Stockholm School of Economics
Department of Accounting and Financial Management
Bachelor Thesis, December 2022

The Implications of Strategy in Executive Compensation Design

An empirical study on US firms investigating the relationship between executive compensation design, firm performance, and the role of business strategy

Liam Clareus
25044@student.hhs.se

Malcolm Thell
25069@student.hhs.se

Abstract

The aim of this study is to investigate the relationship between executive compensation design and firm performance. With respect to the design of compensation, we consider the percentage share of executives' total remuneration that is attributed to performance-linked compensation (PLC). Furthermore, we examine the impact that business strategy has on the relationship. This is tested by using business strategy as a moderating variable. The regression models employed are quadratic and the dependent variable, firm performance, is proxied by ROA and Tobin's Q. We find that the share of PLC in executive pay contracts is positively associated with ROA but not with Tobin's Q. Business strategy is found to moderate the relationship between PLC and ROA. This is not the case for Tobin's Q, however. Firms are classified, in line with Porter's definition, as either pursuing a differentiation or cost-leadership strategy. Differentiators are found to benefit from high levels of PLC, while cost-leaders benefit from employing pay policies that compensate their executives with a more balanced mix between performance-linked and fixed pay items. The study is conducted on publicly listed firms in the United States from the period 2006-2020. The results of the study contributes to the executive compensation literature with regard to how the appropriate level of PLC in executive pay contracts differs depending on the firm's pursued business strategy.

Tutor: Irina Gazizova

Keywords: Executive compensation design; business strategy; firm performance

Table of contents

1. Introduction

1.1 Background

The relationship between firm performance and executive compensation has long garnered considerable attention from both researchers and the business world. This relationship is of interest since it is a matter of how firm performance and thus shareholder wealth are maximized (Hall & Liebman, 1998; Jensen & Murphy, 1990). The owners of public firms and those with decision-making authority within these companies are separate entities, which creates an intricate relationship between the two parties. Shareholders entrust their businesses and wealth to an executive team, in the process of which they resign their direct influence over operational decisions and their direct access to information (Jensen & Murphy, 1990). The top management team is not required to disclose all information about the firm's day-to-day operations and all the factors relevant to their decisions. Hence, information asymmetry arises in this partnership, which is typically referred to as a principal-agent relationship (Healy & Palepu, 2001).

The possible negative effects that information asymmetry may have on the firm's performance, e.g., through managers engaging in deviating behaviors, will lead the firm's shareholders to implement measures that achieve an alignment of interests between them and their executives (Jensen & Meckling, 1976). While such measures could include monitoring, this often proves too costly and/or not feasible (Berk & DeMarzo, 2020, p. 1033). Instead, compensation systems are advocated as an instrument to have executives act in line with shareholders' interests of maximizing firm performance (Berk & DeMarzo, 2020, p. 1036). Here, the question arises as to how compensation should be designed to accomplish this goal (Hall & Liebman, 1998). A common distinction between types of compensation is between performance-linked compensation (PLC) and non-performance contingent (fixed) compensation. The most commonly used types of PLC are stock options, restricted stock grants, and cash bonuses (Murphy, 1985), while fixed pay normally refers to base salaries. The appropriate amount of PLC in relation to total compensation is a matter of contention in the literature. Two renowned theories in this field of study are the *agency theory* and the *motivation crowding theory.* The two differ in regard to how they view the purpose of compensation and the assumptions and predictions they make about human nature concerning different pay schemes. From their differences, one can infer different ranges of appropriate levels of incentive-based pay to total compensation based on which theory is applied.

Compared to agency theory, motivation crowding theory is generally more in favor of a balanced mix between incentive and non-incentive-based pay (Frey & Jegen, 2001). We do not favor one theory over the other, nor do we explicitly test the theories. Instead, they are used to help describe and derive theoretical inferences from the results of our tests.

Both agency theory and motivation crowding theory recognize the importance of context in determining how executive pay will influence firm performance. With this in mind, we believe that the firm's choice of business strategy might be an important contextual determinant regarding how executive compensation design relates to corporate performance. Our study will use the term business strategy according to Porter's widely-cited definition of generic competitive strategies (Porter, 1980). Two types of strategies will be considered: the differentiation strategy and the cost-leadership strategy. We predict that differentiators benefit from having their executives be paid with more PLC than cost-leaders, following their higher risk profile, among other factors. A more appropriate executive compensation scheme for cost-leaders is on the other hand predicted to be a more balanced mix between PLC and fixed compensation, which coincides with what would be deemed appropriate according to motivation crowding theory's assumptions (Frey & Jegen, 2001). Hence, differentiators are predicted to employ compensation systems more in line with agency theory (Jensen & Meckling, 1976), with their expected greater emphasis on PLC.

1.2 Purpose

The purpose of our paper is to conduct a study on the relationship between executive compensation design and firm performance. Furthermore, we aim to investigate the possible impact that business strategy has on this relationship. This test will be conducted with business strategy as a moderating variable. The study therefore aims to answer the following research question:

> *"What is the relationship between executive compensation design and firm performance, and how is it affected by business strategy?"*

1.3 Contribution

Our study differs from previous research by having the main independent variable of our regressions be the design of executive compensation, as measured by the share of PLC of total compensation, as opposed to focusing on the absolute level of total executive remuneration, which has been the more common approach within the field. We chose to investigate the structure of executive compensation since the matter of appropriately designing executive pay remains overlooked in much of the literature and thus requires further study (Mehran, 1995).

Additionally, we expand on the work of many current executive compensation studies by incorporating the firms' business strategy into our models as a variable of interest for explaining the association between the design of executive pay and firm performance. By considering firms' choice of business strategy, we aim to investigate how different strategies differ in terms of their impact on our association of interest.

Our study is also conducted on recent data, covering the time period from 2006 to 2020, which is after the introduction of the FAS 123R accounting reporting standard that has led to firms recognizing the cost of employee stock and option grants (Hayes et al., 2012). This constitutes an addition to the research literature since the studies of interest for our research generally do not have data more recent than the early 2010s, with the most influential papers relying on data much older than that; these use data from the 1970s to 90s.

1.4 Delimitation

Our study is limited to publicly listed firms in the United States from the period 2006-2020. We set our focus on publicly listed firms since this ensures the availability of the data we need to conduct our research, which would generally not be the case if private companies were considered. There are several factors underlying our choice of the United States as the setting for our study, of which the main two are that the US has a wide availability of high-quality data and that the US is an interesting case study as the largest and most influential global economy.

For the companies included in our data sample, we examine the annual remuneration of these firms' C-level executives, i.e., their CEOs, CFOs, and other top executives. Unlike much of the executive compensation literature, our study is not interested in the absolute level of executives' total compensation but rather the percentage share attributed to PLC of their total remuneration. This means that our study does not consider whether the executives are over-compensated in absolute terms, but instead, the structure of their compensation and its impact on business performance is of interest. Of note is that we do not consider the effects of individual compensation items on firm performance, e.g., how does the share of stock options of total compensation affect business performance?

1.5 Disposition

The remainder of this paper is organized as follows: Section 2 begins with an overview of the current research literature on executive compensation and business strategy, followed by a review of the theoretical framework that underlies our study. In section 3 we present the empirical method of our study, in which the hypotheses of our paper are outlined, along with a description of the variables employed in our models and of our data sample. Section 4 gives a presentation of the data, addresses correlation and multicollinearity, and ends with our analysis of the regression results from testing the hypotheses. We then discuss our findings and consider the potential issue of endogeneity in section 5, followed by a final section that summarizes the results and concludes this paper.

2. Literature and theory

In this section, we present the theoretical framework and relevant research studies that underlie and motivate our study of the impact that business strategy has on the relationship between executive compensation design and firm performance.

2.1 Theories on compensation

A natural starting point for examining the relationship between executive compensation design and firm performance is to look to the predictions of the main theories on how the design of compensation schemes affect individuals' performance. Here, agency theory and motivation crowding theory are two established diverging views that exist on how managerial compensation should be structured to realize the most value in terms of firm performance.

2.1.1 Agency theory

Agency theory highlights that the separation of ownership and decision-making authority, that characterizes publicly traded companies in particular, creates a conflict of interests (Jensen & Meckling, 1976). The relationship in focus is one of an agent and a principal, where the principal has contracted the agent to act on their behalf (Jensen & Meckling, 1976). If unresolved, the misalignment of interests between the agent and the principal will cause the agent to act in accordance with their own interests, to the detriment of the principal (Gormley & Matsa, 2016). The issue presented is referred to as the principal-agent problem (Jensen & Murphy, 1990). To prevent the agent from following through on deviant behaviors, the principal can either directly monitor the agent or adopt incentive schemes that align their interests (Welbourne et al., 1995). The cost of close monitoring of the agent increases when information asymmetry exists between the parties (Lewellen et al., 1987; Mishra et al., 1998), i.e., the agent possesses more information than the principal in regard to matters such as the appropriateness of their decisions. Information asymmetry also increases when tasks have what is referred to as low programmability – that is, the tasks are hard to structure (Welbourne et al., 1995).

In a business context, shareholders are the principals, and the executives of the firm are the agents that have been contracted to further the financial interests of the shareholders. Examples of agency problems in such a context include the executives shirking, empire-building, engaging in fraudulent behavior, and enjoying excessive perquisites (Berk & DeMarzo, 2020, p. 1032). In the presence of information asymmetry where direct monitoring proves costly, agency theory holds that PLC and stock ownership are means of resolving the principal-agent problem by making the executives internalize the costs and benefits of their actions, as they are borne by their shareholders (Berk & DeMarzo, 2020, p. 1032).

The use of any theory in guiding the design of incentive alignment systems requires the theory to address and explain the issue of human behavior within organizations (Martin et al., 2015; Welbourne et al., 1995). Here, agency theory has been criticized for being limited in its applicability following its traditional economic assumptions of humans being rational and utility-maximizing actors (Welbourne et al., 1995).

2.1.2 Motivation crowding theory

More so than agency theory, motivation crowding theory is concerned with what motivation is, how it changes, and how it drives performance. As opposed to agency theory, motivation crowding theory advocates for a more balanced compensation mix between fixed and PLC.

The theory presented by Frey and Jegen (2001) asserts that there are two types of motivation: intrinsic and extrinsic motivation. Intrinsic motivation in relation to performance refers to the motivation to perform for the pure satisfaction of performance, while extrinsic motivation to perform is tied to extrinsic rewards. Individuals are usually driven by a mix of both forms of motivation, but there are scenarios where one type of motivation is the sole driver of performance (Frey & Jegen, 2001).

One element of motivation crowding theory is the concept of crowding out, which means that one’s total level of motivation is lowered because of excessive extrinsic motivation, often resulting from compensation being too heavily linked to performance (Frey & Jegen, 2001). In this process, the increase in extrinsic motivation drives a reduction of intrinsic motivation which decreases total motivation. In the case of executive compensation design, excessive PLC is predicted to result in decreased motivation to perform for executives, which ultimately harms shareholders. Here it is assumed that the executives have some level of intrinsic motivation, which is reduced in the case of excessive compensation. Motivation crowding theory and the concept of crowding out are of importance for investors, both shareholders and debtholders, since executive motivation and incentive design will determine both the risk level and performance of the firm (Frey & Jegen, 2001).

2.2 The pay-performance link

The pay-performance link is a measure of the extent to which a CEO's compensation, or any other employee's pay for that matter, is tied to changes in the performance of their firm (Jensen & Murphy, 1990). One can identify two main issues in regard to the pay-performance link. The first concerns the existence of the link; does a positive correlation between executive pay and firm performance exist? If one finds evidence of such a correlation, the second issue concerns the strength of this link; to what extent is executive pay tied to firm performance?

Previous research has found evidence of executive compensation being positively correlated with corporate performance. One such study was conducted by Zhou (2000) on a sample of Canadian-listed firms. He concluded that "The evidence is consistent with, and largely similar to, the findings of previous studies for other countries, particularly the United States. It is found that … compensation is tied to company performance".

The results of Core et al. (Core et al., 1999) are conflicting in regard to the relationship between CEO compensation and performance. With the performance variable being a measure of return on assets, they find a positive but insignificant correlation. However, with stock return as a proxy for performance, they found that the association between performance and compensation is both significant and positive. Worth noting is that their research suggests that excessive compensation is associated with firm underperformance.

Consistent with agency theory and motivation crowding theory, the previously mentioned studies have found evidence of a positive association between CEO compensation and firm performance. That being said, the result of Core and colleagues (1999) that a change of the performance proxy variable affects the proof of the existence of the pay-performance link raises questions as to the strength of the link and its relationship with stock- versus accounting-based performance measures.

In regard to the strength of the pay-performance link, the research of Jensen and Murphy (1990) is widely cited. They study the effects of CEO remuneration on firm performance by estimating the so-called pay-performance sensitivity – defined as the dollar change in the CEO's compensation for every 1000 dollar change in the wealth of their shareholders. With data on public US firms during the 1970s and 80s, they arrive at an estimate of CEOs' wealth on average changing by 3.25 dollars per 1000 dollar change in shareholder wealth. The pay-performance sensitivity is unsurprisingly found to be the largest for stock options and restricted stock grants, followed by bonuses, and last, salaries (Jensen & Murphy, 1990). Stock options are, for instance, estimated by the authors to be more performance sensitive than salaries by order of ten.

Jensen and Murphy (1990) find that pay-performance sensitivity is positive and significant but of low magnitude. The pay-performance sensitivity is determined to be too low to provide CEOs with incentives that match the economic implications of their actions. Hence value-destroying projects with private benefits for the CEO, e.g., empire-building and pet projects, are not sufficiently discouraged. The results are described by them as puzzling and "inconsistent with the implications of formal agency models of optimal contracting".

An additional finding of the paper (Jensen & Murphy, 1990) is that the bonuses awarded to CEOs exhibit low variability from one year to another, which stands in conflict with the theoretical assertion that bonuses are contingent on performance. Moreover, Jensen and Murphy (1990) show that the annual variability in CEO salary plus bonuses is comparable to that of ordinary employees. Similar to the results regarding the pay-performance sensitivity, these findings are inconsistent with the expectation of corporate management remuneration being heavily performance- and incentive-based.

2.2.1 Institutional arrangements

The previously mentioned studies on the pay-performance link (Jensen & Murphy, 1990; Core et al., 1999; Zhou, 2000) were conducted on data from 1974-1986, 1982-1984, and 1991-1995, respectively. More recent research on the pay-performance link has been carried out by (Chen et al., 2015). Their paper shows that the pay-performance sensitivity has increased significantly following the passing of the Sarbanes-Oxley (SOX) act in 2002. This result holds for both accounting-based and market-based performance measures. The SOX act was enacted as a response to the corporate governance scandals of the early 2000s. The intent of the act was to provide boards and shareholders with more accurate information from corporate management (Berk & DeMarzo, 2020, p. 83). Consistent with the results of the study and the intent of the act, SOX is believed to have strengthened the pay-performance link by improving financial reporting quality and increasing the discipline of corporate executives (Chen et al., 2015).

In the same vein as the research of Chen et al. (2015), Clarkson and colleagues (2011) focus on new legislation by examining the implications of increased executive compensation disclosure requirements on the strength of the pay-performance link. The study is conducted on a sample of 240 publicly listed Australian firms over the period 2001-2009. The researchers find the association between executive pay and performance to be positive and significant only during the latter part of their study (2004-2009). They conclude that increased regulatory oversight does strengthen the pay-performance association.

The findings of Clarkson and colleagues' study (2011) and the paper by Chen et al. (2015) validate the importance of institutional arrangements, like new regulations, on the effectiveness of performance-based executive pay. Their results also shed some doubt as to the validity of the pay-performance link, as they were not able to prove its existence for the entirety of the research period. The non-US setting of the study could however contribute to explaining why this was the case since the institutional environment of the study is of importance due to different corporate governance regulations.

2.3 Business strategy

The pay-performance literature has been expanded on through research examining the effect that a firm's pursued strategy has on the optimal design of executive compensation contracts. The incorporation of strategy as a variable of importance is not a new phenomenon in the research literature on firm performance and its ties to compensation. It is nonetheless overlooked in many of the studies on executive compensation. This has been the case in the research papers brought up and referred to so far, but as these studies have reported weak and contradictory results, we deem it to be of interest to examine the impacts of business strategies as an additional avenue of the literature that may grant further insights into explaining how executive pay influences business performance.

2.3.1 Porter's generic competitive strategies

As Porter (1980) describes it, competitive strategies are offensive or defensive measures taken by firms that create a defendable position within their industry. These actions allow businesses to successfully cope with the five competitive forces of Porter's well-known industry analysis framework, which is expected to yield the firms superior return on investment (Porter, 1980).

Porter (1980) identifies three generic competitive strategies: cost-leadership, differentiation, and focus. These strategies are generic in the sense that they can be pursued and prove effective in many different business situations. While there are three generic competitive strategies, the two fundamental ways of achieving competitive advantage are the cost-leadership strategy and the differentiation strategy (Whittington et al., 2020). This is because firms with a focus strategy will to various degrees also follow either a low-cost or differentiation strategy, with the difference to these more “pure” competitive strategies being a question of scope since the focus strategy is applied to a narrower customer group (see figure 1 in the Appendix).

As the name implies, the cost-leadership strategy involves the firm competing on the premise of having the lowest price in its market. This position is achieved and successfully held through the firm maintaining structurally lower costs than its peers (Whittington et al., 2020). Hence, the strategy requires managers to have tight cost and overhead control while working towards increased operational efficiency and minimizing costs in areas such as sales, marketing, R&D, and services (Porter, 1980). Expending resources on risk-taking activities and experimentation may be detrimental to the effective implementation of a cost-leadership strategy (Dess et al., 1997). Whittington et al. (2020) identify four key drivers behind the cost-leadership strategy: input costs, economies of scale, experience effects, and product/process design.

The differentiation strategy allows the firm to charge its customers a premium price through its offerings being perceived as distinctive from competitors. Inherent to the differentiation strategy is the cultivation of brand equity which results in increased customer loyalty and decreased customer price sensitivity (Porter, 1980). This gives differentiation firms higher margins and pricing power. Besides growing and maintaining a strong brand, firms can achieve meaningful differentiation on the basis of innovation (Whittington et al., 2020). The three primary drivers of differentiation that enable a firm to successfully pursue a differentiation strategy are product and service attributes, customer relationships, and complements (Whittington et al., 2020).

2.3.2 Business strategy in relation to performance and compensation

Chen and Jermias (2014) examine the impact of corporate strategy on the effectiveness of different executive pay policies. As within our study, pay policies are a measure of the extent to which PLC is used in paying executives, and firms are classified as pursuing either a differentiation or cost-leadership strategy. The authors define PLC as the sum of bonuses, stock options, and restricted stock granted during the year. Building upon previous executive compensation research that has made the connection to business strategies, Chen and Jermias (2014) perform their study under the assumptions that: “(i) different strategies require different pay policies; (ii) the relative effectiveness of different pay policies varies across strategies; and (iii) a misalignment of business strategy and compensation policy will negatively affect performance".

The two predict and are able to find evidence that the share of PLC used in executive compensation packages will be and is higher for firms pursuing a differentiation strategy (Chen & Jermias, 2014). Cost-leadership firms on the other hand are found to benefit from making their executives' pay less contingent on performance measures.

Yanadori and Marler (2006) study compensation systems within high-technology firms. They find that a firm's intention to pursue an innovation strategy has a significant influence on the design of the strategic employee groups' compensation. In the context of the study's focus on technologically advanced firms, strategic employee groups refer to employees within the firms' R&D departments. Yanadori and Marler's use of the term business strategies differs from that of Porter's (1980) strategy classification framework of firms either belonging to a differentiation or low-cost strategy. Their measure of whether a firm qualifies as being high-technology is however comparable to Chen and Jermias' (2014) approach to delineating between differentiators and low-cost firms. Yanadori and Marler use R&D intensity, calculated as R&D expenditure over the total number of employees, as a proxy for innovation strategy, while Chen and Jermias use R&D expenditure as a percentage of total sales in their strategy classification procedure. These two measures are comparable as a higher R&D allocation will, ceteris paribus, translate to a higher R&D intensity resulting in an overlap between the differentiation strategy and the innovation strategy.

Furthermore, Yanadori and Marler (2006) study the compensation of R&D employees, while the study of Chen and Jermias (2014) is concerned with executive compensation systems. Their focus on R&D employees comes from these employees' strategic importance in the firm delivering on its pursued strategy. While our study will be exclusively focused on firms' top management teams, the results of Yanadori and Marler's study should nonetheless be of interest since top executives are crucial in the firm realizing its strategy, and hence they should also be considered a strategic employee group.

Yanadori and Marler (2006) find that an innovation strategy has the effect of making R&D employees' compensation have: a higher emphasis on long-term pay (e.g. stock options and restricted stock) relative to short-term pay (e.g. salaries and bonuses); and the effect of increasing the length of stock option vesting periods. An increased portion of long-term pay to short-term pay results in increased compensation risk following the inherent uncertainty of outcomes further in the future (Yanadori & Marler, 2006). Chen and Jermias (2014) predict that PLC will, due to its inherent risky nature, be used by differentiators to attract less risk-averse managers. While Yanadori and Marler do not argue for the benefits of increasing the riskiness of compensation contracts, their finding is consistent with Chen and Jermias' prediction. In general, PLC is not necessarily tied to any specific time horizon, be it long-term or short-term, but its inclusion of stock options and restricted stock grants makes it more long-term oriented than its counterpart: base salary.

2.4 Theoretical framework and hypotheses development

2.4.1 Hypothesis 1 development

The studies presented in the pay-performance link section of our study's literature review validate the existence of a positive but weak link between executive pay and performance.
While most of these studies have been conducted with the dependent variable of their models being the absolute level of executive compensation, studies such as the one by Jensen and Murphy (1990) investigate the pay-performance sensitivity of individual remuneration items. As one would expect, they find that the remuneration items that make up PLC have a higher pay-performance sensitivity than base salaries. Increasing the share of PLC of executives' compensation packages will thus increase their pay-performance sensitivity function, which within the framework of agency theory, will incentivize executives to act in the best interest of the firm's shareholders, working towards maximizing firm performance.

Increasing the pay-performance sensitivity of managers does however come at the cost of burdening them with increased risk, which at high levels of PLC is expected to make them forego risky but NPV-positive projects (Coles et al., 2006). More so than agency theory, motivation crowding theory expects the relationship between executive compensation design and firm performance to be curvilinear (inverted U-shaped). This is because compensation policies that to a large extent tie pay to performance are predicted to be performance inhibitive, following a decrease in the total motivation of the executives.

Consequently, we expect that the relationship between the share of PLC of total compensation and firm performance will be positive but curvilinear since both agency theory and motivation crowding theory predict that excessive levels of PLC will adversely affect performance. Thus, we propose the following directional hypothesis:

H1: There is a positive relationship between executive compensation design, measured as the share of PLC of total compensation, and firm performance.

2.4.2 Hypothesis 2 development

As mentioned, the association between executive pay and firm performance has been found to be weak and researchers within the field of executive compensation have consequently conducted studies that consider the implications of a firm's chosen business strategy. There are reasons to believe that a firm's business strategy, as defined by Porter (1980), will influence the relationship between the share of PLC of total compensation and firm performance. Three main arguments have been identified that underlie our prediction that firms pursuing a differentiation strategy will benefit more so than cost-leadership firms by having their executives be paid with a larger share of PLC of total compensation. Consequently, firms with a low-cost strategy are instead expected to benefit from an increased emphasis on fixed pay. These three lines of reasoning are laid out below:

First, the higher risk inherent with PLC, as opposed to a fixed pay scheme, should attract and retain managers with a higher risk profile, considering that risk-averse managers will seek positions with lower variability pay (Chen & Jermias, 2014). Risk-tolerant managers are better suited to handle the uncertainty and risks of a differentiation strategy (Chen & Jermias, 2014). The differentiation strategy is associated with more risks than the cost-leadership strategy since the means of differentiation that the differentiation strategy involves often require a larger degree of innovation and thus more R&D than is required within the cost-leadership strategy (Dess et al., 1997; Porter, 1980). According to Core and Guay (1999), CEOs that are risk-averse tend to invest less in risky projects. For firms with a differentiation strategy that are run by risk-averse managers, the resulting lack of investments into risky ventures such as R&D projects might ultimately render the firm's competitive edge obsolete. Core and Guay (1999) claim that PLC is a means of making CEOs become less risk-averse. This claim is supported by the findings of Gormley and Matsa (2016), who show that CEOs with less PLC have a higher tendency towards diversifying through acquisitions, stockpiling cash, and reducing risky investments.

However, increasing the risk that the executive has to bear through introducing pay policies within which their pay is heavily linked to the performance of the firm may result in the executive seeking to lower their personal risk by avoiding investments into risky projects (Core & Guay, 1999; Lewellen et al., 1987). The benefits of performance-linked executive pay in regard to investments into R&D may thus not follow a linear relation but rather prove negative after crossing some upper bound of the share of PLC of total compensation.

Second, a performance-linked pay-out policy results in more financial flexibility since managers and employees alike understand that their pay will vary with the financial position of their firm or with the achievement of strategic objectives (Chen & Jermias, 2014). The increased financial flexibility that follows from a compensation arrangement that is not fixed but instead dependent on the state of the firm gives the firm increased leeway in its capital allocation decisions into areas such as R&D and marketing (Chen & Jermias, 2014). This is beneficial for differentiation firms since they are expected to be more reliant on and allocate more resources to R&D and marketing than cost-leadership firms (Porter, 1980, pp. 37-41). E.g., when a differentiating firm is performing poorly, it will be able to increase its marketing expenses with capital that is not tied to a fixed compensation scheme.

Third, managers' tendencies towards opportunistic behaviors in association with risk may be discouraged following a performance-linked pay scheme. Discouraging opportunistic or deviating behaviors is of greater importance within differentiation firms since they are, as identified, generally predicted to be riskier than low-cost firms, and increased risk comes with increased difficulty in assessing the quality of managerial decisions (Mishra et al., 1998). This is because the variability of outcomes from managerial decisions increases with the level of risk associated with the decision in question. Increased uncertainty in regard to the outcome of managers' actions (commonly referred to as performance ambiguity) leads to a greater degree of information asymmetry, and hence the risk of moral hazard on the part of the manager increases (Mishra et al., 1998). E.g., in the presence of risk, it is more difficult for shareholders to identify if a bad outcome was the result of poor managerial decisions or a consequence of factors outside the control of the manager.

Activities such as R&D, which differentiators are more engaged in, are at higher risk of being gamed by managers because of their discretionary, ambiguous, and high variability nature (Cheng, 2004). The literature on managerial opportunism in relation to R&D investments is extensive but conflicting in regard to whether or not opportunism takes the form of an increase or decrease in R&D expenditures (Driver & Guedes, 2017). Research finds that managers may increase R&D investments in order to "enhance their own prestige, power, or incumbency", while decreases in R&D spending may be the result of managers seeking to smooth or adjust the reported earnings of the firm (Driver & Guedes, 2017).

Welbourne et al. (1995) find that PLC systems lead to increased mutual monitoring among agents. Their study is concerned with employees within work groups that are in part being compensated through a gainsharing program. Gainsharing programs are a means of sharing financial gains with all employees of a business unit when that unit meets predetermined performance measures (Welbourne et al., 1995). Our focus on compensation design in terms of the share attributed to PLC of total compensation makes our measure of compensation design concerned with the degree to which it ties the pay of executives to the performance of their firms. In a sense, this makes the measure of compensation design a question of the degree to which individual executives are compensated as part of a gainsharing program. For the top management team, the performance considered is not that of a single business unit but that of the firm's performance as a whole. The result of Welbourne and colleagues' study might thus be transferable to higher hierarchical levels of the organization, and we would thus expect PLC to increase executives' monitoring of one another, making them less inclined to engage in opportunistic behaviors.

PLC policies lend themselves well to the risky and R&D-heavy nature of the differentiation strategy if they result in executives increasingly monitoring one another, in line with the results of Welbourne et al. (1995). However, worth noting is that the opportunistic tendencies of managers in relation to R&D activities, as brought up by Cheng (2004), and Driver and Guedes (2017), may be exacerbated by a PLC system if the system is not sufficient in encouraging managers to take a long time horizon. Driver and Guedes find that CEOs with a greater degree of PLC are more likely to opportunistically decrease the firm's R&D expenditure to increase the firm's earnings if they plan to resign the following year since this will increase their severance package. While this is an example of PLC resulting in destructive short-terministic managerial behaviors, PLC has also been found to encourage managers to take a long-term perspective on the firm's performance (Lewellen et al., 1987; Martin et al., 2015), indicating that the research literature has not arrived at a complete understanding of the association between PLC and manager opportunism. The disparity between research results, that PLC can either be discouraging or leading to myopic opportunism, may be the result of factors such as the length of the vesting periods associated with equity-based pay, and within the choice of performance measures used to determine managers' pay. This has not been explored in the literature, to the best of our knowledge.

The arguments laid out above lead us to formulate our second hypothesis:

H2: Business strategy moderates the relationship between executive compensation design, measured as the share of PLC of total compensation, and firm performance.

3. Methodology

In this section, we begin by describing the design of our research and the variables included in our models, followed by a review of our data sample and how it was constructed.

3.1 Research design

For each of the regressions, we use two proxy variables for firm performance: ROA and Tobin's Q. All regressions are performed with executive compensation design as the independent variable, which is measured as the share of PLC of total compensation. To examine the effects of business strategy on the association between executive compensation design and firm performance, a K-means cluster analysis is conducted to classify firms as either pursuing a differentiation strategy or a cost-leadership strategy. Included in the regression models are a set of control variables: firm size, leverage ratio, business risk, and compensation size. In addition, the model includes year and industry fixed effects to control for year- and industry-specific factors that might otherwise influence our results.

The units of *PLC*, PLC^2, *LEVERAGE*, and *BUSINESSRISK* are expressed as percentages, where their respective estimated coefficients are to be interpreted as the effect that a percentage point change in the variables has on the firm performance proxies.

3.1.1 Hypothesis 1

To test hypothesis 1: *there is a positive relationship between executive compensation design, measured as the share of PLC of total compensation, and firm performance*, we employ two multivariate quadratic regression models: one with ROA as the dependent variable and one with Tobin's Q. Within the framework of motivation crowding theory, the association between the share of PLC of total compensation and firm performance is, as aforementioned in section 2.4.1, expected to be curvilinear, that is, exhibit an inverted U-shape. Agency theory does not predict as strong of a performance-diminishing effect with higher levels of PLC to total compensation. However, those employing the framework generally recognize that transferring more risk onto the agent, through having compensation be more heavily linked to performance, risks making the agent more risk-averse. This might cause them to forego risky but value increasing projects, and thus decrease the firm's performance.

The regression model for testing hypothesis 1 is the following:

Quadratic regression model without strategy

$\text{PERFORM}_{it} = \beta_0 + \beta_1\text{PLC}_{it} + \beta_2\text{PLC}^2_{it} + \beta_3 SIZE_{it} + \beta_4 LEVERAGE_{it} + \beta_5\text{BUSINESSRISK}_{it} + \beta_6\text{LOGCOMP}_{it} + \beta_7 INDUSTRY + \beta_8 YEAR + u_{it}$

Where:

PERFORM: Firm performance, proxied by ROA (in %) and Tobin's Q

PLC[1]: Executive compensation design, measured as performance-linked compensation over total compensation, expressed as a percentage. *PLC* is limited to values between 0%–100%.

STRATEGY: A categorical variable set equal to 0 if the firm pursues a differentiation strategy and 1 if a cost-leadership strategy is pursued.

SIZE: Firm size, measured as the natural logarithm of total assets.

LEVERAGE: Leverage ratio, measured as debt (total interest-bearing liabilities) over equity, expressed as a percentage.

BUSINESSRISK: The standard deviation of percentage changes in operating income, expressed as a percentage.

LOGCOMP: Total compensation, measured as the natural logarithm of the executive's total compensation.

INDUSTRY: Industry fixed effects

YEAR: Year fixed effects

i: Firm

t: Year

3.1.2 Hypothesis 2

In order for us to test hypothesis 2: *business strategy moderates the relationship between executive compensation design, measured as the share of PLC of total compensation, and firm performance*, we again perform two regressions; one for each of the two firm performance proxies, with the difference to the previous two regressions being that we employ strategy as a moderating variable. Here, the regression model is as follows:

[1] PLC expressed in cursive (*PLC*) refers to the independent variable, while PLC, not expressed in cursive, is the abbreviation of performance-linked compensation.

Quadratic regression model with strategy as a moderating variable

$\text{PERFORM}_{it} = \beta_0 + \beta_1\text{PLC}_{it} + \beta_2\text{PLC}^2_{it} + \beta_3\text{STRATEGY} + \beta_4\text{STRATEGY} \times \text{PLC}_{it} + \beta_5\text{STRATEGY} \times \text{PLC}^2_{it} + \beta_6 \mathit{SIZE}_{it} + \beta_7 \mathit{LEVERAGE}_{it} + \beta_8\text{BUSINESSRISK}_{it} + \beta_9\text{LOGCOMP}_{it} + \beta_{10}\mathit{INDUSTRY} + \beta_{11}\mathit{YEAR} + u_{it}$

3.2 Variables

Prior research studies on executive compensation and firm performance is guiding our choice of control variables. The variables used in our regression models are discussed in detail below:

3.2.1 Dependent variables

Firm Performance ("ROA" & "TOBIN'S Q"): We use two proxies for firm performance in our regressions: Tobin's Q*,* measured as the ratio of the firm's market capitalization to the book value of the firm's total assets; and return on assets (ROA), measured as the ratio of EBIT to the book value of the firm's total assets at the end of the previous year.

By having the dependent variable in our tests be proxied by two variables, we address the risk that is present when only one proxy variable is employed, since we in the case of only one proxying variable would not know if our result is dependent on our choice of proxy variable or if the result holds for multiple proxying variables. Hence, we have chosen to examine Tobin's Q and ROA, which additionally allows us to distinguish between accounting-based performance measures by using ROA, and stock-based performance measures through the use of Tobin's Q. Here, the question arises: is one sort of performance measure more sensitive than the other to the design of executive compensation? Additionally, will the association between executive compensation design and firm performance prove significant or insignificant for both types of performance measures, or will only one be deemed significant? While interesting to test if the choice of performance measure has implications for the results of our regressions, there are also benefits and drawbacks to each proxying variable, which makes employing multiple variables appropriate.

Accounting returns are important for determining executive compensation since firms' boards of directors use accounting returns in their assessment of the value added by the CEO (Mehran, 1995). Executives know this and are therefore incentivized to make corporate decisions and report the company's financials in a manner that is beneficial for the accounting-based performance measures employed by the board (Mehran, 1995). Hence, we expect ROA to be a useful proxy for firm performance in regard to the design of executives' compensation.

While accounting-based performance measures can provide useful information in the assessment of an executive's unobservable actions, Jensen and Murphy (1990) argue that tying executives' pay to accounting-based, rather than stock-based, measures of performance will give managers perverse incentives to manipulate the firm's financials and to forego the most valuable projects in favor of projects with large immediate accounting-based returns (Jensen & Murphy, 1990). Executives are agents contracted to act in the best interest of their shareholders, and thus the authors claim that the most appropriate performance measure is one tied to the shareholders' wealth, such as Tobin's Q.

In opposition to this statement, Mehran (1995) highlights that the use of performance measures based on the stock market comes with more "noise" than those based on accounting returns. In the assessment of the quality of executives' decisions, stock-based performance measures will incorporate factors that are outside the control of the executives, which lends credence to the argument that the use of these measures in determining executive compensation borders on being unfair and too blunt an instrument (Mehran, 1995).

3.2.2 Main independent variables

Executive compensation design ("PLC"): Executive compensation design is the dependent variable of our regressions. Unlike much of the executive compensation literature, we are not interested in the absolute level of compensation but instead in the design of executive compensation. The variable is a measure of the percentage share of PLC of total compensation.

PLC is calculated for each executive as the sum of the following annual compensation items: the dollar value of bonuses earned during the fiscal year (BONUS); the dollar value of stock awards granted during the fiscal year under the FAS 123R standard (STOCK_AWARDS); the dollar value of option awards granted during the fiscal year under the FAS 123R standard (OPTION_AWARDS); and the dollar value of all other compensation earned during the fiscal year (OTHCOMP).[2]

Business strategy ("*STRATEGY*"): In order to include business strategy as a variable in our regression models, we first had to classify each firm observation as belonging to either the group of firms pursuing a differentiation strategy or the group of firms with a

[2] The compensation items in the parentheses refer to the names of the variables in the EXECUCOMP database.

cost-leadership strategy; the reason as to why is provided in section 2.3.1. The classification process was conducted through the use of K-means cluster analysis (see Appendix, figure 7), where firms were classified according to their gross margin, R&D allocation, and asset utilization.

Differentiators are expected to have higher gross margins than cost-leaders following their ability to charge customers premium prices (Porter, 1980). In addition, firms following a differentiation strategy are expected to differ from low-cost firms in terms of their heavier investments in R&D activities (Whittington et al., 2020, p. 210). The higher allocation into R&D should enable differentiators to offer innovative products and services, of which the resulting differentiation among peers is what underlies their ability to charge the aforementioned premium prices. In terms of asset utilization efficiency, cost-leadership firms are expected to outperform differentiation firms, following the low-cost firms' focus on increasing the efficiency of their operations through e.g., economies of scale and tight cost control (Porter, 1980).

3.2.3 Control variables

Firm size ("*SIZE*"): There have been many studies conducted on the impact that firm size has on the level of CEO compensation. Research evidence supports a strong positive relationship between firm size and executive pay (Cosh, 1975; Kostiuk, 1990; Murphy, 1985). The allocation theory of control provides the theoretical grounds underlying a positive pay-size relationship. The theory asserts that in a market equilibrium, the most talented executives will control the largest companies since this is where the productivity of their actions will be most magnified and utilized, leading to them providing the most economic value in these positions (Zhou, 2000; Cosh, 1975).

An additional recurring argument in the literature for the positive association between firm size and compensation is that larger firms tend to be more profitable and stable, which increases their ability to compensate their executives (Clarkson et al., 2011).

Firm size is proxied by the natural logarithm of the firm's total assets to address that the distribution of firms' size is skewed (see Appendix, figures 8 and 9).

Business risk ("*BUSINESSRISK*"): Since we are measuring the performance of the companies in our data sample, it is appropriate to control for business risk, as is done in papers performing similar analysis, i.e *Executive compensation structure, ownership, and firm performance* by Mehran (1995). This is because the riskiness of the business will relate to its valuation and profitability, which are directly tied to our firm performance proxy variables.

Leverage ("*LEVERAGE*"): Leverage is a measure of the firm's financial risk level, which has an effect on the firm's performance and should thus be controlled for. E.g., ROA increases with leverage, and the valuation of the firm is impacted by the level of risk shareholders have to bear by owning stock in the company (Berk & DeMarzo, 2020, p.75).

Total compensation ("*LOGCOMP*"): In the literature review section of our paper we saw that many studies have found the relationship between executive remuneration and firm performance to be positive (Clarkson et al., 2011; Core et al., 1999; Zhou, 2000). We hence control for the size of executives' total compensation packages in our tests. Total compensation is the sum of PLC and salary (SALARY), the fixed component of executives' remuneration.

Industry fixed effects ("*INDUSTRY*"): If there are other explanatory variables than those included in the models, the possible issue of omitted variables has been addressed by including industry fixed effects.

There is reason to expect compensation to vary across industries. Inter-industry differences may be the result of the varying difficulty in terms of managing that comes with operating within different environments (Kostiuk, 1990). E.g., more dynamic industries, such as the automotive industry with its transition towards battery electric and autonomous vehicles, will require and demand greater managerial talent than an industry that is more stable. Industries also differ with regard to their capital and labor requirements for the same level of sales, which results in different pay scales (Kostiuk, 1990).

In our regressions, we control for industry fixed effects by classifying firms according to their main industry group based on their standard industry codes (SIC). There are ten such main industry groups that a firm can belong to.

Year fixed effects ("*YEAR*"): Controlling for year fixed effects is common practice within the research literature and we therefore chose to take it into account in our regressions. Additionally, as we saw in the institutional arrangement section of our study's literature review (subsection 2.2.1), research has found that the effectiveness of performance-linked executive pay is impacted by the introduction of new regulations, which makes it sensible to control for trends over time.

3.3 Sample

The data used in this study was gathered from three different datasets which contained: company financial data, company market data, and executive compensation data, of which the two former were extracted from Capital IQ's database COMPUSTAT and the latter from Capital IQ's database EXECUCOMP. Companies were not excluded based on stock listing or size to ensure that there is a sufficient range of variety in our data. The datasets used are based on the entire database available of US firms on COMPUSTAT from the year 2006 to 2020. The starting point for this period was chosen to be 2006 since this was when the FAS 123R financial accounting standard was introduced.

The idea behind FAS 123R was to make firms expense the cost of equity-based employee compensation on their financial statements (Hayes et al., 2012). Before the new standard, equity-based compensation was not expensed since it is not a real monetary expense, but it is however a direct expense to the firm's shareholders (Hayes et al., 2012). Since the standard changed the way in which firms report equity-based compensation, the relevant variables for equity-based pay within the EXECUCOMP database differ depending on if one is interested in the period before or after 2006. To be consistent, we therefore chose to limit our dataset to the period after 2006. We had originally intended to have our data range be from 2000 to 2020.

3.4 Sample selection process

Executive-firm-year observations were excluded from the dataset if the observation did not contain all the data necessary for our analysis. After having merged the three datasets and removed the observations that did not contain data from all three datasets, the initial sample contained 463,637 observations. We then dropped observations if these did not adhere to the following criteria, being required to contain positive data on their: sales, total assets, and market capitalization. Firms with missing equity data were also excluded from our sample. Additionally, executive-firm-year observations were removed from the sample if their share of PLC was not between 0 and 100%.

Firms within the financial, insurance, or real estate industry were also dropped due to these not being comparable to the rest of the dataset, which is in line with other studies (Cosh, 1975). Firms in these industries often have large balance sheets and are not valued on the same basis as firms from other industries (Fama & French, 1992).

After excluding extreme statistical outliers[3] for all of the continuous variables employed in our models, our final sample contained 15,770 executive-firm-year observations. Of note is that our tests are conducted on an unbalanced panel set of data.

Table I. Sample Selection Criteria

Criteria	*Total Observations*
Initial Sample (3 datasets): Number of Executive Firm Year Observations for Publicly Listed Firms in the US between 2000-2020	463 637
Excluding Executive Firm Year Observations:	
Not Included in All Datasets	(-232 812) = 230 825
Missing or Negative Sales data	(-195 254) = 35 571
Missing or Negative Asset data	(-2 592) = 32 979
Missing or Negative Market Capitalization data	(-2 064) = 30 915
from 2005 and Earlier (FAS 123R)	(-7 936) = 22 977
Missing Equity Data	(-969) = 22 008
with PLC Below 0% or Above 100%	(-33) = 21 975
within the Financial, Insurance, or Real Estate Industry	(-1 647) = 20 328
with Extreme Outliers for PLC, Tobin's Q, ROA, BUSINESS RISK, LEVERAGE, LOGCOMP, & SIZE (Q1 or Q3 ± 3 × IQR)	(-4 558) = 15 770
	15 770

[3] An observation is considered to be an extreme statistical outlier if it is either 3 times the interquartile range above the 3rd quartile, or 3 times the interquartile range below the first quartile (Grubbs, 1969).

4. Findings and analysis

This section presents the descriptive statistics of our dataset, examines the correlation between variables, addresses possible issues regarding multicollinearity, and ends with an overview of the results after having tested our two hypotheses.

4.1 Description of data

Table II, which can be seen below, displays the descriptive statistics of our panel dataset. The number of observations in our data sample amounts to 15,770, of which 12,529 (79.45%) observations belong to firms pursuing a differentiation strategy, while the remaining 3,241 observations are of cost-leadership firms.

In regard to the dependent variables of our models, *ROA* and *TOBIN'S Q*, we observe that the mean for all of the firms in our dataset is 9.45% and 1.10, respectively. Cost-leaders are found to have both a higher *ROA* and *TOBIN'S Q* than differentiators.

The percentage share of PLC of the total compensation earned by executives within the firms of our sample is 77.07%, which means that the fixed component of executives' remuneration, their salaries, is 22.93% on average. Agency theory and motivation crowding theory does not provide any concrete numbers with respect to the share of PLC that is deemed appropriate in managerial compensation contracts. This in turn makes it more difficult to interpret the appropriateness of the way the firms of our sample have structured their executives' compensation. Hence, we can not, at this point, say if 77.07% PLC of total compensation is excessive, adequate, or too low.

Taking the firms' pursued business strategy into account, we find that executives within differentiating firms are compensated with a higher share of PLC than the executives of cost-leadership firms, which is in line with our prediction of differentiators benefiting more than cost-leaders from tying the pay of their managers to the performance of the firm. That said, there is a rather small difference between the business strategies, being only 2.22 percentage points.

The average leverage, measured as debt to equity, is 87.41% for the firms of our data sample. Differentiators are found to take on more leverage than cost-leaders, having a leverage ratio of 88.97% versus 81.40%. At 60.83%, the median leverage for all firms is considerably lower than the mean, and the difference between the strategies is lower: 61.36% and 59.19%, respectively. In addition, we observe that the standard deviation is high, approximately 100% for both strategies, indicating a wide variability in the amount of leverage that firms take on. Contrary to the results, we would expect cost-leaders to be able to bear more financial risk due to the nature of their operations being more stable and hence less risky than differentiators, which are predicted to allocate more resources towards high risk areas of their operations like R&D. However, cost-leaders might take on less debt to keep interest expenses down as a result of their tight cost control.

Following the reasoning provided in section 2.3.1 with respect to the different risk levels inherent to each strategy, we would expect the *BUSINESSRISK* of firms with a differentiation strategy to be higher than that of cost-leaders. We do however observe that this is not the case; cost-leaders' mean *BUSINESSRISK* is approximately 40% higher than that of differentiators on average. The same result holds for the median.

In terms of total compensation size, we find that the difference inter-strategy is low. The level of remuneration for executives within differentiating firms is slightly higher, which is likely due to the differentiators of our sample also being slightly larger than the cost-leadership firms, as seen with the firm size control variable. The difference in *SIZE* is however, like with total compensation size, low and arguably negligible.

Table II. Descriptive Statistics

Variables	*N*	*Mean*	*STD*	*P25*	*Median*	*P75*
ROA (Full Sample)	15 770	9.45	6.69	5.22	8.83	12.94
ROA (Cost Leaders)	*3 241*	*10.84*	*7.38*	*6.39*	*10.38*	*14.85*
ROA (Differentiators)	*12 529*	*9.09*	*6.45*	*5.07*	*8.38*	*12.48*
TOBIN'S Q (Full Sample)	15 770	1.10	0.80	0.53	0.87	1.47
TOBIN'S Q (Cost Leaders)	*3 241*	*1.14*	*0.86*	*0.58*	*0.89*	*1.46*
TOBIN'S Q (Differentiators)	*12 529*	*1.09*	*0.78*	*0.52*	*0.86*	*1.47*
PLC (Full Sample)	15 770	77.07	13.07	69.82	79.18	86.68
PLC (Cost Leaders)	*3 241*	*75.31*	*13.90*	*67.72*	*77.48*	*85.21*
PLC (Differentiators)	*12 529*	*77.53*	*12.81*	*70.38*	*79.67*	*86.8*
SIZE (Full Sample)	15 770	10.05	1.09	9.30	10.07	10.78
SIZE (Cost Leaders)	*3 241*	*9.63*	*1.11*	*8.75*	*9.63*	*10.45*
SIZE (Differentiators)	*12 529*	*10.16*	*1.06*	*9.48*	*10.14*	*10.86*
LEVERAGE (Full Sample)	15 770	87.41	101.23	29.19	60.83	121.79
LEVERAGE (Cost Leaders)	*3 241*	*81.40*	*108.5*	*26.70*	*59.19*	*122.35*
LEVERAGE (Differentiators)	*12 529*	*88.97*	*99.20*	*29.85*	*61.36*	*121.79*
BUSINESSRISK (Full Sample)	15 770	7.00	8.94	1.66	3.20	7.95
BUSINESSRISK (Cost Leaders)	*3 241*	*9.14*	*10.99*	*2.02*	*4.05*	*12.53*
BUSINESSRISK (Differentiators)	*12 529*	*6.45*	*8.23*	*1.60*	*2.89*	*7.21*
LOGCOMP (Full Sample)	15 770	8.14	0.86	7.54	8.06	8.70
LOGCOMP (Cost Leaders)	*3 241*	*8.04*	*0.80*	*7.49*	*7.98*	*8.54*
LOGCOMP (Differentiators)	*12 529*	*8.17*	*0.87*	*7.55*	*8.09*	*8.73*

4.2 Correlation and multicollinearity

Table III, shown below, displays a Pearson correlation matrix with the inclusion of the variance inflation factor (VIF) for each of the unique[4] variables in our regressions.

The Pearson correlation coefficient measures the linear correlation between the dependent, independent, and control variables that we employ in our models. The Pearson correlation matrix is a useful tool to get an overview and understanding of how the variables are related, and it further allows us to see if any variables have too high of a correlation with one another, which could be an indicator of multicollinearity (Wooldridge, 2013, p. 95).

The VIF is a measure that quantifies the severity of multicollinearity in regression analyses. Multicollinearity adversely affects the results of regression models and exists when one independent variable in a multivariate regression model can be linearly predicted from the other predictor variables with a high degree of accuracy (Wooldridge, 2013, p. 96).

As expected, we note that both of our dependent variables, *ROA* and *TOBIN'S Q*, are positively correlated with our main independent variable, *PLC*. The *PLC* variable is also considerably more correlated with the *TOBIN'S Q* variable than it is with *ROA*.

Additionally, we observe that total compensation (*LOGCOMP*) is highly correlated with *PLC*. This is to be expected since *PLC* is a direct function of total compensation, being the product of dividing performance-linked pay by total compensation. It is also the case that salaries, the inverse of the *PLC* variable, stay largely fixed over time (Jensen & Murphy, 1990), while performance-linked pay constitutes the variable part of compensation, and hence increases in total compensation will be highly correlated with increases in the share of PLC of total compensation.

In the correlation matrix we have chosen to exclude the variables that are a direct function of another variable that is already represented in the matrix. Hence, the PLC^2 variable and the two interaction terms: $STRATEGY \times PLC$ and $STRATEGY \times PLC^2$ are not displayed in Table III. These three variables would be highly correlated with the variables they are a function of and their VIF would consequently be abnormally high for both variables, which would wrongfully indicate that an issue of multicollinearity exists within our choice of variables. As such, their inclusion in the matrix would be nonsensible.

[4] PLC^2 and the interaction terms are not regarded as unique since they are the product of other explanatory variables. They are hence not included in Table III.

For all the variables in Table III, we observe no VIF that exceeds the generally accepted rule-of-thumb threshold of 10 (Wooldridge, 2013, p. 98), indicating that multicollinearity is not a concern for our regression models.

Table III. Pearson Correlation Matrix and VIF's

	1	2	3	4	5	6	7	8	VIF
ROA	1.0000								
TOBIN'S Q	0.5773	1.0000							
PLC	0.1255	0.1729	1.0000						2.52
STRATEGY	0.1055	0.0274	-0.0688	1.0000					1.74
SIZE	0.0740	-0.0305	0.3121	-0.1966	1.0000				1.56
LEVERAGE	0.0079	-0.0182	0.0284	-0.0302	-0.0462	1.0000			1.06
BUSINESSRISK	-0.2821	-0.1706	0.0045	0.1220	-0.1807	-0.0476	1.0000		1.38
LOGCOMP	0.1609	0.1794	0.7671	-0.0626	0.4569	0.0222	-0.0694	1.0000	2.86

4.3 Hypothesis 1: results and analysis

We use the regression model specified in subsection 3.1.1 to test our first hypothesis; *there is a positive relationship between executive compensation design, measured as the share of PLC of total compensation, and firm performance*. In the table below, Table IV, one can observe that two quadratic multivariate regressions have been conducted, one with *ROA* and one with *TOBIN'S Q*. Both of these regressions, as well as the regressions employed to test hypothesis 2, have been conducted with robust standard errors[5].

Observing the regression with *ROA* as the dependent variable, we note that our main independent variables, *PLC* and PLC^2, are both significant at a significance level of less than 1%. We find the coefficient of *PLC* to be positively related to *ROA*, while we observe that the coefficient of PLC^2 is slightly negative. This indicates that the association between the share of PLC employed in executive compensation contracts and firm performance, as measured by *ROA*, exhibits a curvilinear relationship. The *PLC* independent variable is positively linearly correlated with the firm performance proxy, *ROA*. Here, a percentage point increase in the share of PLC of the total compensation of an executive leads to an increase of approximately 0.13 percentage points in the *ROA* of that executive's firm. The relationship between *ROA* and our other main independent variable, PLC^2, is quadratic and negative, which makes

[5] To examine if there is heteroscedasticity in our data, we performed the Breusch-Pagan test, and we were not able to reject the null hypothesis of the test for any of the regressions. Thus we used robust standard errors to address the issue of heteroscedasticity in our data (Wooldridge, 2013, p. 277).

increases in *PLC* have a negative impact on *ROA* that increases with scale. Hence, *PLC^2* somewhat counteracts the positive effect that increasing *PLC* has on *ROA*.

Since we find that the two main independent variables of our regression, considered together, are positively correlated[6], albeit curvilinearly (inverted U-shaped) rather than linearly, with *ROA*, we find support for and accept our first hypothesis at a significance level of below 1% when *ROA* is employed as the firm performance proxy.

Using *TOBIN'S Q* as the proxy for firm performance, we observe that both *PLC* and *PLC^2* are once again significant at a significance level below 1%. The direction of the two independent variables' coefficients is however reversed as compared to the regression conducted with *ROA* as the dependent variable. This indicates that the association between our two main independent variables and *TOBIN'S Q* exhibits a U-shaped relationship.

Plotting the curve for *TOBIN'S Q* with the control variables excluded yields some puzzling results. One finds that the curve is below 0 on the y-axis (being *TOBIN'S Q*) for all values of *PLC*, indicating that any share of PLC in executive compensation contracts will have a negative effect on the valuation of the firm. The minimum point on this plot is at a *PLC* of approximately 52%, and as such, increasing *PLC* has a positive impact on *TOBIN'S Q* after this point. With this said, we conclude that the use of *TOBIN'S Q* as the dependent variable leads us to not be able to reject the null hypothesis for our study's first hypothesis.

For both regressions, all control variables were significant at a significance level of 1%, with the only exception being the *LEVERAGE* variable for the *ROA* regression. The R^2 and adjusted R^2 are quite similar for both regressions: 17.63% and 17.49% respectively for the *ROA* regression, and 20.91% and 20.77% respectively when *TOBIN'S Q* is used as the firm performance proxy. The R^2 and adjusted R^2 values can be interpreted as being quite low, but such an assessment does not consider that one would not expect the compensation design of executives, and the models' accompanying control variables, to fully explain the variation in performance across firms. Hence, we deem the somewhat low R^2 and adjusted R^2 values to be a nonissue.

[6] As can be seen in table IV, the sum of *PLC* and *PLC^2* is positive, given that *PLC* can not be less than 0%, nor more than 100%. As such, increasing *PLC* to any level above 0 is positively related to *ROA*.

Table IV. Regression, Hypothesis 1

Dependent Variable	*ROA*	*Tobin's Q*
PLC	0.1293524***	-0.0155531***
	(4.78)	(-4.49)
PLC^2	-0.0008734***	0.0001485***
	(-4.37)	(5.78)
LOGCOMP	0.9405654***	0.0776497***
	(8.73)	(5.78)
SIZE	0.2777504***	-0.0429131***
	(4.72)	(-5.90)
LEVERAGE	-0.0008573	-0.0006155***
	(-1.43)	(-8.46)
BUSINESSRISK	-0.1986227***	-0.0188937***
	(-27.71)	(-19.84)
Constant	-2.182402	2.483617***
	(-1.49)	(13.57)
N	15 770	15 770
R^2	0.1763	0.2091
Adjusted R^2	0.1749	0.2077

Notes: Below the coefficients, t-values are presented in parentheses, which display the significance of the coefficients at a significance level of either 0.1(*), 0.05(**), or 0.01(***).

4.4 Hypothesis 2: results and analysis

Employing the regression model that was specified in 3.1.2, we test if the relationship between the share of PLC of total compensation and firm performance is moderated by business strategy – measured through *ROA* and *TOBIN'S Q*. The output of our tests in regard to hypothesis 2 is presented below in Table V.

Starting off by observing the output of the *ROA* regression, we note that both *PLC* and PLC^2 are positive but no longer significant, as opposed to the results in section 4.3. The *STRATEGY* variable and the two interaction terms: the one between *STRATEGY* and *PLC* and the other between *STRATEGY* and PLC^2 are all significant at a significance level below 1%. When applied technically, moderation is measured as the interactive effect between the independent variable and the moderating variable which is regressed on the dependent variable. The fact that both interaction terms are significant therefore indicates that the relationship between the dependent variable, *ROA*, and the main independent variables, *PLC* and PLC^2, is contingent upon another variable: *STRATEGY*. Consequently, *STRATEGY* moderates our association of interest, which means that the relationship we test for differs depending on the value of our moderating variable, i.e., which business strategy a given firm has been classified to be pursuing.

The coefficient of the *STRATEGY* variable is negative at –11.59, which is to be interpreted as firms with a cost-leadership strategy having a *ROA* of 11,59 percentage points less on average than differentiators at a *PLC* of 0%. This is because the *STRATEGY* variable is set equal to 1 if the firm pursues a cost-leadership strategy and 0 if a differentiation strategy is pursued.

The coefficient of the interaction term *STRATEGY* × *PLC* is positive, while the second interaction term *STRATEGY* × PLC^2 is negative. These coefficients indicate a curvilinear relationship between firm performance and the main independent variables, given that the firm pursues a cost-leadership strategy. Since firms with a differentiation strategy set the value of *STRATEGY* and thus the two interaction terms to 0, while the coefficients for both *PLC* and PLC^2 are positive, the relationship between *PLC* and *ROA* exhibits a positive exponential relation. Therefore, the effects of increasing or decreasing the share of PLC in executive compensation contracts are more pronounced in terms of firm performance in low-cost firms. In other words, the performance of firms with a low-cost strategy is more sensitive to the design of executive compensation as it, unlike for differentiators, risks being adversely affected by further increases at already high levels of *PLC*.

As highlighted, when the moderating effect of *STRATEGY* is considered, both the interaction terms are found to be significant, while the two main independent variables turn insignificant. This consequently lends support to our second hypothesis, which we are therefore able to accept when having firm performance be proxied by *ROA*.

Turning to the second regression with *TOBIN'S Q* as the firm performance proxy, we observe a multitude of differences as compared to the previous regression with *ROA* as the dependent variable. First, *PLC* and PLC^2 are both significant, and the direction of their coefficient estimates are found to be the same as in the regression testing hypothesis 1 using *TOBIN'S Q*.

Second, the *STRATEGY* variable and both of the interaction terms are deemed to be insignificant. A point of similarity between the two regressions is however the direction of the *STRATEGY* variable and the interaction terms. The fact that *PLC* and PLC^2 remain significant when testing for moderation, and that both the *STRATEGY* variable and the two interaction terms are insignificant, underlies the assessment that the association between *PLC* and *TOBIN'S Q* can not be said to be moderated by *STRATEGY*. That said, we conclude that the null hypothesis accompanying our second hypothesis can not be rejected when *TOBIN'S Q* is used as a firm performance measure.

All of the control variables for both regression models are found to be significant at a 1% significance level. The R^2 and adjusted R^2 values for the regression are once again similar, more so than before: being 19.04% and 18.88% respectively for the *ROA* model, and 20.94% and 20.79% respectively for the *TOBIN'S Q* model. These results can be compared with the R^2 and adjusted R^2 values of the models testing hypothesis 1. Doing so, we find that the R^2 and adjusted R^2 value for the hypothesis 2 *ROA* regression is higher than that of the hypothesis 1 *ROA* regression, which means that more of the variance in the data is explained when *STRATEGY* is considered. The difference between the two *TOBIN'S Q* regressions is on the contrary negligible, which makes sense in the light of us not being able to find support for our second hypothesis with *TOBIN'S Q* included in the model.

Considering both the R^2 and the adjusted R^2, we can observe that they are on a similar level across the four regressions, spanning from 17.63% and 17.44% to 20.94% and 20.79%, respectively. An R^2 and adjusted R^2 at a level hovering around 20% should be considered sufficiently high for these regressions since it shows an acceptable level of explanatory power. It would be rather extraordinary if the *PLC* were to explain most of the variation in firms' performance.

Table V. Regression, Hypothesis 2

Dependent Variable	*ROA*	*Tobin's Q*
PLC	0.0024319	-0.0183819***
	(0.08)	(-5.05)
PLC^2	0.0000902	0.0001652***
	(0.42)	(6.29)
STRATEGY	-11.59007***	-0.4088407
	(-4.61)	(-1.28)
STRATEGY × PLC	0.4229369***	0.0098002
	(5.92)	(1.05)
STRATEGY × PLC^2	-0.0030762***	-0.0000575
	(-6.08)	(-0.85)
LOGCOMP	0.7940014***	0.0779941***
	(7.36)	(5.87)
SIZE	0.3539997***	-0.0430885***
	(6.05)	(-5.96)
LEVERAGE	-0.0004728***	-0.0006218***
	(-0.80)	(-8.45)
BUSINESSRISK	-0.2156856***	-0.018833***
	(-29.76)	(-19.32)
Constant	2.151018	2.600114***
	(1.41)	(13.82)
N	15 770	15 770
R^2	0.1904	0.2094
Adjusted R^2	0.1888	0.2079

Notes: Below the coefficients, t-values are presented in parentheses, which display the significance of the coefficients at a significance level of either 0.1(*), 0.05(**), or 0.01(***).

5. Discussion

In this section, we discuss our findings and address the possible issue of endogeneity within our study.

5.1 Discussion of findings

After having conducted our tests and analyzed the results of the regressions, we find that there is a discrepancy in the results between which variable of *ROA* and *TOBIN'S Q* that is employed as the firm performance proxy.

With *ROA* as the dependent variable, our findings are in line with the expectations we had formed from our literature review and theoretical framework; we were able to find support for both hypothesis 1 and 2. The share of PLC in compensation contracts is found to be positively related to firm performance, and the relationship is moreover observed to be curvilinear. This is when business strategy is disregarded. With respect to hypothesis 2, the firm's pursued business strategy is found to moderate the relationship between *PLC* and firm performance.

For firms with a cost-leadership strategy, the relationship is curvilinear, indicating that a balanced mix between PLC and non-performance contingent pay is associated with higher performance for these types of firms. As such, a remuneration scheme that strikes such a balance is preferable, which was in line with what we were expecting.

Differentiators on the other hand are found to benefit from increasing the share of PLC in executive compensation contracts with no observable drawback in terms of performance for higher levels of *PLC*. We had expected PLC to be more beneficial for differentiators than cost-leaders, and this is reflected in our findings. We did not however expect the relation to exhibit increasing returns to scale with no performance-diminishing effect of *PLC* since both agency and motivation crowding theory imply that such an effect should be present at excessive levels.

When investigating the relationship between executive compensation design and firm performance as measured by *TOBIN'S Q*, we are not able to find support for either of our two hypotheses. When testing for hypothesis 1, we observed that both *PLC* and PLC^2 were found to be significant but not positively related to *TOBIN'S Q*. Instead, the results suggested the opposite to be true; that increasing the share of PLC of total compensation will at no value of *PLC* be beneficial for the firm's *TOBIN'S Q*.

Shifting the focus to our second hypothesis, we observed that, contrary to the test conducted with *ROA* as the dependent variable, none of the variables related to strategy are significantly different from zero when their relation to *TOBIN'S Q* is examined. Hence, the firm's choice of pursued business strategy is not found to be a determinant of any significance to that firm's *TOBIN'S Q*. I.e., business strategy does not have a moderating effect on the relationship between executive compensation design, as measured by the share of PLC used in constructing compensation contracts, and *TOBIN'S Q*.

With our test findings summarized, the question still remains as to why *ROA* and *TOBIN'S Q* are different with regard to the results we get when examining our association of interest. To begin answering this question, we must consider the differences between the measures themselves.

ROA is an internal measure of the firm's performance; it is entirely objective with respect to giving a numerical recount of what has transpired within the firm in the last year with regard to the output the firm has generated from its assets. While ideally being contingent on the firm's fundamentals, that is, their internal performance measures, *TOBIN'S Q* is as a measure ultimately determined by an external dimension; shareholders' expectations in regard to the firm's future performance (Berk & DeMarzo, 2020, p. 328).

As is familiar, the variable used to predict our firm performance proxies is the way in which the firm's executives' compensation has been designed. As such, our study has not been concerned with the level of executive remuneration but instead its structure in terms of performance-linked versus fixed compensation items. The level of executive compensation is a matter that we would expect the firm's shareholders to take into account when valuing any given firm since this is a direct cost to them as the firm's residual claimants. The design of executive compensation contracts might however be deemed too much of a minute and internal business matter of the firm to be taken into account by shareholders of the firm in their investing decisions. This line of reasoning might explain why we did not find support for either one of our two hypotheses when using *TOBIN'S Q* as the firm performance proxy.

5.2 Issues related to endogeneity

If the results of regression models are to be informative, the assumption that the independent predictor variables are exogenous and not endogenous must hold true. Otherwise, the coefficient estimates of the independent variables of our models risk being under- or overestimated, and hence decisions made based on the results of the test will be made on faulty premises (Wooldridge, 2013, p. 255).

An independent variable is said to be exogenous if it is not driven by other factors; be it observable or unobservable (Wooldridge, 2013, p. 87). Technically, endogeneity becomes an issue in the model when one of the independent variables of the regression is correlated with the error term (Wooldridge, 2013, p. 87). The issue can arise from several causes, the most common of which are omitted variable bias and simultaneity bias (Wooldridge, 2013, pp. 88-89).

Omitted variable bias occurs when one or more important explanatory variables have been left out of the model, thus resulting in the estimation coefficients of the independent variables being biased since they end up explaining the effect of the omitted variable(s) (Wooldridge, 2013, pp. 88-99). E.g. the variable Z has not been included in the model, but since it is related to the dependent variable Y and is also related to one of the predictor variables, X, it will bias the coefficient estimate of X and thus degrade the informative power of the model.

In the context of our study, we speculate that characteristics of the firm's board of directors (BOD) might be a variable of importance that might have been wrongfully omitted from the regression models. The characteristics of the BOD that we are interested in for the purpose of this potential issue of endogeneity is the extent to which they have been captured[7] by the firm's top management team; that is, the level of corporate governance in the firm. If the BOD can be said to have been captured, we would expect their management oversight to be compromised and hence the level or quality of corporate governance in the firm to be decreased. The BOD characteristics variable will be related to our outcome variable through the well-studied relationship between corporate governance and firm performance (Vafeas, 2003).

We also find it plausible that the BOD characteristics variable might be related to our main independent predictor variables, *PLC* and PLC^2, in two ways. On the one hand, the performance measures that executives have to meet in order to receive their compensation might be less demanding if the professional relationship between the BOD and the top management team is compromised (Core et al., 1999). On the other hand, the design of the executives' compensation contracts might be different when the BOD is captured. One could expect that the design of the payment policies will be altered to favor the preferences of the

[7] A board of directors is considered to be captured, when their "monitoring duties have been compromised by connections or perceived loyalties to management" (Berk & DeMarzo, 2020, p. 1034).

executives. With these two aspects in mind, it seems possible that the interaction between executive compensation design and firm performance would be different depending on the characteristics of the BOD that we have considered.

The second possible cause of endogeneity we consider is simultaneity bias, which occurs when the dependent variable is not simply a response to the independent variable but also a predictor of it (Wooldridge, 2013, pp. 558-559). As such, we have to consider if firm performance influences the share of PLC in executive compensation contracts. One could argue that executives will be compensated more generously when their firm is high performing and that they would receive less remuneration as a response to poor performance of the firm (Hall & Liebman, 1998). Our study is however as mentioned, not concerned with the level of executive pay as the focus instead lies on its composition between performance-linked and fixed pay items.

If one accepts that good performance leads to larger compensation packages, the question then becomes: will increases in compensation come primarily from increases in PLC or in their salary? We would expect that it would not be uncommon for executives to be rewarded for good performance through stock and option grants or with bonuses (PLC) (Rappaport, 1999), which suggests that an issue of simultaneity could exist. However, we are also not opposed to the idea that poor firm performance would at times be met with executives being paid with more PLC in order to be enticed to turn the story around (Kostiuk, 1990).

As seen from the reasoning above, we do not expect firm performance to have a clear influence on executive compensation design in any one direction, but we are open to the notion that our study might have an endogeneity issue caused by simultaneity bias. We deem the case for simultaneity bias being a problem in our models to be stronger than the case laid out in regard to omitted variable bias influencing our results.

To conclude, the potential for endogeneity in our tests exists and should be kept in mind when considering the results of the models. However, testing and providing remedies for these potential issues is outside the scope of this study.

6. Conclusions

The aim of this study is to investigate the relationship between executive compensation design, as measured by the share of PLC of total compensation, and firm performance. Additionally, we examine if, and if so how, this relationship is moderated by business strategy. This study was conducted on US-listed firms with data from 2006 to 2020, and we used one accounting-based measure (*ROA*) and one market-based measure (*TOBIN'S Q*) as the proxies for firm performance.

When having firm performance be proxied by *ROA*, we find that the share of PLC in executive compensation contracts and firm performance are positively associated with a curvilinear (inverted U-shaped) relationship. The result does not hold when *TOBIN'S Q* is employed as the firm performance proxy. Instead, the share of PLC of total compensation is found to be negatively associated with a convex relationship to the firm's *TOBIN'S Q*.

When introducing the firm's business strategy as a variable of interest for the association between executive compensation design and firm performance, our results are once again different depending on which firm performance proxy is used. With *ROA* as the dependent variable, we find support for business strategy moderating the relationship, and as predicted cost-leaders benefit from compensating executives with less PLC than differentiators. Regressing the variables on *TOBIN'S Q*, we are not able to find support for the moderation effect of business strategy on our association of interest.

With the considerable differences between the two dependent variables in mind, we speculate that the reason why the results with *TOBIN'S Q* differ from those with *ROA* as the proxy for performance is that the design of executive compensation contracts is not a factor considered by financial market actors when valuing the firm.

Of note is that we acknowledge the possibility of endogeneity being an issue within our data, and we therefore advocate that some caution be taken when drawing strict inferences from our research results.

To conclude, the evidence presented in this paper suggests that the design of executive compensation packages has implications on the accounting-based performance of firms, and moreover, these implications depend on the pursued business strategy of the firm.

6.1 Limitations of our study and suggestions for future research

As aforementioned in the previous section, the tests of our study were conducted on a sample of publicly listed US firms, which makes the conclusions one can draw from this paper's test results neither necessarily applicable to private corporations nor in other national settings. Hence, we encourage researchers in the executive compensation field, that have greater resources at their disposal, to widen the scope of our study by testing our research question in other geographies and with private firms.

Other suggestions for future research include taking a more nuanced view of the different types of business strategies a firm can pursue, as we, in our study, only classified firms according to one of two possible strategies while we recognize that other strategies exist. This could be done by using more sophisticated classification methods than conducting a cluster analysis on only three measures of the firms' characteristics.

In regard to the choice of dependent variables, we see an additional opportunity to expand our research. Future studies could employ other accounting-based performance measures such as ROE, ROCE, and ROIC to improve the understanding of the relationship and its implications for compensation design. Lastly, it would be of interest to further examine why there is a discrepancy between the results when using market- versus accounting-based performance proxies.

7. References

Berk, J., & DeMarzo, P. (2020). Corporate Finance, 5th Global Edition

Chen, H., Jeter, D., & Yang, Y. (2015). Pay-performance sensitivity before and after SOX. Journal of Accounting and Public Policy, 34(1), 52-73. 10.1016/j.jaccpubpol.2014.09.003

Chen, Y., & Jermias, J. (2014). Business strategy, executive compensation and firm performance. Accounting and Finance, 54(1), 113-134. 10.1111/j.1467-629X.2012.00498.x

Cheng, S. (2004). R&D Expenditures and CEO Compensation. The Accounting Review, 79(2), 305-328. http://www.jstor.org/stable/3203246

Clarkson, P. M., Walker, J., & Nicholls, S. (2011). Disclosure, shareholder oversight and the pay–performance link. Journal of Contemporary Accounting & Economics, 7(2), 47-64. https://doi.org/10.1016/j.jcae.2011.07.001

Coles, J. L., Daniel, N. D., & Naveen, L. (2006). Managerial incentives and risk-taking. Journal of Financial Economics, 79(2), 431-468. 10.1016/j.jfineco.2004.09.004

Core, J. E., Holthausen, R. W., & Larcker, D. F. (1999). Corporate governance, chief executive officer compensation, and firm performance. Journal of Financial Economics, 51(3), 371-406. https://www.sciencedirect.com/science/article/pii/S0304405X98000580

Core, J., & Guay, W. (1999). The use of equity grants to manage optimal equity incentive levels. Journal of Accounting & Economics, 28(2), 151-184. 10.1016/S0165-4101(99)00019-1

Cosh, A. (1975). The Remuneration of Chief Executives in the United Kingdom. The Economic Journal, 85(337), 75-94. 10.2307/2230529

Dess, G. G., Lumpkin, G. T., & Covin, J. G. (1997). Entrepreneurial Strategy Making and Firm Performance: Tests of Contingency and Configurational Models. Strategic Management Journal, 18(9), 677-695. http://www.jstor.org/stable/3088133

Driver, C., & Guedes, M. J. C. (2017). R&D and CEO departure date: do financial incentives *make CEOs more opportunistic? Industrial and Corporate Change, 26(5), 801-820. 10.1093/icc/dtx009*

Fama, E. F., & French, K. R. (1992). The Cross-Section of Expected Stock Returns. The Journal of Finance, 47(2), 427-465. 10.1111/j.1540-6261.1992.tb04398.x

Frey, B. S., & Jegen, R. (2001). Motivation crowding theory. Journal of Economic Surveys, 15(5), 589-611. 10.1111/1467-6419.00150

Gormley, T. A., & Matsa, D. A. (2016). Playing it safe? Managerial preferences, risk, and agency conflicts. Journal of Financial Economics, 122(3), 431-455. 10.1016/j.jfineco.2016.08.002

Grubbs, F. E. (1969). Procedures for Detecting Outlying Observations in Samples. Technometrics, 11(1), 1-21. 10.2307/1266761

Hall, B. J., & Liebman, J. B. (1998). Are CEOS Really Paid Like Bureaucrats? The Quarterly Journal of Economics, 113(3), 653-691. http://www.jstor.org/stable/2586870

Hayes, R. M., Lemmon, M., & Qiu, M. (2012). Stock options and managerial incentives for risk taking: Evidence from FAS 123R. Journal of Financial Economics, 105(1), 174-190. 10.1016/j.jfineco.2012.01.004

Healy, P. M., & Palepu, K. G. (2001). Information asymmetry, corporate disclosure, and the capital markets: A review of the empirical disclosure literature. Journal of Accounting and Economics, 31(1), 405-440. 10.1016/S0165-4101(01)00018-0

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs and ownership structure. Journal of Financial Economics, 3(4), 305-360. https://doi.org/10.1016/0304-405X(76)90026-X

Jensen, M. C., & Murphy, K. J. (1990). Performance Pay and Top-Management Incentives. Journal of Political Economy, 98(2), 225-264. http://www.jstor.org/stable/2937665

Kostiuk, P. F. (1990). Firm Size and Executive Compensation. The Journal of Human

Resources, 25(1), 90-105. 10.2307/145728

Lewellen, W., Loderer, C., & Martin, K. (1987). Executive compensation and executive incentive problems: An empirical analysis. Journal of Accounting and Economics, 9(3), 287-310. 10.1016/0165-4101(87)90009-7

Martin, G. P., Wiseman, R. M., & Gomez-Mejia, L. R. (2015). Going short-term or long-term? CEO stock options and temporal orientation in the presence of slack. Strategic Management Journal, https://onlinelibrary.wiley.com/doi/10.1002/smj.2445

Mehran, H. (1995). Executive compensation structure, ownership, and firm performance. Journal of Financial Economics, 38(2), 163-184. 10.1016/0304-405X(94)00809-F

Mishra, D. P., Heide, J. B., & Cort, S. G. (1998). Information Asymmetry and Levels of Agency Relationships. Journal of Marketing Research, 35(3), 277-295. 10.2307/3152028

Murphy, K. J. (1985). Corporate performance and managerial remuneration. An empirical analysis. Journal of Accounting and Economics, 7(1-3), 11-42. 10.1016/0165-4101(85)90026-6

Porter, M. E. (1980). Competitive Strategy (First Free Press ed.)

Rappaport, A. (1999). New thinking on how to link executive pay with performance. Harvard Business Review, https://hbr.org/1999/03/new-thinking-on-how-to-link-executive-pay-with-performance

Vafeas, N. (2003). Length of Board Tenure and Outside Director Independence. Journal of Business Finance & Accounting, 30(7-8), 1043-1064. 10.1111/1468-5957.05525

Welbourne, T. M., Balkin, D. B., & Gomez-Mejia, L. R. (1995). Gainsharing and Mutual Monitoring: A Combined Agency-Organizational Justice Interpretation. Academy of Management Journal,

Whittington, R., Regnér, P., Angwin, D., Johnson, G., & Scholes, K. (2020). Exploring Strategy, 12th edition

Wooldridge, J. M. (2013). Introductory Econometrics: A Modern Approach (5th ed.)

Yanadori, Y., & Marler, J. H. (2006). Compensation strategy: Does business strategy influence compensation in high-technology firms? Strategic Management Journal, 27(6), 559-570. 10.1002/smj.521

Zhou, X. (2000). CEO pay, firm size, and corporate performance: evidence from Canada. Canadian Journal of Economics/Revue Canadienne D'Économique, 33(1), 213-251. https://doi.org/10.1111/0008-4085.00013

8. Appendix

Figure 1: Porter's generic competitive strategies

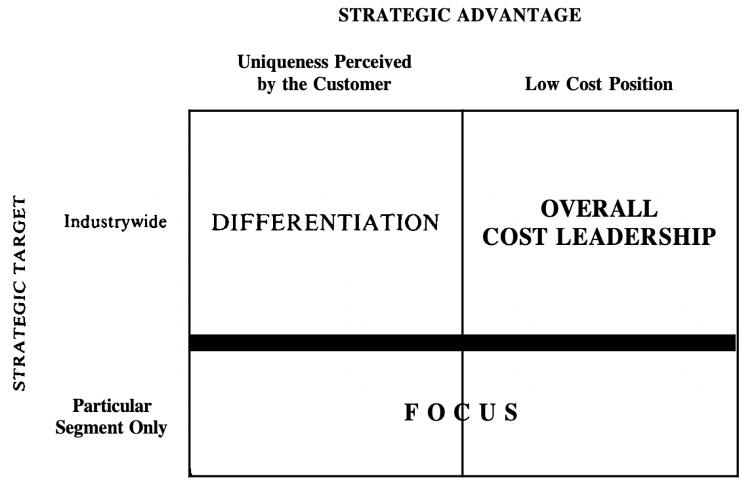


Figure 2: Scatter plot of *ROA* and *PLC* with a quadratic fitted line

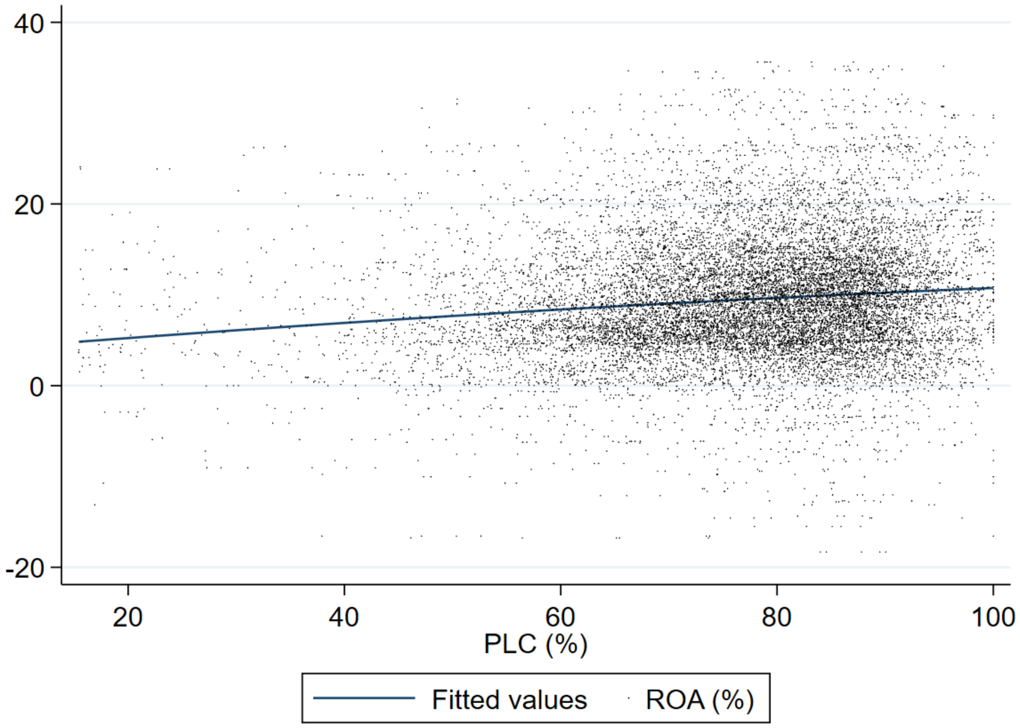


Figure 3: Scatter plot of *TOBIN'S Q* and *PLC* with a quadratic fitted line

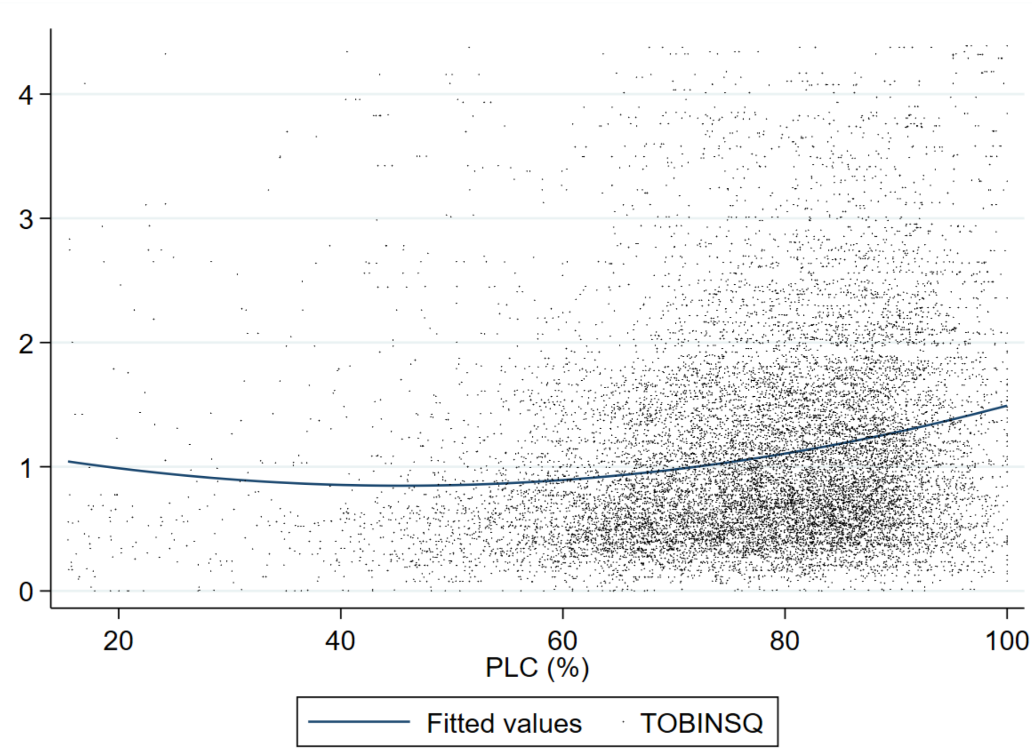


Figure 4: Scatter plots of *ROA* and *PLC* with a quadratic fitted line sorted by *STRATEGY*

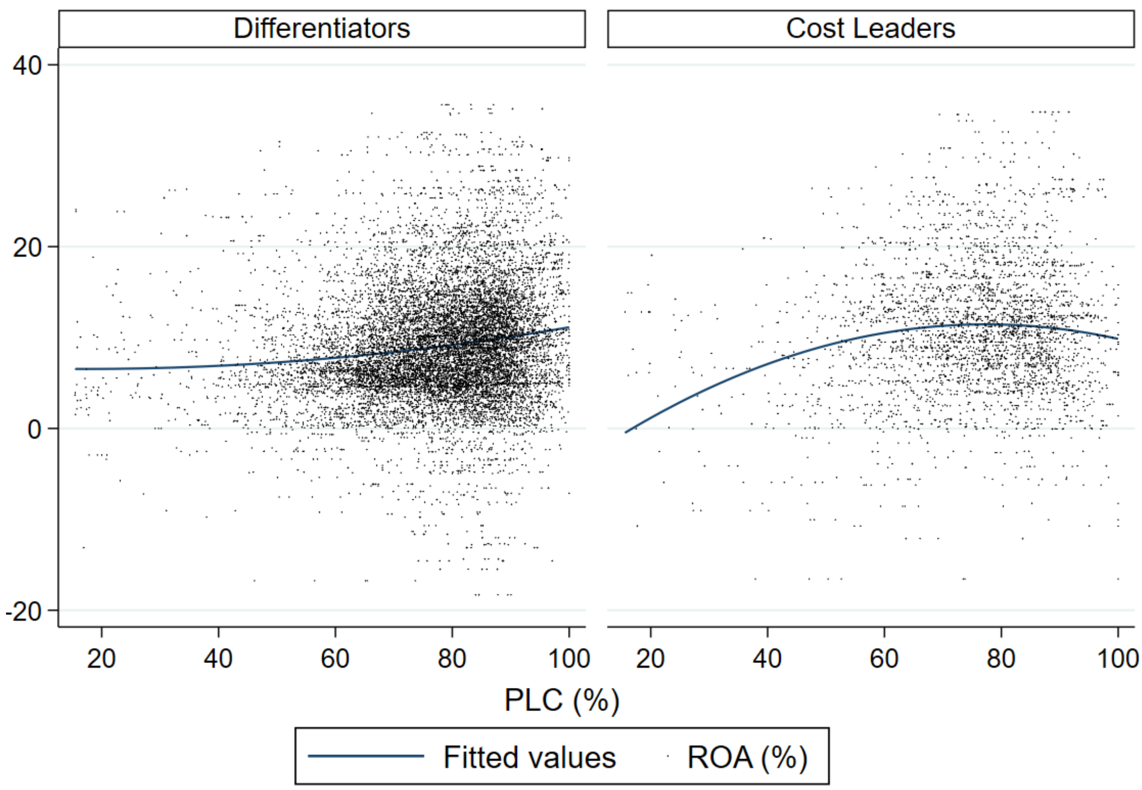


Figure 5: Scatter plots of *TOBIN'S Q* and *PLC* with a quadratic fitted line sorted by *STRATEGY*

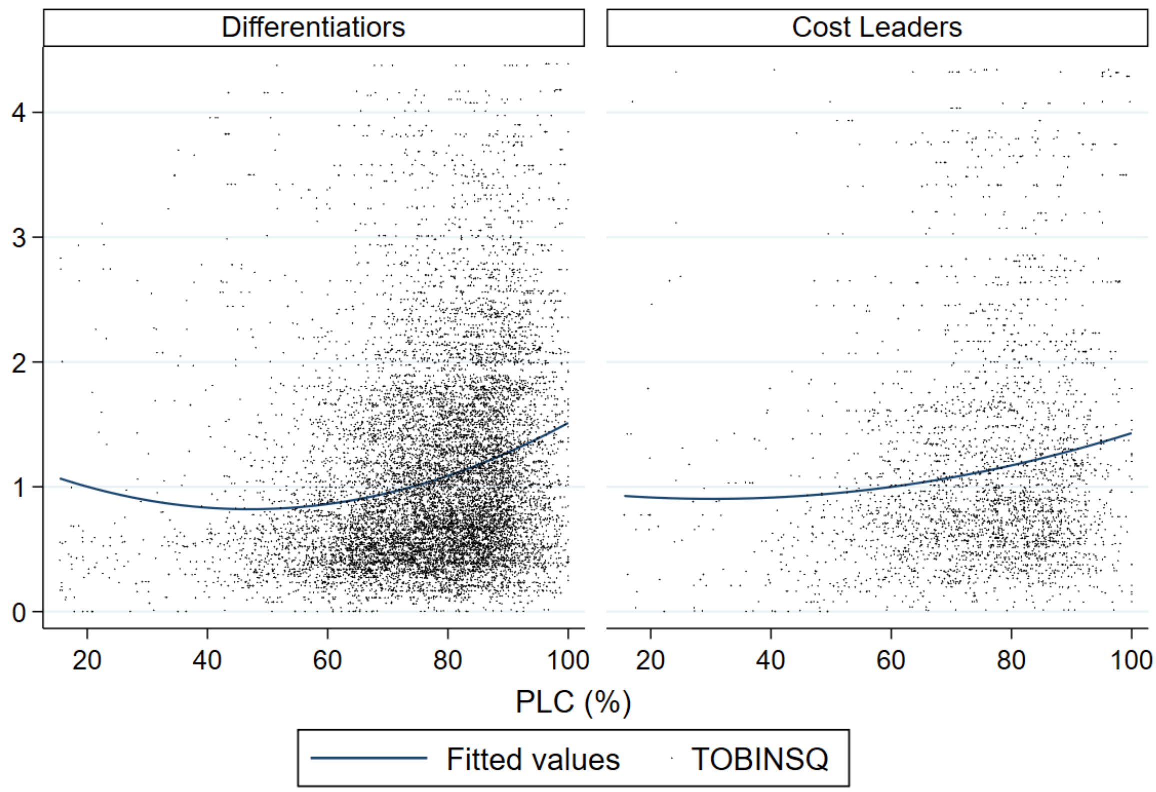


Figure 6: Histograms of *PLC* sorted by strategy

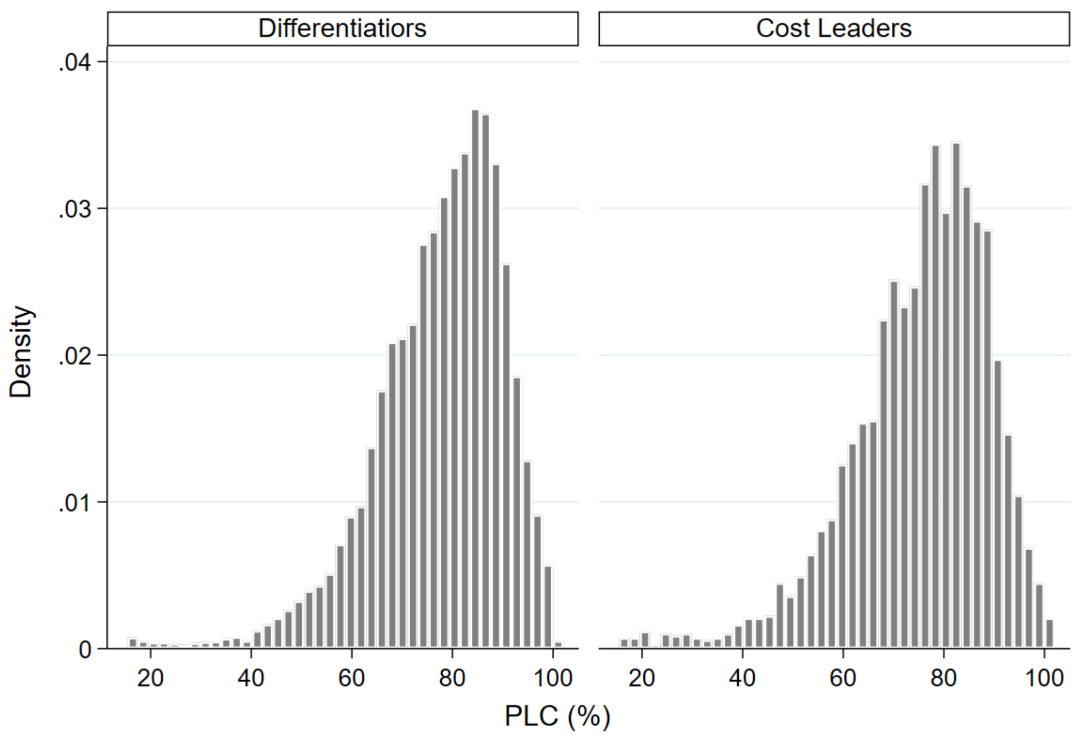
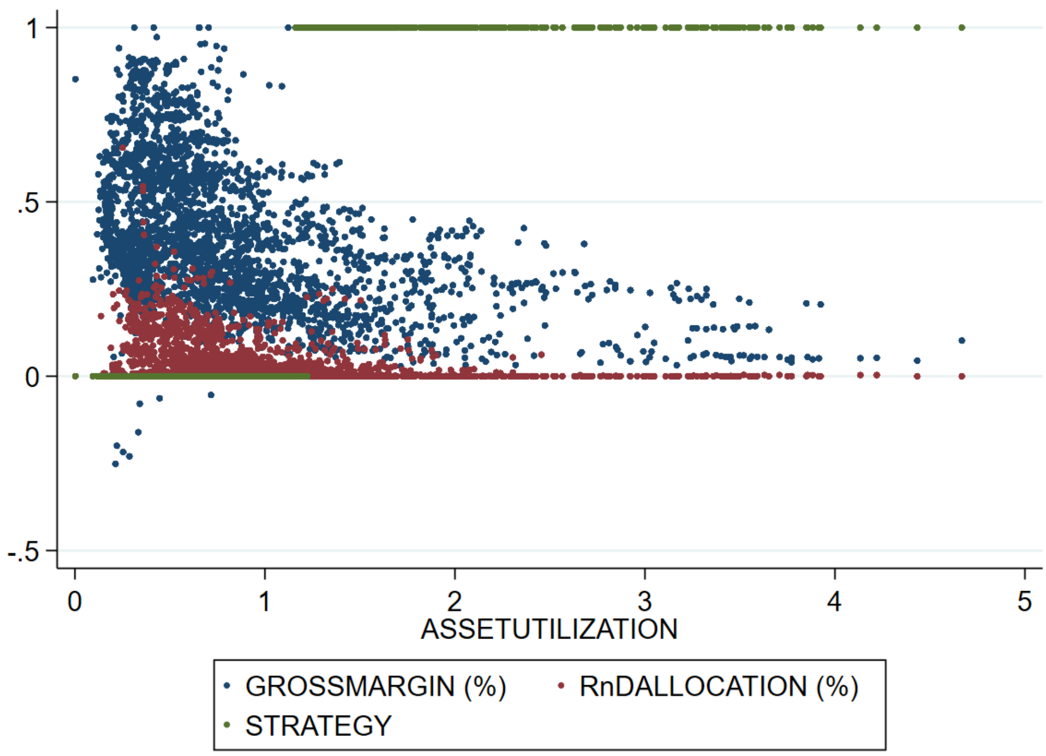


Figure 7: Output of the k-means clustering to classify the business strategy of the firms in our data sample, with the input variables being gross margin, R&D allocation and asset utilization.



The scatter plot should be interpreted as follows:

The green dots are the output of a K-means clustering (K=2), and can either take a value of 0 or 1. These clusters are based on the input variables gross margin, asset utilization, and R&D allocation. A value of 0 means that the observation has been classified to belong in the cluster of firms with a differentiation strategy, as seen by the high values of the blue and red dots, indicating high gross margins and R&D allocations respectively, as well as being positioned on the lower end of the x-axis, indicating low asset utilization. Cost-leaders on the other hand take on a value of 1, with their lower gross margins and R&D allocations, but higher asset utilization.

Figure 8: Histogram of the firms' assets

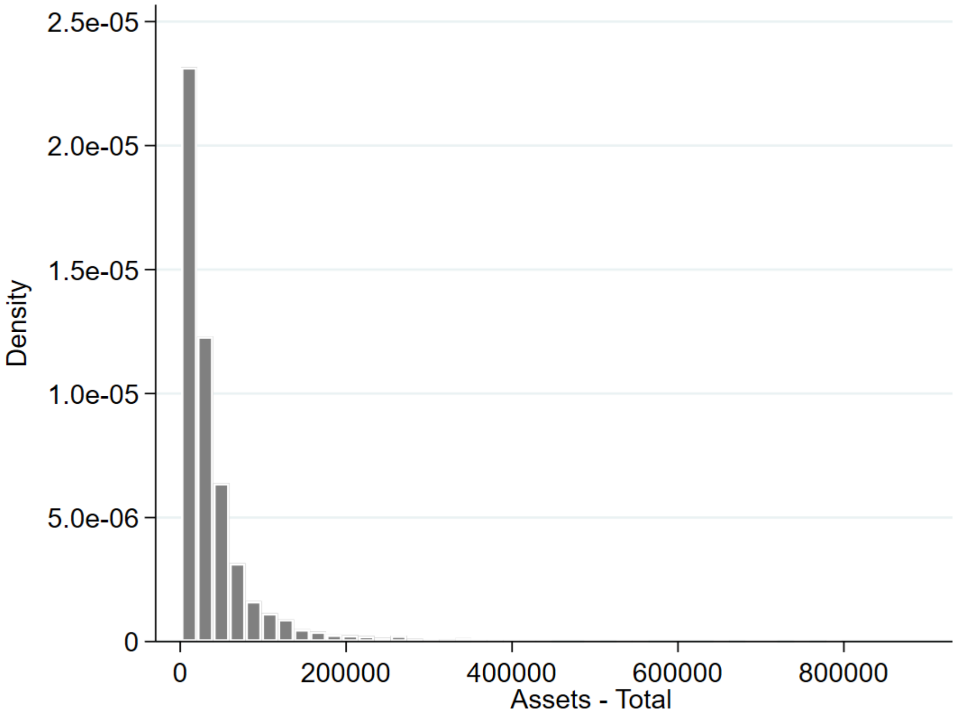


Figure 9: Histogram of *SIZE*