or negative. Information about compensation expectations will also be clearer with older executives. CEOs with more experience in their career are more likely to demand higher compensation than younger CEOs. In addition to increased information, executives who are younger will more likely focus on long-term objectives due to their age, while older executives may be less concerned about long-term performance as they get closer to retirement (Anderson, Banker and Ravindran 2000). As we can see from the graph below it seems that non-IT executives have generally been slightly older than IT executives but

the difference has become smaller over the past decade. The average as well as median age of IT executives is 52 years, four years younger than the average Non-IT executive. The p-value for test of difference indicated that the difference is significant.



D. Volatility

Volatility has played a role in compensation structure due to the increased riskiness of option value changes. Executives would rather be compensated with larger cash or salary portions if the volatility of company stock can greatly influence the value of options. With this increased risk in stock executives will negotiate for other forms of compensation. On the other hand, it is possible that companies will grant executives with more options in order to compensate for higher volatility in option value.

As well as a representation of risk in value changes, volatility can also be used as a proxy for innovation or growth opportunities within a company. Previous research has

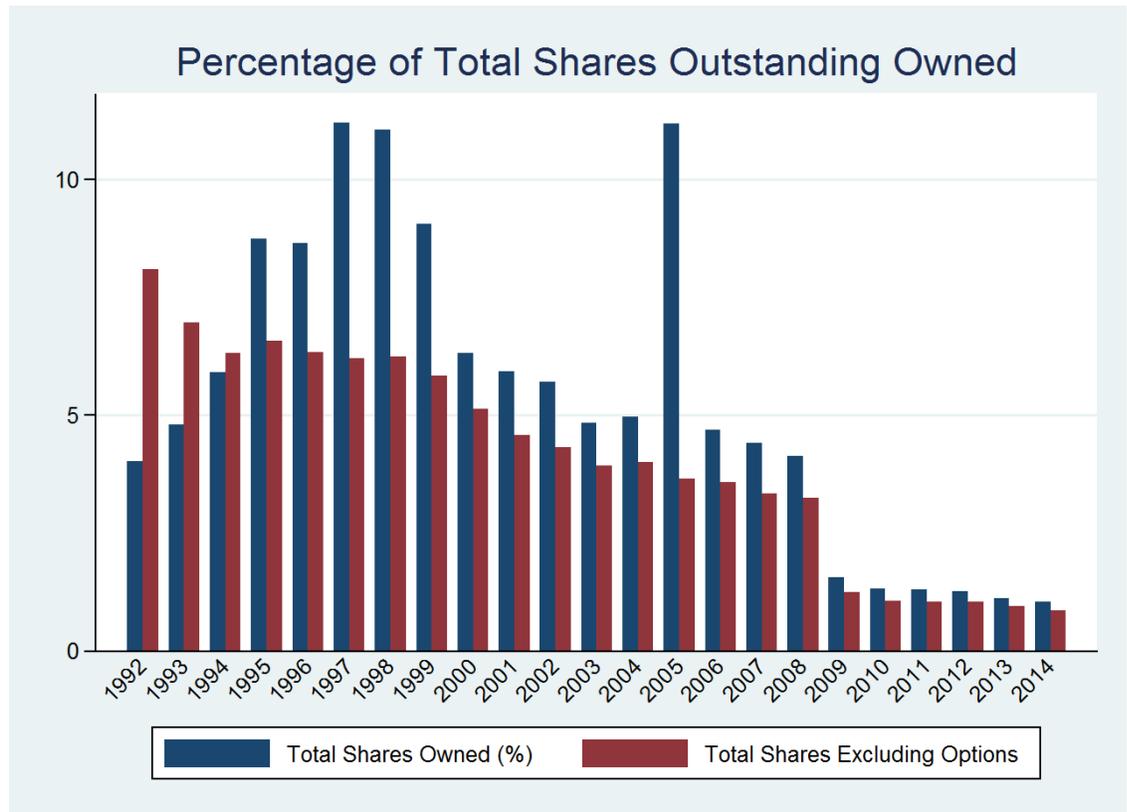
showed that companies with long-term objectives and risky projects favor central ownership rather than outside ownership of stock (Francis and Smith 1995). In the IT industry companies are more volatile when comparing both means and medians to non-IT companies, in addition the difference is significant when using a p-value calculation.

E. Ownership & Structure

The amount of stock an executive receives in compensation may affect incentives if stock ownership represents a large amount of outstanding stock. Stock ownership can have two effects, the first of which is a convergence of interests. If an executive's wealth is composed of a majority of stock it would be inefficient to reward this executive with more stock compensation in order to boost performance incentives (Anderson, Banker and Ravindran 2000). Awarding these executives with too much stock will reduce the effect that performance incentives provide. Entrenchment can occur when an executive owns a larger amount of outstanding stock when compared to other shareholders. Owning such high levels of outstanding stock "insulates the manager from market discipline, which may lead to greater personal consumption of firm resources (higher total pay) and suboptimal decision making (lower firm performance) "(Anderson, Banker and Ravindran 2000). As done by (Anderson, Banker and Ravindran (2000) I also define two variables, which account for executive holdings of outstanding stock in forms of options as well as stock. I compare stock held to total pay as well as firm equity and in addition I compare options held to total pay as well as firm equity.

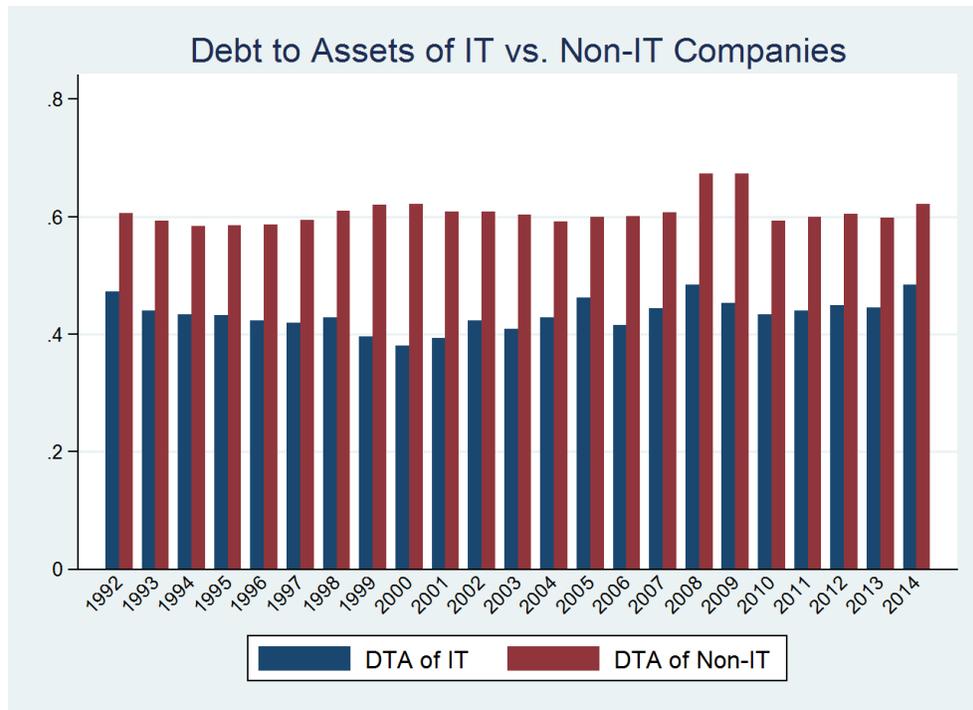
In the graph below we can see that IT company executives have held a higher percentage of Shares Outstanding than their non-IT counterparts. However the difference has decreased throughout the past 19 years and the difference between these executives

has become much smaller, specifically within the past six years. In Table 6 we can find all four of the variables mentioned in the previous paragraph as well as their respective mean and medians. Observing the p-value for test of difference we find all of the variables to be significantly differentiated except for *Options Held/Firm Equity*, which is just slightly above the significance boundary of 0.05.



The company’s structure will also influence the level of incentive based pay an executive will receive in compensation. *Debt to Assets* has been suggested to affect incentive based compensation depending on how a company is structured. Companies with larger debt would often prefer less risky projects and will appropriately compensate executives with less stock based income (John and John 1993). Other researchers have conflicted on the issue, Garvey and Mawani (1999) found that stock options may be used

to reduce incentivizing risky projects when debt levels are high but found that there was “no evidence that risk-taking incentives are increased by financial leverage.”



F. Size

Size will reflect the compensation structure as well. Larger companies will often hire more experienced executives while smaller ones will hire younger ones and in turn pay smaller compensation packages. Controlling for company size will reduce the affect of company incentives on executive pay has on our independent variable. In addition to differing experience in CEOs and CFOs, smaller companies will often use other forms of compensation aside from salaries and bonuses due to capital constraints. In this study company size will be adjusted for by using the *Market Value*.

G. Time

I will introduce four time variables in this study. First of which will be a time trend variable that will cover all 22 years of this study. The final three will consist of dummy variables for each year following one of the regulation changes mentioned. Dummies for the years 2006 and 2013 will show the direct change of regulation on the subsequent year's compensation structures. In Table 3 you can find a summary of the variables, which quantify the time changes, and the aforementioned dummy variables and in addition interaction terms between these variables and the IT industry dummy.

IV. Data and Empirical Results

In this section I will briefly describe the dataset and the steps taken to compile and create the set to be used in the regression. I will also talk about some of the descriptive information and the variables used in the study as well as the regression and their purpose. Finally I will conclude with the regression results and the outcomes of the study.

A. Data

Using the Execucomp data set, as well as the annual company data from Compustat, I was able to compile a dataset that would allow me to analyze the changing use of compensation over the past two decades. Execucomp compiles compensation on executives at companies within the S&P 1500. The dataset starts at the year 1992 and covers over two decades of compensation data until 2014. Compustat compiles company data from balance sheet to financial statement to cash flow details and provides an annual summary for North American companies both public and private. Using Excel and Stata I was able to import annual data from the Compustat database and integrate it into the Execucomp data set over 3,300 company compensation data. Included in the Execucomp data set are the respective Standard&Poor's Industry Codes and descriptions. I used these industry codes to separate the data by industry and identify the specific industries that contained information technology companies. Table 1 covers the four industries as well as their respective subsections as well as listing the respective S&P Industry codes. Narrowing down this data set was particularly important in order to see trends among top executives. I chose to only focus on CEO and CFO data in this study. Unfortunately

during the data gathering process some of the variables defined in the previous section limited the observable range of the study. The regressions in the following sections will focus on the years 2005-2014.

Using this dataset I created multiple time and industry dummies to help analyze the data. Specifically I introduced a time trend variable, which depends on which year observations occurred. This time trend variable will help show the overall effect each year has had on the compensation methods. In addition I added dummies for years following regulation changes.

B. Descriptive Information

Table 6 provides an overall outlook of all the variables discussed in the previous section as well as providing mean and median values for each variable. The table also features a P-value test of difference that identifies the variables with significantly different means between IT executives and non-IT executives. Due to the lack of data regarding dividend payouts a limited regression would have to be run and in order to observe a greater sample of compensation data I chose to drop the dividend rate from the regression. Using a four-step model allowed me to compare effects across time and with interaction terms I was able to identify the specific industrial affect over time as well as affects due to the three regulation changes. In the preliminary preparation for this study data was to be used from 1992 until 2014 but due to the nature of data collection a period of ten years was used instead (2005-2014). This data range will still allow me to account for the largest regulation change, FAS123R, and still provides a large amount of observations to appropriately provide insight into the last decade of change within compensation.

C. Results

A table of the four models used and mentioned in the previous section can be found in Table 7 after the Bibliography. For the purpose of conciseness in this section I will summarize the first regression using the term, *Original11*⁷ to refer to the variables used in all 4 of the models. I will go over my findings by differentiating between the four models and by summarizing the differences between them.

Model 1

The first equation is shown below. Model 1 is meant to show the overall trend that option use has gone through over the past 10 years across all the companies in the study and provide a basis for comparison with the next three models with.

$$OptionShare = \alpha + Original11 + Time Trend + \varepsilon_j$$

OptionShare, as defined in Table 2, is the percentage of total compensation that an executive receives in the form of a stock option payment. As mentioned at the start of this section the *Original11* refers to the eleven variables defined in the Methodology and Theory section, excluding the dividend rate as explained above.

Focusing on the first eleven variables we see that there are eight significant variables. *Return* was significant at a 5% level however it indicated that for every one percent increase in current company stock price an executive would receive a 0.0047% decrease in *OptionShare*. *Lagged Return* was also significant but the correlation coefficient was miniscule and did not have any large effect on *OptionShare*. For every 1% increase in *Volatility*, on average, *OptionShare* increases by 0.032% and the

⁷ The original eleven variables are Book-To-Market, Return, LReturn, Age, Volatility, Stock Held/Total Pay, Stock Held/Firm Equity, Options Held/Total Pay, Options Held/Firm Equity, Debt to Assets and finally Market Size.

correlation is significant at the 5% level. All but one of the four variables used to account for ownership were deemed to be significant at the 1% level, however *Options Held / Firm Equity* was not significant at any level. This falls in line with the previous study performed by Anderson, Banker and Ravindran. *Stock Held / Firm Equity* had the largest effect on Option use with a 1% increase leading to a .277% increase in *OptionShare*. *Debt to Assets* was also significant at the 1% level, demonstrating a 0.065% decrease in *OptionShare* for every 1% increase in the ratio.

Focusing on the Time Trend variable I observe that since 1992 the companies in the study have decreased *OptionShare* by 0.6277 every year. This means that over the 10 year period of this study the percentage of options being used within compensation packages decreased by 6.277%. In the following section I will discuss the findings of Model 2 which accounts for periods following regulation changes.

Model 2

In this model two dummy variables were introduced for the years 2006, and 2013 as follows:

$$OptionShare = \alpha + Original11 + Time Trend + d2006 + d2013 + \varepsilon_j$$

Following the introduction of these variables there was no significant change within the correlations of the *Original11* variables in the study. Moving on to the dummy variables we find that after the revision of FAS123 revision *OptionShare* decreased by -4.619% which falls in line with the previous study done by Hayes, Lemmon and Qiu. Taking into account the year 2013 we see that *OptionShare* across all the companies within the study rose by 0.745% however this result is not significant at the 5% level. The *Time Trend*

which was introduced in the first model was still significant at the 1% level and the correlation increased after accounting for the two years with the introduction of the dummy variables. *Time Trend* is now associated with a yearly decrease in *OptionShare* of 0.794 percent or 7.94 percent decrease over the time period of this study. It is clear that within the companies of this study option use as a form of compensation has decreased dramatically over the past decade when accounting for the variables defined in Methodology and Theory and that FAS123R had a large affect while any introductions from the Dodd Frank Act did not seem to provide any deterrent to option use.

Model 3

In this regression Model 1 was used and the *Time Trend* variable was replaced with an interaction variable composed of the *Time Trend* variable and a dummy for IT companies. This variable allows for the observation of an average yearly *OptionShare* change in companies within the Information Technology Industry.

$$OptionShare = \alpha + Original11 + (Time Trend * dIT) + \epsilon_j$$

There were no significant changes in the *Original11* variables results aside from a decrease in the significance of volatility which saw it fall outside the 5% level. The association of *Stock Held/Firm Equity* with *OptionShare* increased slightly from 0.277% to 0.308% for each 1% increase in the variable. The new interaction of *Time Trend* and *dIT* showed that over the ten year period companies within the IT industry increased their option use by a yearly average of 0.205%, after accounting for other factors which affect option use. This indicates that over the period IT industries did not suffer the same average yearly affect that other companies did over the time period.

However further isolation of the regulation period is needed to identify whether or not companies within the IT industry actually observed positive option use.

Model 4

In this final model an additional two interaction terms were added to the regression in order to observe the change regulation had on the IT industry. The regression was run as follows:

$$OptionShare = \alpha + Original11 + (Time\ Trend * dIT) + (d2006 * dIT) + (d2013 * dIT) + \varepsilon_j$$

The *Original11* variables did not see any significant changes from the previous model but the introduction of the two new interaction terms showed much different results from the results in Model 3. (*d2006 * dIT*), although not significant at the 5% level as it was in Model 2, showed that *OptionShare* use did not decrease as much as it did for non IT companies with the introduction for the revised FAS123. A coefficient of -2.184% was much lighter than the -4.619% in Model 2 which indicates the industry is not as sensitive to regulation changes as others. When interacting the IT dummy and the year 2013 we see that there is a 2.181% decrease in *OptionShare* in the year within IT companies a much different scenario than Model 2 which indicated there was an increase in option use among all companies. Finally when observing (*Time Trend * dIT*) we find that there is little change between this model and the previous. After accounting for the regulation changes we find that there was a very small yearly change from 0.205% to 0.226% which is a total of 0.21% over the past decade.

V. Conclusion

The results of this study indicate three different aspects one old and two new. First of all the results indicate that there has been a drastic decrease in option use within all companies following the introduction of FAS123(r) which reinforces previous studies done on this issue but this study has shown that there is a significant decrease in option use over the past decade even when accounting for regulation changes and other factors. Second, we can also observe that the IT industry has not reduced their use of options at any greater level than the remaining industries, if anything companies within the industry are less sensitive to the regulation changes over the past decade and have actually increased option use after factoring in other variables. Finally it seems that the industry has seen a large decline in option use in 2013 however I do not believe it has to do with the specific passing of Dodd Frank Section 952. Overall this study has revealed that the industry is less sensitive to regulation change and that option use is still strong within IT firms. The IT industry is always on the hunt for innovation and it would be wise that an industry with high ambitions.

There are copious amounts of areas that could be researched within this topic. Focus on other industries should reveal how regulation has affected option use and with the recent financial crisis, studies within the financial sector would be a useful avenue for future research. Other areas for research would also include lawmaking. Studies of incentives for option use could provide lawmakers with more guidance on policies that would target specific industries or control risk-taking.

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Tables

Table 1

The table below summarized the companies that fall within the IT grouping used in this study. All Industries covered as well as their sub-industries are represented in this table.

S&P Industry Code	Industry Group	Sub-Industry
4510	Software & Services	Internet Software & Services IT Consulting & other Services Data Processing & Outsourced Services Application Software Systems Software Home Entertainment Software
4520	Technology Hardware & Equipment	Communications Equipment Networking Equipment Telecommunications Equipment Computer Hardware Computer Storage & Peripherals Electronic Equipment & Instruments Electronic Components Electronic Manufacturing Services Technology Distributors Office Electronics
4530	Semiconductors & Semiconductor Equipment	Semiconductor Equipment Semiconductors
5010	Telecommunication Services	Alternative Carriers Integrated Telecommunication Services Wireless Telecommunication Services

Table 2

Each variable defined in section three of the study and a brief description of each variable.

Variable	Description
OptionShare	The percentage of total compensation that an executive receives in the form of a stock option payment
Book-to-Market	A ratio between the book value of the firm and the market value of the firm. Calculated by dividing the book value per share and the market price per share which are both included in Execucomp data.
Return	The percentage return of a company's share price over the year
LReturn	The percentage return of a company's share price over the year lagged by one year. (The variable Return lagged by one year)
Dividend Rate	The amount of dividend paid out per share from the company
Age	Age of executive in observation
Volatility	Stock volatility for specific company in an observation
Stock Held/Total Pay	The total amount of stock held by an executive divided by the total amount of compensation in a given year
Stock Held/Firm Equity	The total amount of stock held by an executive divided by the total equity of the firm in a given year
Options Held/Total Pay	The total amount of options held (exercisable and unexercisable) divided by the total amount of compensation in a given year
Options Held/Firm Equity	The total amount of options held (exercisable and unexercisable) divided by the total equity of the firm in a given year
Debt to Assets	The total debts of a company divided by the total assets of the company
Market Size	The total market volume of the company calculated by the close price times the total shares outstanding

Table 3
(continued)

Variable	Description
Time Trend	A variable which is dependent on which year an observation occurs. Each year is assigned a number and (0-21)
d2006	A dummy for the year 2006 (year following FAS123(r))
d2013	A dummy for the year 2013 (year following Dodd Frank)
Time Trend * dIT	Interaction term between Time Trend and IT industry
d2006 * dIT	Interaction term between d2006 and IT industry dummy
d2013 * dIT	Interaction term between d2013 and IT industry dummy

Table 4

The mean value of salary and options granted compared to the total amount of compensation executives received in IT industry companies (thousands of dollars).

Year	Salary	Options Granted	Total
1992	407.98	918.43	1881.92
1993	421.65	1744.47	1961.10
1994	425.99	1643.83	2368.04
1995	411.09	1988.21	2593.30
1996	412.08	3130.77	3337.59
1997	400.82	4511.44	4450.08
1998	408.21	3585.97	5349.31
1999	409.53	6430.51	6816.62
2000	432.53	10096.80	10468.55
2001	462.10	7100.14	8215.50
2002	462.09	3549.52	4641.14
2003	468.69	2358.13	3737.15
2004	494.56	2838.65	4133.43
2005	525.95	2829.80	4150.25
2006	457.17	1281.23	3449.04
2007	432.27	1203.36	2770.70
2008	460.74	1440.49	2865.61
2009	467.60	1267.64	2710.55
2010	486.49	1235.67	3314.68
2011	503.58	1515.49	4068.14
2012	515.17	1234.06	3598.66
2013	520.16	1615.85	3865.74
2014	555.08	1220.56	4086.62
Total	467.94	2731.33	4096.08

Table 5

The mean value of salary and options granted compared to the total amount of compensation executives received in non-IT industry companies (thousands of dollars).

Year	Salary	Options Granted	Total
1992	464.83	441.54	1662.92
1993	479.43	532.02	1753.95
1994	480.06	726.35	1930.79
1995	490.16	641.49	1988.37
1996	502.97	1151.60	2760.19
1997	516.99	1399.09	3196.11
1998	528.93	1757.09	3521.63
1999	548.28	2047.80	4092.13
2000	562.23	2547.00	4805.29
2001	576.81	2305.30	4478.39
2002	584.21	1595.95	3908.97
2003	593.60	1210.79	3668.54
2004	616.29	1364.62	4156.97
2005	645.25	1296.89	4433.93
2006	565.17	805.09	3774.97
2007	556.51	750.84	3494.86
2008	579.71	726.69	3312.81
2009	598.32	607.57	3017.66
2010	620.44	641.38	3603.63
2011	631.56	661.97	3737.70
2012	646.50	573.97	3826.02
2013	669.18	655.88	4256.02
2014	703.39	664.78	4676.88
Total	585.08	1018.62	3594.53

Table 6

Summary of the variables defined in section three of the study and compared between non-IT and IT companies

	mean			median		
	It firms	non-it firms	pval	It firms	non-it firms	pval
Option Share	32.75%	21.82%	0.000	24.54%	14.46%	0.000
Book-to-Market	0.26	0.22	0.806	0.42	0.48	0.000
Return	67.85%	59.93%	0.819	3.62%	5.95%	0.000
Lagged Return	47.54%	53.14%	0.850	3.53%	6.28%	0.000
Dividend Rate	1.90%	2.20%	0.000	1.50%	1.90%	0.000
Age	52.08	53.97	0.000	52	54	0.000
Volatility	49.57%	40.54%	0.000	46.50%	37.35%	0.000
Stock Held/Total Pay	14381%	268%	0.021	15.29%	10.15%	0.000
Stock Held/Firm Equity	232%	178%	0.000	4.54%	0.51%	0.000
Options Held/Total Pay	24.22%	11.99%	0.000	15.08%	4.38%	0.000
Options Held/Firm Equity	10.93%	13.15%	0.068	3.36%	2.23%	0.000
Debt to Assets	61.14%	43.66%	0.000	39.30%	59.47%	0.000
Market Size	8432.72	7597.44	0.002	1130.36	1657.14	0.000

Table 7

Results of for the following four regressions.

Model 1: $OptionShare = \alpha + Original11 + Time\ Trend + \varepsilon_j$

Model 2: $OptionShare = \alpha + Original11 + Time\ Trend + d2006 + d2013 + \varepsilon_j$

Model 3: $OptionShare = \alpha + Original11 + (Time\ Trend * dIT) + \varepsilon_j$

Model 4: $OptionShare = \alpha + Original11 + (Time\ Trend * dIT) + (d2006 * dIT) + (d2013 * dIT) + \varepsilon_j$

Variable	Model 1	Model 2	Model 3	Model 4
Time Trend	-0.6277 (-7.21)	-0.7937 (-7.72)		
d2006		-4.6193 (-3.39)		
d2013		0.7448 (1.43)		
Time Trend * dIT			0.2053 (9.24)	0.2255 (9.35)
d2006 * dIT				-2.1837 (-0.73)
d2013 * dIT				-2.1806 (-2.08)

Table 7

(Continued)

Variable	Model 1	Model 2	Model 3	Model 4
Return	-0.0047 (-2.83)	-0.0051 (-3.06)	-0.0039 (-2.4)	-0.0038 (-2.34)
Lagged Return	0.0001 (2.37)	0.0001 (2.38)	0.0001 (2.39)	0.0001 (2.39)
Book-to-Market	-0.0003 (-0.99)	-0.0003 (-1.03)	-0.0001 (-0.51)	-0.0001 (-0.49)
Age	0.0005 (0.02)	0.0043 (0.18)	0.0034 (0.14)	0.0044 (0.18)
Volatility	0.0323 (2.8)	0.0300 (2.6)	0.0205 (1.77)	0.0199 (1.72)
Options Held / Total Pay	0.0162 (3.5)	0.0163 (3.53)	0.0159 (3.45)	0.0160 (3.46)
Options Held / Firm Equity	-0.0010 (-0.16)	-0.0009 (-0.14)	-0.0012 (-0.18)	-0.0013 (-0.19)
Stock Held / Total Pay	0.0061 (3.99)	0.0061 (4.04)	0.0063 (4.13)	0.0063 (4.13)
Stock Held / Firm Equity	0.2774 (3.41)	0.2808 (5.48)	0.3082 (6.05)	0.3086 (6.06)
Market Value	0.0000 (5.89)	0.0000 (5.84)	0.0000 (5.4)	0.0000 (5.41)
Debt to Assets	-0.0648 (-10.4)	-0.0645 (-10.36)	-0.0516 (-8.04)	-0.0513 (-7.99)
Constant	41.79206 (17.63)	38.7812 (17.96)	25.6791 (17.29)	25.6230 (17.25)
R-Squared	0.0391	0.0404	0.0425	0.0429
Adjusted R-Squared	0.0379	0.039	0.0413	0.0415
Observations	9558	9558	9558	9558