CEO Compensation, Strategy, and Firm Performance

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Abstract

CEOs are increasingly being granted options as part of their compensation packages. However, despite all of the research conducted on executive compensation, there has been little investigation into the impact of CEO stock option grants on firm performance. In addition, many previous studies have found conflicting results on the impact of equity-based compensation on performance. Our study incorporates the competitive strategy adopted by the firm into its analysis. We document that a firm's strategy impacts the level of stock options granted to the CEO. We also found that, after controlling for a firm's competitive strategy, the relationship between CEO stock options and firm performance is stronger than when the sample is considered on a pooled basis.

Key words: CEO compensation, stock options, competitive strategy, firm performance

1. Introduction

Executive compensation is a topical area in corporate governance and attracts a significant amount of interest from academics, regulators and shareholders alike. The topic of executive compensation has been a widely researched over the past few decades, with some even commenting that growth of research in the area has outstripped the growth in executive pay (Bebchuk & Fried, 2003). Much of the existing research centres on the ability of compensation plans to improve firm performance. Performance improvement is achieved through the use of incentive schemes, which motivate executives to take actions that benefit the company and shareholders, which, in turn, increases their own compensation. Most studies find that incentive schemes have a positive effect on performance, but other studies have found little relationship to firm performance.

As part of their compensation packages, CEOs are increasingly being granted stock options, and these options represent a substantial portion of the overall compensation package (Lam & Chng, 2006, p. 249; Zhou, 2001, p. 566). By granting these options, it is hoped that the CEO's interests will become more aligned with the shareholders' interests, and thus the CEO will strive to increase company performance over the long-term.

The literature has examined the roles of both cash-based and equity-based compensation as part of an incentive compensation scheme. Studies investigating the impact of equity-based compensation on firm performance have reported mixed results (e.g. Core & Guay, 1999; Garen, 1994; Himmelberg et al., 1999). However, most of the literature on equity-based compensation has focused on executive stock ownership. With a few notable exceptions (e.g. Hanlon et al., 2003; Lam & Chng, 2006; Tang, 2014), little research has been undertaken to investigate the impact of stock options on firm performance.[1] Whilst there are certainly similarities between CEO stock ownership and stock option grants, stock options differ from stock ownership in that they are generally thought to encourage a longer term focus, and they have a different payoff function due to the exercise price (Barron & Waddell, 2008, p. 771; Lam & Chng, 2006, p. 251). Hanlon et al. (2003) and Lam and Chng (2006) are several such studies that examine the impact of stock options on performance. Using a pre-SOX dataset, both studies report that options have value implications for firms and that the results are consistent with efficient contracting and incentive alignment.

A significant portion of prior literature has examined incentive compensation schemes on a universal basis (e.g. analysing total equity-based compensation without distinguishing between stock

[1] Much of the existing literature on executive stock option grants focuses option backdating, which was a relatively common occurrence pre-SOX, or on the impact of options on investment decisions and the levels of risk-aversion exhibited by executives, but does not explicitly link these to firm performance.

ownership and options, or pooling all firms together in the analysis on performance). Several studies have criticised this approach and assert that more consideration needs to be given to other aspects that could impact the effectiveness of incentive compensation schemes on firm performance (Banker et al., 2013; Matolcsy & Wright, 2011; Barkema & Gomez-Mejia, 1998; Gomez-Mejia et al., 1987).[2] One such aspect that has been asserted is a firm's competitive strategy, and the need to consider this pursued strategy when examining the effectiveness of a firm's compensation structure (see, for example, Balkin & Gomez-Mejia, 1987; Montemayor, 1996). Chen and Jermias (2014) find that incentive compensation schemes are more appropriate for firms pursuing a product differentiation strategy, rather than a cost leadership strategy, and that a misfit between strategy and compensation structure adversely affects firm performance.

Thus, the aim of our study is to determine the impact of a firm's strategy on the relationship between CEO option grants and firm performance in US public firms. Following several high-profile corporate failures (e.g. Enron, WorldCom), the Sarbanes-Oxley Act (SOX) was introduced in 2002, and the Act has stricter provisions relating to the issue and disclosure of stock options. Prior studies almost exclusively utilise a pre-SOX dataset. Our study, however, investigates the effectiveness of CEO option compensation in a post-SOX environment in order to provide a comparison to these previous studies. Our study also answers calls from previous studies to consider firm strategy and its impact on the effectiveness of incentive compensation schemes, and builds on the work of Chen and Jermias (2014) by considering CEO option compensation alone—a decision made as there is little research examining option compensation and firm performance, and because it is important to determine the effects of individual elements of a compensation package (Banker et al., 2013).

It is predicted that a firm's competitive strategy influences its use of stock options as part of the CEO's compensation package, and the results support this prediction. Product differentiation firms utilise a larger amount of options than cost leadership firms in their compensation packages. The results also support the prediction that there will be a positive relationship between CEO stock option grants and firm performance, and this relationship strengthens when a firm's competitive strategy is introduced to the equation. The results suggest that CEO stock option grants can be effective under both strategies, however this effectiveness depends on whether the options are granted in line with the strategy pursued. The results appear consistent with the efficient contracting and incentive

[22] Banker et al. (2013) highlight that different components of compensation can have differing interactions; Matolcsy and Wright (2011) emphasise that the fit between firm characteristics and the type of compensation used can influence performance; Barkema and Gomez-Mejia (1998) note that governance characteristics can influence the compensation-performance relationship; and Gomez-Mejia et al. (1987) observe that ownership structure also impacts the degree to which managers are compensated for performance.

alignment theory of the principal-agent model, suggesting that options are an effective mechanism to align CEOs' interests with those of the shareholders in order to increase firm value.

The rest of our paper is structured as follows. Section 2 reviews the relevant literature related to agency theory, stock option compensation, and firm strategy, and also develops the hypotheses. Section 3 describes the data and research method, the results of which are presented in Section 4. Section 5 summarises and concludes the study.

2. Literature Review and Hypothesis Development

2.1. Agency Theory and Incentive Schemes

Agency theory is the dominant paradigm in executive compensation. Agency theory stems from the separation of ownership (i.e. the shareholders; the principal) from management (i.e. executives; the agents). Because of this separation, problems can arise regarding adverse selection and moral hazard. Adverse selection problems arise prior to the contract, when an agent has private information about his skill level that is not known to the principal, which presents the opportunity for the agent to misrepresent his skill level in order to obtain higher pay (Banker et al., 2013; Hölmstrom, 1979). After the formation of the contract, the agent, due to the nature of his duties, typically has more information about the task environment than the principal. This information is not costless for the principal to obtain, making it difficult to fully monitor the agent's actions (Hölmstrom, 1979; Chen & Jermias, 2014, p. 115). Because actions are not fully observable, the moral hazard problem arises, whereby the agent is more likely to use his private information to make decisions based on self-interest rather than on maximizing shareholder wealth (Jensen & Meckling, 1976; Banker et al., 2013; Chen & Jermias, 2014).

Incentive-based compensation schemes (ICS) are seen as a solution to agency problems by mitigating the risk of moral hazard. The primary aim of an ICS is to align the interests of the CEO with the interests of the shareholders by making the CEO's compensation contingent on the firm's performance (Banker et al., 1996; Merhebi et al., 2006, p. 482; Chen & Jermias, 2014, p. 115). ICS motivate the agent to channel his efforts towards activities that aid in achieving the organization's goals and maximise shareholder wealth (Bebchuk & Fried, 2003; Bebchuk & Weisbach, 2010; Jensen & Meckling, 1976) causing the agent to make a trade-off between the cost of exerting increased effort and the benefit of a higher compensation reward (Banker et al., 2013).

However, there are many occasions where compensation arrangements have been flawed, with a number of high-profile corporate scandals, such as Enron and WorldCom highlighting these occasions, with others also suggesting that compensation practices played a part in the collapse of

several significant banks during the global financial crisis (Conyon et al., 2011). Bebchuk and Fried (2006) suggest that the problem is not limited to a few "bad apples", but is widespread and systematic. They, and others (e.g. Garvey & Milbourn, 2006) assert that there is currently a lack of arm's-length arrangements in the contracting environment. This is characterised by managerial entrenchment and rent-seeking behaviour, whereby the CEO's compensation becomes increasingly decoupled from firm performance. Thus, whilst ICS seek to address agency problems, they can also be part of the agency problem (Bebchuk & Fried, 2003).

There is a concern that current compensation arrangements lead to CEOs prioritizing short-term investments and performance at the expense of long-term shareholder value (Bebchuk & Fried, 2010; Laux, 2012, p. 515). There seems to be agreement that this short-termism can be mitigated by linking compensation to long-term performance, and it is thought that equity compensation with longer vesting periods can create the necessary long-term alignment (Bebchuk & Fried, 2010, p. 5; Laux, 2012, p. 513).

Numerous studies have been undertaken which examine the impact of various ICS on firm performance. Much of the literature has found that the use of an ICS has a positive impact on performance (e.g. Gomez-Mejia et al., 1987; Tosi & Gomez-Mejia, 1994; Core et al., 1999; Core & Guay, 1999), supporting the optimal contracting theory (Merhebi et al., 2006, p. 482). However, some studies have not found this association (e.g. Garen, 1994; Tang, 2014), indicating that managerial rent-seeking behaviour is not absent. Bebchuk and Fried (2006) conclude that CEO compensation packages will likely involve a combination of optimal contracting elements and shareholder value maximizing outcomes, and the influence of managerial rent-seeking, showing that efforts still need to be made to improve compensation policies so that executives do not act in self-interest, but rather in the shareholders' interests.

One possible reason for these contrasting results is that many previous studies have chosen to examine the relationship between ICS use and firm performance on a universal basis, without distinguishing between the different components of compensation (Chen & Jermias, 2014, p. 116). Banker et al. (2013) highlight the importance of making this distinction, finding that the impacts of salary and bonuses can cancel each other out at times, which could explain why some studies examining aggregate cash-based compensation have not found strong associations between compensation and performance. As it is important to determine the effects of specific components of compensation, this study examines the impact of stock option grants—a component of equity compensation which is commonly used in an attempt to align the CEO's interests with the firm's.

Another possible reason for the previous weak or inconsistent results is the failure to consider other factors that could impact the appropriateness of the compensation structure. Indeed, Garen (1994) notes that agency implications are just one part of the picture in explaining firm performance, and his results suggest that other factors should also be considered when investigating the relationship between ICS and performance. Matolcsy and Wright (2011, pp. 747, 761) show that compensation awarded to CEOs which is inconsistent with firm characteristics negatively impacts firm performance. Several studies from the management literature (Balkin & Gomez-Mejia, 1987; Barkema & Gomez-Mejia, 1998; Montemayor, 1996) have identified strategy as an important factor to consider when examining this relationship between compensation and firm performance and, in a recent accounting study, Chen and Jermias (2014) found that a misfit between a firm's strategy and its compensation structure had a negative impact on performance.

The concerns with the effectiveness of ICS, the importance of determining the impact of specific components of CEO compensation, and the increasing importance of strategy in determining the optimal CEO compensation package prompt the following research questions: (i) what is the impact of CEO stock option grants on firm performance? and (ii) does a firm's competitive strategy impact that relationship?

2.2. Option Grants

Stock option grants are increasingly being used as part of executives' compensation packages. In 2001, 54% of executives' total compensation packages in the US was made up of stock options (Lam & Chng, 2006, p. 249), and Barron and Waddell (2008, p. 769) note that all-option equity awards are common in practice.

The primary aim of granting stock options to the CEO is to align his incentives with those of the shareholders, as part of his wealth becomes linked to the firm's performance (Lam & Chng, 2006, p. 251). Zhou (2001) finds that executive stock option grants can provide greater incentive effects to increase performance than stock ownership. It is also thought that options, with their longer vesting periods, will increase the incentives for CEOs to make decisions to improve the firm's value over the longer-term (Bebchuk & Fried, 2010, p. 5; Laux, 2012, p. 513). Lam and Chng (2006, p. 251) list several main features of stock option grants that help to align CEO and shareholder interests: (i) the value of the options is a convex function of stock performance, meaning CEOs have a greater incentive to accept projects that improve shareholder value and, thus, their own compensation; (ii) options typically have a set period before vesting, meaning that CEOs cannot exercise the options immediately, forcing the CEO to consider the longer-term in making investment decisions, mitigating the short-term focus that has been a common cause for concern compensation arrangements; and

(iii) CEOs are typically unable to sell their options before they vest, meaning that the CEOs are locked-in, and must take risky decisions in order to increase the value received from the options. Barron and Waddell (2008, p. 771) also state that stock ownership and stock options have different payoff function due to the implied exercise price, which is zero stock grants and the strike price for stock options, which will only be exercised if they are in-the-money.

The Sarbanes-Oxley Act (SOX) was introduced in 2002 in the wake of numerous high-profile corporate scandals, such as Enron and WorldCom, in an attempt to improve the quality of corporate governance. The passage of SOX and the enforcement by the Securities and Exchange Commission (SEC) has had an influence on CEO compensation, in particular on equity compensation. Whereas previously a firm had to file a return with the SEC within 10 days following the grant month if it had granted an executive stock or options, such grants must now be filed within 2 days. In addition, executives must certify the integrity of the annual report and must return any profits realised through the sale of stock or exercising of options made within 12 months of an accounting restatement as a result of misconduct (Sections 302, 304). To add further restrictions, the boards of firms listed on the NYSE or NASDAQ must have a majority of independent directors, as well as an independent compensation committee. These requirements should reduce the extent of managerial rent-extraction and reduce CEOs' ability to game the system through methods such backdating. This should lead to a greater proportion of efficient option grants to CEOs that improve performance. Tang's (2014) study would appear to support this, finding that the number of options granted post-SOX dramatically decreased for non-family-owned firms, and that this was accompanied by an increase in subsequent years' ROA, suggesting that stock option grants were excessive pre-SOX (more effective post-SOX), and therefore more indicative of the managerial power theory.

The majority of the prior literature ignores the specific effects of stock options, focusing instead on stock ownership, or on overall equity. Several studies do, however, examine the impact of executive stock options on firm performance. Rapp et al. (2009) examine the use of executive stock option compensation in Germany, finding no association, or even a negative association between option compensation and performance. However, when they further break down their analysis, they find that option grants awarded with ambitious performance hurdles increase subsequent performance, whilst option awards with low performance hurdles are associated with poor performance in the future (Rapp, Schaller, & Wolff, 2009). In the USA, Hanlon et al. (2003) find an asymptotic relationship (i.e. increasing, but at a decreasing rate) between executive option grants and future earnings. Lam and Chng (2006), however, find a convex relationship (i.e. decreases before it increases) between firm performance and the granting of executive stock options. It is generally thought (Barron & Waddell, 2008, p. 767) that this convexity helps to counter CEO risk aversion as a

greater portion of his compensation becomes tied up in options, forcing him to take risks in order to realise the benefits and receive higher compensation. The results of both Hanlon et al. (2003) and Lam and Chng (2006) appear consistent with the efficient contracting theory, although they examine the same pre-SOX period as Tang (2014). One plausible way to interpret this is to assume that the pre-SOX stock option compensation examined by Tang (2014) exhibited elements of efficient contracting, however the stricter regulations imposed by SOX meant that option compensation became more efficient post-SOX.

However, Barron and Waddell (2008) observe that the exercise or strike price of options can also influence the effectiveness of options. The common practice in the US is to set the strike price of executive stock options equal to the stock price on the grant-date (i.e. at-the-money), with Barron and Waddell (2008, p. 775) finding that 96% of executive stock options were granted at-the-money between 1993-2003. It has been asserted, however, that equity grants—stock or options—should not be made at-the-money (Bebchuk & Fried, 2010, p. 26). It has also been suggested that if firms are constrained in their ability to alter the strike price, then other forms of compensation, such as restricted stock, should be used to better align the CEO's incentives (Barron & Waddell, 2008, p. 769). This might be the case if, for example, the firm wishes to retain the CEO (e.g. see Bizjak et al., 2008), who would go elsewhere if the option grant was made out-of-the-money (i.e. in a manner inconsistent with similar firms).

Zhou (2001) observes that the levels of stock option grants and stock ownership can differ greatly across the population and are not perfectly correlated. Additionally, Core and Guay (1999) argue that a comprehensive measure of equity incentives requires both components to be included. They observe that firms generally set equity compensation levels in alignment with economic determinants to increase the alignment of interests between shareholders and executives. Thus, stock option grants are unlikely to be representative of total equity compensation granted to the CEO, and it is therefore assumed in this study that firms will work towards an optimal level of option grants as part of the CEO's equity compensation package.

It is evident that there is still a large portion of CEO compensation awarded through stock-option grants, almost exclusively made at-the-money (i.e. without ambitious performance hurdles). Improvements have come about through the passage of SOX, however, and the characteristics of options do promote a longer-term focus, encouraging investment into long-term value-generating projects. Option grants awarded to CEOs at-the-money, although they may not be optimal, are still expected to have a positive impact on firm performance. However, given the conflicting theory and results, the first hypothesis is stated in its null form as follows:

H_1: There is no relationship between CEO option compensation and firm performance.

2.3. Strategy

Strategy is becoming increasingly important variable to consider when investigating firm performance (Chenhall & Chapman, 2006). A firm's strategy can impact the effectiveness of a given compensation package; different strategies require different compensation packages and performance criteria, and an inappropriate compensation package can adversely impact firm performance (Balkin & Gomez-Mejia, 1987; Barkema & Gomez-Mejia, 1998; Rajagopalan & Finkelstein, 1992; Chen & Jermias, 2014; Montemayor, 1996).

Porter[3] (1980; 1985) develops a framework in which he outlines how firms can compete effectively by giving consideration to their strategic priorities. He argues that a firm can gain a competitive advantage though product differentiation or cost leadership. A firm can adopt a cost leadership strategy, whereby it offers its products at a lower price than its competitors, or it can adopt a product differentiation strategy, whereby it aims to satisfy customers through factors such as quality, uniqueness, and flexibility[4]. The chosen strategy, then, determines to a large extent the actions that the firm will undertake to achieve this competitive advantage and higher performance.

Chen and Jermias (2014) investigate the use of ICS and find that firms do adopt varying compensation packages depending on the chosen strategy, and that a closer alignment of strategy and the compensation package has a positive impact on performance. They find that product differentiation firms obtain higher benefits from a higher use of ICS than cost leadership firms, who utilise a lower level of ICS.

As stock options are one component of ICS, it is expected that product differentiation firms will make greater use of them in their compensation packages, and this will be a better fit for these firms rather than for cost leadership firms. Firstly, product differentiators deal with a more uncertain environment; their focus on uniqueness and innovation adds an extra element of risk to their activities (Porter, 1980). Such firms are more results oriented, employ flexible structures and processes, and use complex coordination mechanisms, and also use tight controls to ensure that overall focus is

[3] Porter's (1980; 1985) framework is adopted here for the theoretical discussion. However, other frameworks exist, such as Miles & Snow's (1978) "defender-analyser-prospector" topology, and this may prove to be a more appropriate lens through which to interpret strategy.

[4] It is important to note, however, that just because a firm follows one strategy, does not mean it can entirely ignore aspects of the other. For example, cost leadership firms should not ignore innovation, quality, or service that could provide some differentiation. And in a similar vein, it is not implicit that product differentiation firms should ignore costs. Indeed, many firms in practice do undertake activities that adopt aspects from each strategy (Chenhall & Langfield-Smith, 1998, p. 244). However, the primary objective for cost leaders is efficiency, whilst the primary objective for product differentiators is innovativeness (Porter, 1985).

maintained (Chenhall, 2003, p. 150). One of these control mechanisms is the compensation package awarded to the CEO, which acts in place of active monitoring by providing appropriate incentives to the CEO. Indeed, Tosi and Gomez-Mejia (1994) find that a positive relationship between CEO monitoring (in the form of an ICS) and firm performance. Chen and Jermias (2014, p. 118) note that the use of an ICS will help the firm to attract and retain managers who are less risk-averse and better able to handle the inherent uncertainty associated with the strategy (see also Hanlon et al., 2003). The value of options increases with firm risk (Black & Scholes, 1973), and the use of stock options encourages the CEO to take risks to increase performance and, in turn, receive an increased payout (Balkin & Gomez-Mejia, 1987; Chen & Jermias, 2014, p. 117; Lam & Chng, 2006, p. 253). The use of stock options can also improve the quality of information gathered before a project is accepted or rejected (Barron & Waddell, 2008, p. 768), resulting in better decision-making by the CEO, and improving the likelihood that the project will generate long-term benefits for the firm. On the other hand, however, if too much risk is transferred to the executive, then performance can suffer as the executive might seek to lock-in any gains already made, and forego further risky investments that might be beneficial to the firm for fear of reducing the value of his compensation received through options (Chen & Jermias, 2014; Lam & Chng, 2006; Laux, 2012).

Secondly, the use of stock options provides the firm with more financial flexibility (Chen & Jermias, 2014, p. 118). Stock options, unlike some other forms of compensation, do not require the firms to make an immediate cash payout (Lam & Chng, 2006, p. 254), which allows the firm to pay the CEO when it is in strong position to do so.

Thirdly, because they encourage risk taking and vest at a point in the future, stock options encourage decisions to be made that take the longer-term into account, mitigating an excessive focus on the shorter-term. This is essential for product differentiation firms as their focus on innovation often requires significant investment in R&D (Chen & Jermias, 2014, p. 118), the benefits of which will be realised over time. The delay in cash outflows means the firm has more resources available in the present to invest in R&D or marketing (Chen & Jermias, 2014, p. 118). Indeed, Barron and Waddell (2008, p. 769) find that research-intensive firms typically use stock options over restricted stock in their compensation policies, and Dechow and Sloan (1991) also find that CEOs are less likely to reduce R&D expenditure when they own more stock options.

Cost leadership firms, however, typically gain the most benefit from employing centralised and well-defined control systems, formalised work processes, and simple coordination mechanisms (Chenhall, 2003, p. 150). Such firms will plan their activities well in order to achieve efficient results (Porter, 1980). Because well-defined means-end relationships are more likely, evaluation processes

can be routine and mechanistic (Chen & Jermias, 2014, p. 119), reducing the need to overcome agency problems and encourage risk taking. Therefore, CEO option grants are not expected to be a good fit with this strategy, and cost leadership firms will not derive as much benefit from their use as part of the CEO compensation package.

These two strategies have differing objectives, as well as differing approaches to achieve those objectives. It should thus follow that differing compensation packages would be necessary in order to realise optimal performance. Therefore, our study seeks to determine whether the use of option grants as part of the CEO's compensation differs based on the strategy adopted. Subsequently, the study also hopes to determine whether the firm's strategy impacts the relationship between CEO option grants and firm performance (as examined in H_1). This leads to the following two hypotheses, again stated in their null form:

> **H_2:** There is no relationship between firm strategy and the level of CEO stock option compensation.
>
> **H_3:** There is no relationship between CEO option compensation, firm strategy, and firm performance.

3. Method and Data

3.1. Sample Selection

The initial sample comprises all firms listed in the S&P Compustat database during the period 2006-2013, from which company financial data was collected. Information pertaining to executive compensation was collected from the S&P ExecuComp database.[5] This period was chosen for two reasons: (i) to investigate the effectiveness of CEO stock option grants post-SOX; and (ii) to avoid data incomparability resulting from the change in the reporting of stock options in ExecuComp brought about by FAS 123R in 2006. In order to be included in the sample, firms had to report the following items in the Compustat database: total assets (*at*), total liabilities (*lt*), common shareholders' equity (*ceq*), market value (*mkvalt*), earnings before income and tax (*ebit*), total sales revenues (*sale*), gross profit (*gp*), and R&D expenditure (*xrdp*). Additionally, firms also had to report the following in the ExecuComp database: total compensation (*tdc1*), the value of options exercised during the year (*opt_exer_val*), the fair value of options granted during the year (*option_awards_fv*), the value of

[5] Prior to 2006, stock options had been reported in ExecuComp at their modified Black-Scholes value. From 2006 onwards, FAS 123R requires firms to report equity-based compensation at its estimated fair value, and this is the value that ExecuComp uses.

unexercised exercisable options (*opt_unex_exer_est_val*), and the value of unexercised unexercisable options (*opt_unex_unexer_est_val*), as well as identify the CEO (*pceo* or *ceoann*).

Table 1

Sample selection criteria and sample size

Panel A: Selection of sample	
	Firm Years
Initial sample of firm years	15,732
Less: Firm years with missing data, financial firms, and outliers	11,068
Final sample	4,664

Panel B: Final sample partitioned by strategy	
	Firm Years
Product differentiation strategy	4,100
Cost leadership strategy	564

The initial sample comprised 2,359 firms and 15,732 firm year observations. Firm years were eliminated if they lacked the necessary data, and firm years in which the sum of all option compensation was equal to zero were also excluded. Financial firms were also removed from the sample. The data were then winsorized at the 1st and 99th percentiles to remove extreme outliers. This left the final sample comprising a total of 4,664 firm year observations spanning 867 firms (564 and 4,100 firm year observations for cost leadership and product differentiation firms, respectively).

3.2. Research Design

The hypotheses are tested using cross-sectional OLS linear regression models. Some studies have made use of time-series data to control for firm-specific effects that may influence CEO option grants. Zhou (2001, pp. 564-567), however, argues that stock ownership and stock options vary largely across firms, therefore, if equity compensation affects executives' incentives, their impact on performance would be revealed in a cross-sectional analysis. In addition, Zhou argues that a firm's contractual environment only changes by a small amount over time, and these small changes are unlikely to induce significant changes in executives' incentives. This is also supported by Core and Guay (1999), who find that firms aim to award executives with an optimal level of equity incentives, and subsequent grants of equity-based compensation are used to correct for any deviations from this

optimal level. Therefore, a time-series analysis would be unlikely to capture the full impact on performance that is attributable to the level of option compensation received by the CEO.

Table 2

Definitions of variables

Variables	Measures	Definitions
OPT/S	CEO stock option compensation	CEO stock option compensation, scaled by total sales, where CEO option compensation = (fair value of options granted in the previous year) + (value of options exercised during the year) + (cumulative value of unexercised exercisable options) + (cumulative value of unexercised unexercisable options)
ROA	Firm performance	Return on assets = (EBIT) / (average assets)
STRAT	Firm strategy	Dummy variable to categorise a firm's competitive strategy = 0 if cost leader; and = 1 if product differentiator
R&D/S	R&D intensity	(R&D expenditure) / (total sales)
GP/S	Price premium capability	(Gross profit) / (total sales)
S/TA	Asset utilization efficiency	(total sales) / (total assets)
ln(TA)	Firm size	Natural logarithm of total assets
Debt/TA	Firm risk	(Total liabilities) / (total assets)
M/B	Growth opportunities	(Market value of equity) / (book value of equity)

This table defines all variables used in the study. Scaling CEO option compensation by sales and taking the natural logarithm of total assets allows for greater variation of the variables. The value of options granted in the previous year is included in OPT/S as it unlikely that performance will be impacted as a result of options granted in the current year. The cumulative value of unexercisable in-the-money options is included in OPT/S as they offer potential benefits to CEOs.

Hypothesis 1 is tested using the following model, which investigates the impact of CEO option compensation on firm performance:

$$\mathrm{ROA}_{\mathrm{it}} = \alpha_1 + \alpha_2 \mathrm{OPT/S}_{\mathrm{it}} + \alpha_3 \ln(\mathrm{TA})_{\mathrm{it}} + \alpha_4 \mathrm{Debt/TA}_{\mathrm{it}} + \alpha_5 \mathrm{M/B}_{\mathrm{it}} + \varepsilon$$

(1)

where ROA is the measure of firm performance, taken as the return on average assets for firm *I* in year *t*, OPT/S is the total value of option compensation scales by total sales, ln(TA) is the size of the

firm taken as the log of total assets, Debt/TA is firm's risk represented as the ratio of total liabilities to total sales revenue, and M/B represents the firm's future growth opportunities calculated as the market value of equity over the book value of equity. OPT/S was calculated by summing the following items: the value of options exercised during the year, the fair value of options awarded in the previous year, and the value of unexercised options, both exercisable and unexercisable. Firm size (ln(TA)), risk (Debt/TA), and growth opportunities (M/B) have been included in the model in order to control for the potential effects these variables might have on CEO option compensation (Core et al., 1999; Hanlon et al., 2003). Given the theoretical discussion regarding H_1, the coefficient for OPT/S could be either positive or negative, although it is predicted that the incentive alignment argument will be dominant and thus the coefficient for OPT/S is predicted to be positive and significant.

To investigate the relationship between CEO option compensation, strategy, and firm performance, two regressions were used. First, the variables used to classify the firms' strategies were regressed against the CEO's option compensation in the following equation:

$$\mathrm{OPT/S_{it}} = \alpha_1 + \alpha_2 \mathrm{STRAT} + \alpha_3 \mathrm{R\&D/S_{it}} + \alpha_4 \mathrm{GP/S_{it}} + \alpha_5 \mathrm{S/TA_{it}} + \alpha_6 \ln(\mathrm{TA})_{it} + \alpha_7 \mathrm{Debt/TA_{it}} + \alpha_8 \mathrm{M/B_{it}} + \varepsilon \quad (2)$$

where STRAT is a dummy variable equal to 0 for cost leadership firms or 1 for product differentiation firms, R&D/S is the research and development intensity, GP/S is the price premium capability, and S/TA is the asset utilization efficiency.

Most firms grant some options as part of the CEO's compensation package, and all firms in this sample grant options. However, because product differentiation firms are expected to utilise a greater amount of options in their compensation packages, it is predicted that the coefficients for R&D/S and GP/S will be positive, whilst the coefficient for Debt/TA is predicted to be negative, due to the expectation that cost leadership firms will utilise a lower amount of options in their CEO compensation packages.

As a supplement to the regression, a hierarchical cluster analysis was used in order to classify firms under their respective strategy based on Porter's (1985) framework. Hierarchical cluster analysis was used as it generates non-overlapping clusters, which classify firms that are similar in terms of the strategy adopted (Chenhall & Langfield-Smith, 1998, p. 251; Chen & Jermias, 2014, p. 123). For this reason, Ward's method was chosen as it minimises the statistical variance within clusters, whilst also maximizing the differences between each cluster. The squared Euclidean distance was used to group the variables, whereby the distance between two cases (clusters) is determined by calculating the sum

of the squared differences between the values of the relevant variables. The two cases which have the smallest distance (i.e. the greatest similarity) between them are then combined into a single cluster. This continues until all cases have been merged into a single cluster (Chenhall & Langfield-Smith, 1998, p. 252; Chen & Jermias, 2014, p. 123).

The cluster analysis arranged the firms into clusters based on the variables identified as strong indicators of strategy. Following Chen and Jermias (2014), three classificatory variables were used: R&D intensity (taken as the ratio of research and development expenditure to total sales); price premium capability (taken as the ratio of gross profit to total sales revenue); and asset utilization efficiency (taken as the ratio of total sales to total assets). They argue that these variables represent differing elements of the two strategies in Porter's (1985) framework. Product differentiation firms gain their competitive advantage through innovation and unique characteristics in their product. This innovation requires the firms to invest significant amounts into research and development, which in turn, also enables them to charge higher prices for their products. Therefore, product differentiators are expected to have higher R&D intensity and price premium capability than cost leadership firms. Cost leadership firms, on the other hand, are less focused on innovation and developing uniqueness in their products, and thus are less able to charge a premium on their products. Instead, they will focus on delivering their products efficiently and keeping tight controls over expenses such as research and development. Cost leadership firms are therefore expected to have a higher asset utilization ratio than product differentiation firms.

The second regression used to investigate whether strategy impacts the relationship between firm performance and CEO option grants is as follows. It takes the same form as equation (1), with the addition of the strategic variables utilised in equation (2):

$$\mathrm{ROA}_{it} = \alpha_1 + \alpha_2 \mathrm{OPT/S}_{it} + \alpha_3 \mathrm{STRAT} + \alpha_4 \mathrm{R\&D/S}_{it} + \alpha_5 \mathrm{GP/S}_{it} + \alpha_6 \mathrm{S/TA}_{it} + \alpha_7 \ln(\mathrm{TA})_{it} + \alpha_8 \mathrm{Debt/TA}_{it} + \alpha_9 \mathrm{M/B}_{it} + \varepsilon \quad (3)$$

If a firm's competitive strategy does impact the relationship between performance and CEO option grants, then both a stronger coefficient for OPT/S and a better R^2 are expected.

4. Results and Analysis

4.1. The Impact of CEO Option Compensation on Performance

The descriptive statistics for CEO option compensation are presented in Table 3. The average return on assets for the sampled firms is 11%. The average value of option compensation in any given

year, is $19.01m, which is made up of options awarded during the year ($1.67m), options exercised during the year ($3.3m), exercisable options still unexercised at the end of the year ($11.11m), and unexercisable options held at the end of the year ($2.94m). Although it cannot be a direct comparison as it includes the accumulated value of unexercised options granted in the past, this value is substantial when compared to the total compensation that is granted each year, on average being the equivalent of 336.64% of the current year's total compensation (5.65m), and the current year's option grant alone makes up 29.59% of the current year's total compensation. The variable representing options in Table 2 is the above value of option compensation, scaled by the firm's total sales, and on average is a significant 15.56. The dummy variable representing strategy (0=cost leader, 1=product differentiator) shows, at an average of 0.88, that the vast majority of firms in the sample are product differentiators, rather than cost leaders. Given that many firms were deleted from the sample due to missing data values, it is possible that cost leadership firms were overly discriminated against.[6] However, for the cost leadership firms remaining, this does allow the theoretical assumptions to be tested regarding the effectiveness of these items and their congruence with cost leaders' strategic objectives. Average R&D intensity is 0.08, and the average price premium capability is 0.48. Firm size is measured as total assets, and averages $5.65bn. The variable measuring firm size in Table 2 is the natural log of total assets, averaging 7.37. Risk is the ratio of total liabilities to total assets, and has an average of 45%. Finally, the average of firms' growth opportunities is 3.77, as measured by the ratio of market value of equity to the book value of equity.

Table 3

Descriptive statistics

Variables	Mean	Std. Dev.	p25	Median	p75
ROA	0.11	0.09	0.06	0.10	0.15
OPT/S	15.56	47.65	1.40	4.24	12.86
STRAT	0.88	0.33	1.00	1.00	1.00
R&D/S	0.08	0.14	0.02	0.04	0.12
S/TA	0.90	0.44	0.60	0.81	1.08
GP/S	0.48	0.23	0.32	0.45	0.64
Ln(TA)	7.37	1.57	6.20	7.24	8.42
Debt/TA	0.45	0.21	0.29	0.46	0.60

[6] Following the theoretical development, some of the data items, such as R&D expenditure and the use of option compensation, are more likely to be suited to product differentiation firms and therefore a greater proportion of cost leadership firms may have been deleted by not reporting these items. The actual effect is unknown, however, as firms were only classified into their respective strategies subsequent to the deletion of these data items.

M/B	3.77	12.42	1.68	2.51	3.89

The overall sample comprises 867 firms and 4,664 firm year observations (564 cost leadership firm year observations and 4,100 product differentiation firm year observations). See Table 1 for an explanation of the variables. See Table 5 for descriptive statistics presented according to the competitive strategy pursued.

Table 4 presents the correlation coefficients between the variables used during this analyses. Option compensation and ROA are positively and significantly correlated, as predicted. Interestingly, the correlations exhibited by size and risk on option compensation are negative, suggesting that bigger or riskier firms are less likely to grant options. This could in part be explained by the time period under study—from 2008-2010 was the Global Financial Crisis, during which many firms lost value and faced an environment with increased risk, and there was a large backlash against compensation policies that were deemed to be excessive (Conyon et al., 2011; Feinberg, 2011).

Table 4

Correlations among variables (p-values in parentheses)

Variable	ROA/S	OPT/S	STRAT	R&D/S	S/TA	GP/S	ln(TA)	Debt/TA	M/B
ROA	1								
OPT/S	0.042 (0.011)	1							
STRAT	0.140 (0.000)	0.065 (0.000)	1						
R&D/S	-0.354 (0.000)	0.159 (0.000)	0.164 (0.000)	1					
S/TA	0.231 (0.000)	-0.136 (0.000)	-0.742 (0.000)	-0.319 (0.000)	1				
GP/S	0.252 (0.000)	0.186 (0.000)	0.271 (0.000)	0.078 (0.000)	-0.407 (0.000)	1			
ln(TA)	0.128 (0.000)	-0.201 (0.000)	0.079 (0.000)	-0.155 (0.000)	-0.092 (0.000)	-0.144 (0.000)	1		
Debt/TA	0.008 (0.625)	-0.150 (0.000)	-0.180 (0.000)	-0.178 (0.000)	0.254 (0.000)	-0.305 (0.000)	0.473 (0.000)	1	
M/B	0.103 (0.000)	0.038 (0.022)	-0.035 (0.018)	0.010 (0.495)	0.050 (0.001)	0.032 (0.031)	0.043 (0.003)	0.164 (0.000)	1

The results for the cross-sectional regression of CEO option compensation on performance are presented in Column 2 of Table 7. As predicted in H_1, CEO option compensation is positively and significantly (t=3.64) related to firm performance, suggesting that stock option grants help to alleviate agency problems by providing appropriate incentives to CEOs to improve firm performance. The coefficient is very weak, however, suggesting that option grants are limited in their effectiveness to provide these incentives, and the low R^2 (0.0354) reveals that the value of option compensation is only plays a small part in explaining overall firm performance. Although these results have less explanatory power, they appear to be consistent with prior literature which has found a positive relationship between executive option compensation and firm value (e.g. Hanlon et al., 2003; Lam & Chng, 2006).

4.2. The Impact of Strategy on CEO Option Compensation

Answering calls from prior literature, this study also investigates whether strategy impacts the granting of stock options, and whether this subsequently impacts the effectiveness of stock options in providing incentives to enhance performance.

Table 5

Business strategy derived from hierarchical cluster analysis

Cluster variables	Cluster 1 Product differentiation	Cluster 2 Cost leadership	Statistical differences (t-test)
R&D intensity	0.0933	0.0222	-11.3476***
Price premium capability	0.5006	0.3084	-19.254***
Asset utilization efficiency	0.7733	1.7814	75.582***
Firm year observations	4100	564	

*** Denotes a significance level of 0.001. The figures reported are the means of the variables for each cluster. See Table 1 for explanations of the variables.

The hierarchical cluster analysis revealed two distinct groups based on the variables expected to be strong indicators of firm strategy (i.e. R&D intensity, price premium capability, and asset utilization efficiency). Due to their need to innovate in order to provide unique products to their customers, product differentiation firms are expected to invest more heavily in research and development, and the uniqueness of their product also allows them to charge a higher price. Therefore, product differentiation firms are expected to have higher a R&D intensity and price premium capability than cost leadership firms. Cost leadership firms, on the other hand, are not

required to innovate as extensively, rather they focus on producing their products in an efficient manner in order to offer a lower price to the customer. They are therefore expected to utilise their assets more efficiently and thus have a higher ratio than product differentiation firms in this respect.

Table 6

Descriptive statistics by strategy

Variables	Mean	Std. Dev.	p25	Median	p75
Panel A: Product differentiation strategy					
ROA	0.10	0.09	0.06	0.10	0.15
OPT/S	16.68	50.32	1.57	4.56	13.56
STRAT	1.00	0.00	1.00	1.00	1.00
R&D/S	0.09	0.15	0.02	0.05	0.13
S/TA	0.77	0.26	0.58	0.76	0.96
GP/S	0.50	0.23	0.34	0.48	0.66
Ln(TA)	7.42	1.57	6.24	7.30	8.43
Debt/TA	0.44	0.21	0.27	0.45	0.59
M/B	3.61	12.80	1.67	2.48	3.78
Panel B: Cost leadership strategy					
ROA	0.14	0.12	0.07	0.14	0.19
OPT/S	6.99	13.43	0.57	2.39	7.58
STRAT	0.00	0.00	0.00	0.00	0.00
R&D/S	0.02	0.04	0.00	0.01	0.03
S/TA	1.78	0.49	1.44	1.62	1.96
GP/S	0.31	0.18	0.18	0.28	0.38
Ln(TA)	7.04	1.46	5.95	6.73	8.32
Debt/TA	0.56	0.19	0.41	0.56	0.70
M/B	4.93	9.17	1.70	2.67	5.05

The overall sample comprises 867 firms and 4,664 firm year observations (564 cost leadership firm year observations and 4,100 product differentiation firm year observations). See Table 1 for an explanation of the variables. See Table 2 for descriptive statistics of the pooled entire sample.

In order to determine whether the cluster analysis was accurate in classifying firms into their respective strategies, Chen and Jermias (2014) undertook, a small sample of the firms under investigation, a content analysis of the Management Discussion and Analysis (MD&A) in the annual financial reports. Their analysis led them to believe that the allocation of strategy assigned by the cluster analysis was reasonably accurate (pp. 124-125).

Table 5 presents the average values for the strategic indicators for each of the two clusters. A *t*-test reveals that all three of the variables in the two clusters are statistically different. Cluster 1 has an average R&D intensity of 0.093, which is greater than the 0.022 of Cluster 2 (*t*=-11.35). Similarly, the price premium capability of Cluster 1 is 0.50, which is also greater than the 0.31 in Cluster 2 (*t*=-19.25). However, at 1.78, Cluster 2 has a higher asset utilization efficiency ratio than the 0.77 if Cluster 1 (*t*=75.58). The two clusters identified therefore support the theoretical discussion and show the distinction between the two competitive strategies in Porter's (1980) framework. Thus Cluster 1 was deemed to represent product differentiation firms as it exhibited higher ratios for R&D intensity and price premium capability, and Cluster 2 was deemed to represent cost leadership firms as it exhibited a higher asset utilization efficiency ratio.

As noted above, the sample contains many more product differentiators than cost leaders, seen by product differentiators having 4,100 (88%) firm year observations and cost leaders having just 564 (12%). However, it must still be determined whether these separate strategies influence the option compensation awarded to the CEO of these firms.

The descriptive statistics of the sample are once again presented in Table 6, however Table 6 dissects the statistics according to the competitive strategy pursued by the firm. Panel A presents the statistics for product differentiators, and Panel B presents the statistics for cost leaders. As they make up 88% of the sample, the means presented for product differentiation firms are very similar to the overall sample means presented in Table 3. Cost leadership firms, however, are markedly different, with the average firm size being essentially the only similarity. The most striking difference is in the awarding of stock options to the CEO—product differentiation firms granting an average of 16.68, with a large amount of variation (σ=50.32), contrasted with an average of 6.99 and a standard deviation of 13.43 for cost leadership firms. This would suggest that firms do grant different amounts of options to CEOs dependant on the strategy pursued. Cost leaders have an average ROA of 14%, performing better than product differentiators (10%) throughout the period. Cost leaders also have a greater portion of debt to total assets, suggesting that they have greater risk exposure than product differentiators (0.56, compared to 0.44). Finally, cost leaders have a greater market to book ratio than product differentiators (4.93, compared to 3.61). The differences in composition between firms pursuing one strategy or the other highlight the need to examine the performance implications of the different components of compensation packages for each strategy, rather than taking a universal approach.

The results of the regression of the strategic variables on the value of CEO option compensation (equation 2) are presented in Column 3 of Table 7. As expected, R&D intensity and price

premium capability are positively and significantly related (*t*=5.77 and *t*=6.94, respectively) to the value of CEO option compensation, with strong coefficients (33.53 and 25.80, respectively). Also as predicted, asset utilization efficiency is negatively and significantly related (*t*=-4.20) to value of CEO option compensation, also with a strong coefficient (-12.79). As both of the product differentiation indicators are positively associated with option compensation, and the cost leadership indicator is negatively associated with option compensation, the null of H_2 can therefore be rejected.[7] This shows that product differentiators do grant more options, and suggests that options are a more appropriate compensation mechanism for firms pursuing a product differentiation strategy than a cost leadership strategy.

Firm risk is positively related to option compensation, however the result is insignificant. This seems to contrast with the theory that, in uncertain environments, options are an effective mechanism to create incentives that align CEOs' interests with shareholders', however it is consistent with Lam and Chng's (2006, p. 266) findings. They report both positive and negative relationships between firm risk and option grants over a ten year period, with five of the associations being statistically insignificant.

4.3. The Impact of Strategy and CEO Option Compensation on Performance

Equation 3 combines equations 1 and 2, and examines the impact of both strategy and CEO option compensation on firm performance; the results are presented in Column 4 of Table 7. Again, the relationship between CEO option compensation and firm performance is positive and significant (*t*=6.43). The coefficient of 0.0002 is remains weak, however it is twice the strength of the coefficient reported in equation 1 (0.0001), suggesting that option compensation is more effective at creating incentives for CEOs to enhance firm value when it is granted at levels appropriate to the firm's strategy. R&D intensity is negatively and significantly (*t*=-16.73) related to firm performance. This can possibly be explained by the fact that R&D expenditure reduces EBIT, and the benefits are unlikely to be realised in the current year, but rather at some point in the future.[8] Asset utilization efficiency and price premium capability are both positively and significantly (*t*=18.40 and *t*=25.15, respectively) associated with firm performance. With the exception of R&D intensity, these relationships give support to H_3. The R^2 of 0.325 is significantly higher than the 0.035 and 0.089 reported in equation 1

[7] Additional robustness tests (not reported) were performed, using the number of options granted (the current year's grant, and the total number of options held in the current year were used) as the dependent variable. Results were qualitatively using the cumulative value of all options held and exercised during the year.

[8] The same regression was run using a one year lag of R&D intensity, however the relationship remained negative, suggesting that if R&D expenditure does positively impact performance, the benefits will take, on average, more than one year to be realised.

and equation 2, respectively, indicating that both strategy and the level of option compensation provide a better indication of performance when combined, rather than considered in isolation.

Table 7

Regression results of the analyses of CEO option compensation, firm strategy, and firm performance

	(1)	(2)		(3)		(4)	
Independent Variables	Predicted sign	Model 1: Option compensation on performance		Model 2: Strategic variables on option compensation		Model 3: Option compensation and strategy on firm performance	
		Coeff.	(t-stat)	Coeff.	(t-stat)	Coeff.	(t-stat)
OPT/S	+ +	0.0001	(3.64)***			0.0002	(6.43)***
STRAT	+ ?			-7.2818	(-2.04) **	0.0180	(3.07)***
R&D/S	+ ?			33.5278	(5.77)***	-0.1609	(-16.73)***
S/TA	- ?			-12.7903	(-4.2)***	0.0924	(18.4)***
GP/S	+ ?			25.8021	(6.94)***	0.1549	(25.15)***
Ln(TA)	? + ?	0.0104	(9.33)***	-5.6604	(-9.54)***	0.0159	(16.1)***
Debt/TA	- + -	-0.0381	(-4.48)***	2.2988	(0.5)	-0.0655	(-8.57)***
M/B	? + ?	0.0007	(6.31)***	0.1676	(2.93)***	0.0006	(6.12)***
N		3620		3620		3620	
R-squared		0.0354		0.0890		0.3253	

** and *** denote significance levels of 0.05 and 0.01, respectively. Column 2 presents the results of equation 1. Column 3 reports the results of equation 2. The results of equation 3 are presented in column 4.

The results show that firms can perform well following either strategy. Taken as a whole, the results would tend to support the optimal contracting view executive compensation. Option compensation can be an effective mechanism to incentivise CEOs to improve firm performance under both strategies, however it is important that the strategy is taken into account when determining the value of the option compensation to grant the CEO as this will influence the effectiveness of the options.

5. Conclusion

Our study investigates the relationship between CEO stock option compensation, firm strategy, and firm performance to determine whether stock option grants to the CEO have a positive impact on performance, and to determine if the firm's competitive strategy impacts this relationship.

As a first test, the entire sample is pooled to examine the impact of CEO stock options on firm performance. Consistent with the first hypothesis, the results show a positive relationship between CEO stock option compensation and firm performance.

Prior literature has called for strategy to be considered as a variable that has implications for firm performance (e.g. Balkin & Gomez-Mejia, 1987; Barkema & Gomez-Mejia, 1998; Montemayor, 1996; Chenhall, 2003). Cluster analysis is performed to identify the strategy pursued by the firms using Porter's (1980) cost leadership or product differentiation framework. The second hypothesis predicts that product differentiation firms will grant a larger amount of options to CEOs than cost leadership firms as part of the compensation package. The regression reveals that factors indicative of a product differentiation strategy are positively associated with the level of stock options granted to the CEO, and factors indicative of a cost leadership strategy are negatively associated with the level of stock options granted to the CEO, supporting the hypothesis.

Finally, the null of the third hypothesis was able to be rejected, finding that there was a positive relationship between the strategy adopted by the firm, the level of CEO option compensation, and firm performance. When strategy is included in the analysis, option compensation has twice as much impact on firm performance than when it was considered in isolation. This suggests that option compensation is more effective at creating incentives for CEOs to enhance firm value when it is granted at levels appropriate to the firm's strategy. As the inclusion of strategy and option compensation provide a better indication of performance when combined, rather than when considered in isolation, the results also reinforce the importance of considering additional factors, such as strategy in this case, rather than adopting a universal approach to analysing the data as has been common in prior literature.

Overall, the results suggest that CEO stock option grants are effective under both strategies as a mechanism to create incentives for CEOs to improve firm performance. However, it is important to consider the strategy adopted by the firm, as this has implications for the value of the option compensation to be granted to the CEO, which, in turn, will influence the effectiveness of the options in improving firm performance. The results appear consistent with the optimal contracting view of executive compensation, whereby the use of stock options as part of the CEO's compensation package helps to alleviate agency problems by creating effective incentives for the CEO to align his interests with shareholders' and take actions to improve the value of the firm, rather than make decisions based on self-interest.

However, the results of our study should be interpreted in light of several limitations. Firstly, firms were classified into a strategy based on the ratios of R&D intensity, price premium capability,

and asset utilization efficiency. Although Chen and Jermias (2014) concluded via content analysis that this method of allocation was reasonably accurate, the possibility remains that some firms were misclassified. In future, alternate measures of strategy could be used, such as having managers indicate the strategy pursued via a survey.

Second, our study does not consider the effects of grant-date strike prices of the stock options. A preliminary analysis revealed that 98% of options granted between 2000 and 2005 were awarded at-the-money, however this data was not available for the period under study. Barron and Waddell (2008) commented that other forms of equity compensation, such as grants of restricted stock, can be more effective at aligning executives' interests with shareholders' if options can only be granted at-the-money. Although it may be reasonable to assume that the previous trend of at-the-money option strike prices continued throughout the period under study, this is not a certainty, and the specific effects of at-the-money, in-the-money and/or out-of-the-money option grants were unable to be determined. Future research could investigate the impact of different strike prices on firm performance, as well as consider the impact of other forms of equity compensation at these different strike prices.

Third, as with any study utilizing accounting data, it is assumed that the figures reported provide an unbiased view of the position and performance of the firms in question. To the extent that these figures have been manipulated, for example, by accelerating revenues or expenses, or by changing the accounting policies adopted, the figures used distort the results presented.

Despite these limitations, I believe this study sheds important insights into the use of stock options as part of a CEO's compensation package. It is able to increase the understanding of how options function as a specific component of equity-based compensation, and how they interact with different strategies adopted by a firm. It is consistent with previous research that examines option compensation pre-SOX, providing further evidence towards the argument that CEO stock option grants are not indicative of managerial rent-seeking, but rather supports the incentive alignment view as an effective component of incentive-based compensation.

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