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An Empirical Study of Executive Management Team Compensation and Company Performance

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AN EMPIRICAL STUDY OF EXECUTIVE MANAGEMENT TEAM COMPENSATION AND COMPANY PERFORMANCE

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Business at Virginia Commonwealth University

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This work is dedicated to my wife and parents who made the PhD program possible for me. To my wife, Stephanie, who again demonstrated that patience is indeed a virtue by supporting this four year endeavor. To the memory of my parents, Gordon C. Jonas and Miriam J. Jonas, who always encouraged my academic pursuits.

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ABSTRACT

AN EMPIRICAL STUDY OF EXECUTIVE MANAGEMENT TEAM COMPENSATION AND COMPANY PERFORMANCE

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Increasing compensation disclosures mandated by the Securities Exchange Commission provide transparency that allows more shareholders to question the results produced by highly compensated executives. The popular business press often decries the apparent imbalance between executive pay and firm performance. Published academic research has responded with hundreds of studies attempting to explain executive pay in terms of firm performance. The preponderance of these studies focus on Chief Executive Officers. This study empirically examines executive compensation for team effects on future firm performance.

Applying a firm specific fixed-effects model to a sample of 13,021 firm-year observations from ExecuComp, the current study regresses top management team compensation and control variables on firm performance averaged one, three, and five

years following the year of compensation. One accounting based measure of performance (return on assets) and one market based measure of firm performance (shareholder return) is examined over the one three and five year horizons.

Consistent with increasing concerns raised by investors regarding excess executive pay, this study finds evidence that higher top management team pay is associated with companies experiencing lower rates of return in the future. However, higher management team pay is associated with higher profits and market value measured in dollars. Theses effects are significantly different between the short-term and long term components of compensation. Although compensation of the team is highly correlated with the CEO, the compensation of the executive team has incremental effects on future firm performance of the company.

This study contributes to the executive compensation literature by providing evidence that the compensation of the top management team affects future company performance. The observed impact of management team compensation on company performance is: incremental to CEO effects noted in prior studies, differential between short- and long-term components of compensation, sensitive to the proxy used for company performance, and attenuates over time. These findings suggest that further research on executive management team compensation is merited in order to address an interesting gap in the extant literature.

CHAPTER 1

INTRODUCTION

Chief Executive Officer (CEO) compensation is one of the most widely researched areas in business with contributions from accounting, economics, finance, and management. Barkema and Gomez-Mejia (1998) note over 300 published studies on top management compensation. The preponderance of these studies focus on the relation between CEO pay and firm performance (Barkema and Gomez-Mejia 1998; Murphy 1999).[1] Specific issues explored by these studies include CEO compensation and performance within the context of firm characteristics such as governance (Matsumura and Shin 2005), board structure (Cahan et al. 2005), stakeholder management (Coombs and Gilley 2005), voluntary disclosure to security analysts (Johnson and Natarajan 2005), non-financial performance measures (Davila and Venkatachalam 2004), culture (Tosi and Greckhamer 2004), R&D expenditures (Cheng 2004), and ethics (Ashley and Yang 2004; Perel 2003).

An ongoing debate in the literature is whether CEO compensation is excessive (Kerr and Bettis 1987; Bebchuk and Grinstein 2005) or whether it is justified based on company performance (Murphy 1986).[2] Some studies incorporate the compensation of one or more hierarchical levels in an attempt to explain a CEO compensation premium as part of an internally financed "tournament" in which direct reports to the CEO compete for the CEO's job (e.g., Lambert, Larcker, and Weigelt 1993; Main, O'Reilly, and Wade

[1] Murphy (1999) graphs the number of CEO papers published per year from 1970 to 1996 which shows an annual rate of CEO compensation papers of over 60 per year by 1995.
[2] Tosi, Werner, Katz, and Gomez-Mejia (2000) meta-analyze available CEO pay to firm performance literature for the period 1962-1998.

1993; O'Reilly, Main, and Crystal 1998; Henderson and Fredrickson 2001; Bognanno 2001; Conyon and Sadler 2001) thus offering a potential explanation for perceived excessive CEO compensation.

Notwithstanding the prolificacy of published executive compensation research studies, few go beyond the CEO to analyze the relationship between compensation of the executive management team and firm performance. This is in spite of long standing theory and practice which support the view that a top management team, not just a CEO, is essential to the successful operation of the modern firm. The dearth of non-CEO compensation research has been recognized in prior papers (e.g., Lambert et al. 1993; Carpenter and Sanders 2002, 2004). Most top management team studies include firm performance (as a measure of team performance) and evaluate how this varies as a function of team attributes which do not include compensation (Cohen and Bailey 1997).

Theoretical support for top management teams (TMT) as the key force in company performance appears in Berle and Means (1932) and continues throughout the agency theory literature (Cyert and March 1963; Jensen and Meckling 1976; Fama 1980; Eisenhardt 1989). The agency theory literature identifies potential problems for firms due to the disparate self interests of owners (principals) and agents which are characterized as the managers, teams, executives, or officers. The TMT of a company is generally defined as the CEO plus key executives reporting to the CEO and is most often proxied by the three to five highest paid executives in a firm. Team theory (Marschak 1955; Marschak and Radner 1972) also suggests that the executives' or the executive team's decisions determine a firm's profit. The notion of information filtering between the executive team members and the CEO affecting firm performance is also a normal

and important part of business operations due to the size and complexity of the modern corporation (Monsen and Downs 1965; Fisher 1981; Hambrick 1995). Small group theory also suggests that groups such as a TMT make better decisions than any single individual when faced with complex problems (Shull, Delbecq, and Cummings 1970; Hill 1982; Michaelsen, Watson, and Black 1989).

Anecdotal evidence from business practice supports the view that complexity of the business environment, as well as the size of publicly-traded companies, requires a high quality management team to enhance the probability of success of the firm. For example, CFOs increasingly align their function with the company's overall strategy to ensure that the entire enterprise delivers on its commitments (Couto and Neilson 2004). CFOs are becoming a strategic business partner in most firms based on their expertise and increasing responsibilities which include compliance with the Sarbanes-Oxley Act, knowledge of IT systems, and ability to manage various business risks (Roth 2004). Business failures and scandals often include various members of the top management team (TMT) indicating agency problems extend beyond the CEO (Berle and Means 1932). For instance, both the Chairman and the CFO of Tyco International were prosecuted for embezzling more than $600 million from the company (Sorkin 2003). Further evidence that people believe in the value of teams and teamwork in business can be seen in the resources many businesses devote to team building and encouraging teamwork throughout their companies. Educational programs also embrace teams as shown by business schools teaching students to work in teams and requiring capstone courses that mandate cross-disciplinary teamwork on projects and simulations.

Thus, the paucity of research on compensation of the top management team and its effects on company performance is surprising. One reason for this may be an expectation that TMT pay is a simple function of CEO pay (Patton 1951), although empirical evidence suggests they are only imperfectly correlated (O'Reilly et al. 1988; Carpenter and Sanders 2002). Nevertheless, observed compensation differences between the CEO and the TMT are the basis of studies on tournament theory in executive compensation.

Another possibility is that CEO compensation is implicitly viewed as a proxy for management team compensation. The limited availability of TMT compensation data prior to the 1992 disclosure rules may have caused entrenchment of CEO research (Lewellen and Huntsman 1970). However, compensation data for key members of the executive team has been publicly available for decades in proxy statements and more recently in databases such as Standard and Poor's ExecuComp. A third possibility is that the periodic outcry about excessive CEO pay in the popular business press (Guerra 2006; *Multinational Monitor* 2003; Puri 1997) obscures the importance of understanding TMT compensation. Notwithstanding these possible explanations, the fact remains that this important aspect of executive management compensation has not been adequately explored.

Contributions of this Study

Most extant research on the relationship between firm performance and TMT compensation explores these variables only to the extent necessary to explain CEO compensation premiums (e.g., tournament theory studies). Of the few compensation studies that focus on the TMT all suffer from either small samples (e.g., Carpenter and

Sanders 2002, 2004; Beatty and Zajac 1994), methodological issues (e.g., Carpenter and Sanders 2002, 2004; Beatty and Zajac 1994), model specifications not designed to identify the incremental "team effect" (e.g., Schaefer 1998; Bebchuk and Grinstein 2005) or a combination of these problems. Furthermore, most executive compensation research (including that on TMTs) is designed to study how various factors affect compensation instead of how compensation might affect firm performance. Because of these issues, the affect of TMT compensation on firm performance, relative to CEO compensation, is unknown. As well, the limited evidence on TMT and firm performance is suspect due to unobserved firm effects and potential endogeneity issues. The present study contributes to the extant literature on executive management teams and firm performance by addressing some of these unanswered questions as identified below.

First, TMT pay and firm performance is tested using models and methods designed to capture the association between firm performance and compensation of the team. Two prior studies conducted similar tests, but each had theoretical, model specification, and/or methodological problems. Carpenter and Sanders (2004) regress TMT pay and control variables on measures of firm performance. However, they exclude the CEO from the team, do not control for firm specific fixed-effects, use compensation data from a single year, and do not consider potential endogeneity between performance and compensation. Bebchuk and Grinstein (2005) use a firm specific fixed-effects model of lagged firm performance, year, and control variables regressed on compensation. Their model is designed to measure factors affecting compensation, although they do not consider endogeneity issues, they omit most control variables other than firm size. This specification evaluates factors affecting growth in executive pay levels over time from

1993 to 2003. This is fundamentally different than the purpose of the present study, which is to estimate the effects TMT compensation has on firm performance in the presence of necessary controls for firm specific fixed-effects and endogeneity.

Second, the present study examines incremental "team effects" by controlling for CEO compensation and observing both the size and significance of incremental effects of TMT compensation on firm performance. Third, the present study adds to the literature regarding the performance effects of variation in compensation across team members. Variation in pay (pay disparity) within a team is predicted to cause lower levels of collaborative behavior which can reduce team performance (Lazear 1989) if team members perceive pay differences to be inequitable. Empirical executive compensation studies that include measures of pay disparity and performance find mixed results using tournament theory (Leonard 1990; Lambert et al. 1993; Carpenter and Sanders 2004), social comparison theory (O'Reilly et al. 1988), wage compression theory (Main et al. 1993) and relative deprivation theory (Henderson and Fredrickson 2001). The present study distinguishes between the egoistic and fraternal components of relative deprivation theory, and using econometric methods, clarifies the likely effects of pay disparity within TMTs on company performance.

The remainder of this dissertation is organized as follows. The next chapter reviews the relevant literature on executive compensation focusing on studies involving management team compensation and measures of firm performance. Chapter 3 provides the theoretical basis and motivation for the hypotheses. The research methodology, including the empirical models and data sources, is identified in Chapter 4. Chapter 5 presents empirical results of the proposed models and findings of the supplemental

analysis. The final chapter concludes the study with a summary and suggestions for future research.

CHAPTER 2

LITERATURE REVIEW

Background

Executive compensation research spans over 80 years going back to at least 1925. During the first 60 years most studies were constrained by shortcomings in data availability, statistical methods, and theoretical development. Given the significant changes in these three areas, and the resulting effect on the extant executive compensation literature, a discussion of each of these prior limitations is warranted prior to reviewing the relevant empirical research. Since these constraints also affect the quantity and nature of research over this 80 year timeframe, the review of extant empirical literature is divided into an early period and a contemporary period.

All executive compensation research, even that which is explicitly CEO compensation, is included in the early period. For purposes of the present study, Murphy's (1985) study is selected as the beginning of the contemporary period of compensation research, since Murphy used extensive data, modern econometric methods, and developed theory.[3] Thus, Murphy (1985) demonstrates the application of advances in these three areas, overcoming arguments that subsequent research suffers from lack of adequate resources and tools.

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[3] Murphy (1999) suggests the modern (contemporary) history of executive compensation research is tied to the acceptance of agency theory, thus beginning in the early 1980's. Although my choice of an early versus modern period is consistent with this time period, it is based on considerations other than just agency theory.

Evolution and Effect of Data Sources

Public disclosure of compensation data was not available to researchers until, in 1933, the seventy-third Congress directed the Federal Trade Commission (FTC) to conduct a study of salaries paid to officers and directors of companies engaged in interstate commerce. Following the resulting FTC report, the Securities Exchange Commission (SEC) required similar data to be reported by companies annually. These early public disclosures required individual compensation data for the three highest paid executives with aggregate amounts reported for other officers and directors (Baker 1939). Even with public disclosure of annual compensation and financial data required by the Securities Act of 1934, the limited detail and the need to manually compile large quantities of data seemed to limit research output and sample sizes. Changes in reporting mandated by the SEC continue to provide more detailed data whereas independent companies such as Standard & Poor's provide data in easier to use formats. Required expansion of the reporting for long-term compensation was passed in 1978 (Antle and Smith 1986). In 1992, the SEC expanded disclosure requirements to include the value of stock option grants, and a tabular presentation format for compensation data was added to Form 14a of the proxy statement (Murphy 1996).

As executive compensation research became more widespread some researchers drew on proprietary databases accumulated by compensation consulting firms (e.g., Abowd 1990; Leonard 1990; Main et al. 1993). These databases often provide more detailed information about a greater number of managers than publicly available data. The use of such compensation consulting firm data continues into current research (e.g., Murphy 1999; Siegel and Hambrick 2005). Other studies accessed data from popular

business publications such as *Forbes*, *Fortune,* and *Business Week* (e.g., McGuire et al. 1962; Ciscel and Carroll 1980). Development of the Compustat, Center for Research in Security Prices Stock File (CRSP), and ExecuComp databases provide efficient access to large quantities of data typically used in executive compensation research, allowing for broader exploration and higher productivity of research in this area.

Nomenclature Issues

The terms "executive compensation" and "managerial compensation" are correctly used by most early studies as they investigate some combination of managers, officers, and directors (Taussig and Barker 1925; Baker 1939; Gordon 1940; Patton 1951; Roberts 1956; Masson 1971). Early studies that began to focus on the highest paid officer include Patton (1951) and Roberts (1956). This practice evolved into the current plethora of CEO compensation research. Beginning in the 1960s, researchers used "executive" and "managerial" labels in studies that only involved CEO compensation (i.e., McGuire et al. 1962). In some cases, such as Lewellen and Huntsman (1970), studies clearly stated that the highest paid executive was being used as a proxy for a firm's management pay package. In later years, most executive or managerial compensation studies examine only CEO compensation. Based on a temporal review of the literature, by the 1980s the focus on CEO compensation was intentional instead of driven by data availability or by an implied use of CEO compensation as a proxy for general managerial compensation practices.

Another inconsistency in terminology within the extant management compensation literature is the use of "Top Management Team" (TMT) or "Top Management Group"(TMG). Hoffman, Lheureux, and Lamont (1997) note that TMTs

are often defined differently in the literature as either: executives "with a title of vice president or higher" or executives who ". . . hold both positions on the executive management team and the board of directors." Some researchers use TMT as the four highest paid executives excluding the CEO (e.g., Carpenter and Sanders 2002, 2004), whereas others use the five highest paid executives including the CEO (e.g., Aggarwal and Samwick 2003; Hanlon et al. 2003 Henderson and Frederickson 2001). In a survey of CEOs, Hambrick (1995) asked, "Who's on your top management team?" The mean response to this question was nine executives (inclusive of the CEO) with a range from five to fourteen executives. Siegel and Hambrick (2005) defined the TMG as anyone who is an officer and in the top three levels of the company which resulted in an average TMG of ten and a range from four to twenty-two members.

Statistical Applications and Related Issues

Until the mid-1950s, executive compensation analyses relied primarily on descriptive methods such as stratifying data, percentage relationships, and averages. Conclusions were based on observation of the data along with these very basic descriptive statistics. Roberts (1956) introduced the use of logarithmic transformations for variables such as compensation and sales as well as using chi-square tests for significance. He also was one of the earliest researchers to point out problems with multicollinearity of the measures being used for sales and profits. McGuire et al. (1962) were among the earliest to use correlation analyses and t-tests. Lewellen and Huntsman (1970) used ordinary least squares regression (OLS) and noted that heteroscedasticity posed a potential problem in the significance tests; however, their attempt to remedy this problem was not effective (Ciscel and Carroll 1980). The multicollinearity problem is

addressed by Ciscel and Carroll (1980), using a two-stage regression approach that explores alternative metrics for firm size. In one of the first studies to use panel methods, Murphy (1985) analyzed executive compensation data employing both cross-sectional and longitudinal methods. He concludes that the controls for firm and individual fixed-effects, which are available by using longitudinal methods, avoid some of the bias implicit in cross-sectional methods. In the 1990s, heteroscedasticity robust standard errors (an easily applied option available in current statistical programs) became an increasingly standard solution to the problem of error terms not being randomly distributed (e.g., Lambert et al. 1993). Schaefer (1998) addresses this problem by employing non-linear least squares. Uncharacteristically, and for reasons not articulated, Bloom and Milkovich (1998) use a random-effects model (instead of fixed-effects) for each firm and SIC code.[4] Notwithstanding concerns regarding the need to control for firm specific fixed-effects, much of the current executive compensation research continues to use OLS with either pooled or cross-sectional data.

Theoretical Foundations of Extant Empirical Research

Entity theory (Paton 1923) motivates early executive compensation studies (Taussig and Barker 1925; Gordon 1940; Patton 1951) as researchers sought to determine the proportion of profits distributed to management and whether management compensation should be considered an expense in arriving at profits or a distribution of profits.[5] Subsequently, Baumol's revenue maximization hypothesis (Baumol 1967) became a central theory in executive compensation research as researchers sought to

[4] Logically the presence of time invariant firm characteristics (fixed-effects) seems a more likely condition.

determine whether compensation was related to sales or profits (e.g., McGuire et al. 1962; Lewellen and Huntsman 1970; Ciscel 1974).[6] Following his own primary analysis of chief executive compensation, Ciscel (1974) was further motivated by Galbraith's compensation hypothesis to analyze the compensation of all directors and officers as a group. This hypothesis is based on the migration of corporate power from a single individual to the officers of the corporation (Galbraith 1971).

An early application of both agency theory (Jensen and Meckling 1976) and the informativeness principle (Holmstrom 1979) resulted in the theory of relative performance evaluation, which was tested by Antle and Smith (1986). As it relates to executive compensation, agency theory suggests that managers will act in their own self interests unless those interests are linked to the corporation's interests through contracting. This is accomplished by linking their compensation to corporate objectives. The informativeness principal extends the principal-agent model by asserting that performance measures are useful to shareholders only to the extent that they provide additional information regarding a manager's behavior. The theory of relative performance relies on the assumption that the performance of other managers (e.g., through the performance of other firms or industry averages) provides additional information useful in evaluating a given firm's managers. Murphy (1999, 2519) notes, "Most research on the relation between executive compensation and company performance has been firmly (if not explicitly) rooted in agency theory."

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[5] The authors refer to a "theory of profits," but the issues described relate to Paton's entity theory.
[6] The first edition of Baumol's book was published in 1959. Related papers were published in 1958 and 1962.

Executive compensation research attempting to explain the large "gap" in pay between hierarchical levels of organizations often draws on tournament theory (e.g., Lambert et al. 1993; Main et al. 1993; O'Reilly et al. 1988; Henderson and Fredrickson 2001; Bognanno 2001; Conyon and Sadler 2001). Tournament theory suggests that executive compensation can be viewed as a tournament where managers compete for a "prize," which is a disproportionately large increase in pay associated with promotion to the position of CEO (Lazear and Rosen 1981). As such, wages of the managers in the organizational hierarchy reporting to the CEO may be lower than their marginal product as part of an implicit "financing" of the prize. In contrast with tournament theory, which predicts large and increasing pay gaps between hierarchical levels moving towards the top of an organization, Lazear (1989) suggests that wage compression might be more appropriate to minimize workers discrediting or sabotaging the efforts of others who are competing for the same promotion. Main et al. (1993) explicitly test this theory. The theory is also implicitly tested by the use of variables representing pay disparity included in both Carpenter and Sanders (2002) and Siegel and Hambrick (2005).

Early Executive Compensation Research 1925 – 1984

Taussig and Barker (1925) conducted a survey resulting in 400 U.S. manufacturing companies providing ten years of company performance, wages for company executives, and other descriptive information. The survey data was summarized and analyzed using basic descriptive statistics comparing executive compensation to various measures of firm size and performance. They observed that executive compensation consisted almost exclusively of fixed salaries with increases occurring

gradually over time, but not in the same year as associated increases in earnings.[7] Management stock ownership was observed to be more common with smaller corporations (based on capital) than larger corporations. Average executive salaries were higher in larger firms but not in direct proportion to company size. The analysis is solely descriptive, but many of the observations have been supported in subsequent studies using more advanced empirical methods.

In 1934, the FTC issued a report on officer and director compensation in fulfillment of Senate Resolution 75, which was passed on May 5, 1933. This report contained data on officer and director compensation for 877 companies listed on the New York Stock Exchange for the years 1928 through 1932 (FTC 1934).[8] Using a combination of data from the FTC report and SEC required disclosures for the years 1928 to 1936, Baker (1939) analyzed executive compensation characteristics of large versus small companies.[9] Baker found that large companies' total compensation for the executive group averaged five to six times greater than the smaller firms and pay for individual executives was three to four times greater in the larger companies.[10] Beginning with the 1934 data, Baker noted a correlation between asset size and total compensation for the top three executives. Also, contrary to Taussig and Barker's (1925)

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[7] This was in contrast to the executive compensation practices in Europe which commonly used annual cash bonuses based on company earnings in addition to fixed salaries.

[8] The report was limited to companies with assets greater than one million dollars and excluded public utilities.

[9] An initial sample of 51 large companies with assets over $100 million in 1929 was compared to a sample of 53 small companies with assets less than $10 million in 1936.

[10] Part of the difference in pay for the executive group resulted from different numbers of executives. Larger companies had more people classified as executives.

observations, Baker (1939) observed that many companies paid bonuses to their executives in both large and small companies.

The question of whether compensation or ownership is the primary incentive for corporate executives was investigated by Gordon (1940) using SEC data on executive compensation and ownership interests for 1935. A sample of 149 companies out of the largest 200 firms in 1929 was split into three sub-samples: industrial, railroad, and utilities. Basic descriptive statistics suggested that compensation (salary and bonus) is a larger incentive to executive management than ownership (and the resulting dividends and appreciation).

Patton (1951) combined 253 survey responses from American Management Association (AMA) members with SEC executive compensation data to analyze the pay practices for officers and directors at 664 companies. SEC compensation data included salary, bonus, and company paid insurance premiums. Using percentage relationships and graphs, he concluded that compensation was categorically higher in certain industries and in higher growth companies. He also concluded that executive compensation varied directly with company profits and observed that executive compensation appeared to follow a pattern based on the compensation of the company president.

Using chi-square analysis, Roberts (1956) examined the relationships between each of two measures of executive compensation with regard to net income, company size, and industry.[11] Data was drawn from SEC filings for a primary sample of 410 companies for the years 1945 to 1950 and a sub-sample of 65 companies for the years

[11] Both average compensation of the executive group and the highest paid person were used.

1935 to 1950. Roberts found that company size is significantly associated with executive compensation and that hypothesized associations between executive compensation and either industry or profit can be explained by size. Roberts also tested the association of executive compensation with company stock rating and with executive turnover by comparing the lowest paying one-sixth of sampled companies to the other companies in his sample. He found no significant differences in either stock rating or executive turnover for low paying companies compared to higher paying companies. One theoretical observation made by Roberts, but not used in his empirical study, is that compensation should be the marginal revenue product of an executive as compared to the next best executive. He also noted that the low turnover rates found in his sample may indicate a practical inability for executive substitution. From this he infers that the marginal revenue product may not actually exist for his sample.

Using a convenience sample based on data availability for 45 *Fortune* 500 firms McGuire et al. (1962) compared CEO compensation separately to profits and sales from 1953 to 1959. Correlations and t-tests indicated stronger associations between compensation and sales than between compensation and profits. Based on lagged and differenced models the authors concluded that executive compensation is a function composed of sales for (at least) the prior two years as well as the current year.

In an early multivariate test of executive compensation and firm performance, Lewellen and Huntsman (1970) found high correlations between executive compensation and both profits and market value but not sales. Executive compensation was proxied by the highest paid officer with tests made on a salary plus bonus measure and a

comprehensive measure.[12] The sample consisted of 50 of the *Fortune 500* companies selected by working down the list until 50 firms with all requisite data elements were obtained. The analysis was based on weighted least squares cross-sectional models for every third year from 1942 to 1963. These researchers found both measures of compensation to be strongly and consistently associated with profits and market value.

Masson (1971) attempted to refute claims that executive compensation was driven by sales maximization instead of profit maximization. He used a sample of the top three to five executives from 39 firms in three industries for the period 1947 to 1966 in a regression analysis of executive compensation on measures of sales, profits, and stock returns.[13] Masson concluded that executive compensation is not related to sales but is strongly related to stock returns.

In 1974, Ciscel analyzed correlations between executive compensation, firm size, and profits for 210 of the largest industrial corporations for the years 1969, 1970, and 1971. Executive compensation was evaluated both for "the senior officer" and separately for the group of all officers and directors. Measures of firm size were sales, assets, and number of employees. Correlations between all variables and the compensation of the officer and director group were generally higher than those with just the senior executives' compensation. Although Ciscel concluded that growth and size were the primary determinants of executive compensation instead of profits, he expressed concern about the effects of multicollinearity on these conclusions.

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[12] The comprehensive measure placed a current income dollar value on all types of earnings as reported in the proxy statements (including pension contributions, stock options, and other fringe benefits).

[13] A percent change model was used with weighted total executive returns regressed on current and lagged variables for sales, earnings per share, and stock returns.

In an effort to resolve the conflicts in extant research on whether executive management was compensated on profits or sales, Ciscel and Carroll (1980) studied a sample of 221 of the largest industrial corporations for the years 1970 to 1976.[14] They used a two-stage regression model to control for multicollinearity with a weighted least squares method applied to CEO salary plus bonus as the measure of executive compensation.[15] They concluded that, beyond a base salary determined by the labor market, both sales and profits were significant determinants of executive compensation.

Contemporary Executive Management Team Compensation 1985-2006

Murphy (1985) analyzed executive compensation by position and individual executive using panel data for a sample of 72 of the largest U.S. manufacturing firms over the period 1964-1970. Compensation data came from executives listed in the proxy statements and company performance data was obtained from Compustat and CRSP. The dependent variable (compensation) was analyzed in total as well as for each individual component reported in the proxy statements (salary, bonus, deferred compensation, and stock options).[16] Firm performance, the independent variable of primary interest, was measured using a metric for shareholder return. He tested models with and without adjustment for industry relative performance, and found that the time-series regressions of firm performance on total compensation had greater explanatory power (R^2 = .805) than the corresponding cross-sectional regressions (R^2 = .657). Regression coefficients and significance levels varied by compensation component and

[14] Data was obtained from *Forbes* and *Fortune*.
[15] The square root of assets was used as the weighting factor.
[16] Total compensation also included fringe benefits but not annual pension benefit accruals. Dividends and stock appreciation were not included.

by each executive level (i.e., Chairman, President, CEO, or Vice-President). The primary conclusion was that firm performance is strongly related to management compensation, but this relationship is not correctly captured by using only salary plus bonus measures of compensation, as was common in the early period.

Drawing on the theory of relative performance evaluation, Antle and Smith (1986) analyzed compensation of the three highest paid executives for a sample of 39 firms for the period 1947-1977 to determine whether industry relative measures of firm performance affect compensation. The compensation measure included an after-tax estimate of all components shown in the proxy statements as well as dividends and appreciation on company stockholdings and other perquisites that could be identified and valued. All sample firms were drawn from one of three industries: chemical, aerospace, or electronics. Raw firm performance data for return on assets (ROA) and return on common stock (RET) came from Compustat. Each of these performance measures was decomposed into a systematic and unsystematic component using average industry performance. Results for ROA supported the relative performance hypothesis in that compensation for unsystematic performance was greater than systematic.[17] However, the results for RET were not significant.

O'Reilly et al. (1988) tested tournament theory versus social comparison theory in analyzing CEO cash compensation. The authors used a sample of 105 firms selected from *Business Week*'s survey of executive compensation for 1984, financial data from *Fortune*'s 1985 listing of the largest industrial firms, and compensation data from

company proxy statements. In a series of OLS regressions of CEO cash compensation on firm characteristics and industry controls, the authors found evidence contrary to that predicted by tournament theory. Their result indicated that CEO compensation is inversely related to the number of vice presidents and also positively associated with average vice president pay.[18] Since tournament theory is based on differences in pay between organizational levels instead of correlation of pay between levels, it is unclear what the correlation between the cash compensation for CEOs and Vice Presidents suggests. Potential evidence of social comparison theory was tested by a regression of CEO compensation with salaries of directors and compensation committee members as independent variables. The significance of these variables is viewed as supporting the social comparison theory. Firm performance (as measured by return on equity) was not a significant variable in any of the regressions of CEO compensation.

Abowd (1990) analyzed the relation between four measures of firm performance and various measures of cash compensation to test whether compensation affects firm performance. He used compensation data from surveys conducted by a compensation consulting firm for 1981-1986, which included data on 75 of the top managers for each of 600 companies. Although Abowd asserts that the data is partitioned by managerial level (including a category for executive management) almost all reported results are aggregated. As a result, it is not possible to observe the separate effects for the executive management team. The four measures of firm performance are based on data from

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[17] Regression coefficients were significant for both measures, but substantially higher for the unsystematic measure.

Compustat: annual shareholder return, after-tax gross cash flow, ROA, and return on equity (ROE). Abowd used logistic regressions and OLS regressions to model each performance measure and each cash compensation measure. Separate models were also estimated with performance and with compensation as dependent variables. He found that market-based firm performance was significantly associated with compensation lagged by one year when using OLS. Other measures of firm performance were not significantly associated with compensation and the logit models produced weaker results than the OLS models.

Using data from a private survey of 439 large corporations for the years 1981-1985, Leonard (1990) analyzed the effects of organizational structure variables and management compensation on firm performance along with factors affecting executive pay. The data included salary plus bonus compensation for 75-100 managers, profits, and return on equity for each company. Using analysis of variance (ANOVA), Leonard developed a model that explains 87.3% of "executive" pay. However, because the "executives" included all 75-100 managers per firm in the survey and the compensation measure only included salary plus bonus, inferences about executive management team compensation are difficult to draw. Findings from first difference regressions of firm characteristics on changes in executive pay for a sub-sample of executives (who did not change jobs over the sample period) showed significance for change-in-profits and change-in-sales albeit with small regression coefficients. Leonard's conclusions: within

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[18] This finding holds both for vice presidents in the five highest paid executives as well as for all vice presidents with compensation data available.

organization, pay differences are consistent with tournament theory, pay (salary plus bonus) is not strongly related to same-year firm performance, the pay to performance relationship is U-shaped (concave), and the best performing managers tend to promote out of the company.

Perhaps the earliest appearance of teamwork in empirical executive management compensation studies is Main et al. (1993). Using 1980-1984 survey data from a consulting company (for top executives at 210 firms) the authors examined salary and bonus differences between the top four management levels. Main et al. (1993) tested tournament theory (Lazear and Rosen 1981) and the theory of wage compression (Lazear 1989) by modeling the pay gap between the CEO level and the Vice President level. The researchers also tested two competing theories by separately regressing ROA and RET on the log of average executive team member salary.[19] The authors found the following support for tournament theory: (1) increasing gaps between levels of salary plus bonus in moving from level four to level one (the CEO) of a company, and (2) significant association between the variation in salary between executive management team members and ROA. Although not the primary variable of interest, executive team salary was significantly associated with both RET and ROA. The adjusted-R^2 for these two regressions were .08 and .42, respectively.

Beatty and Zajac (1994) investigated the relationship between firm risk and the use of stock options in top management compensation. Data for the study were drawn from initial public offering (IPO) registration statements for 435 IPO firms for 1984.

Separate regressions of firm risk all showed significant negative coefficients (use of stock options, non-cash compensation and management ownership). These results suggest that firms with greater risk tend to use stock options and other types of non-cash pay in managerial compensation more often than firms with lower risk.

Mehran (1995) investigated the structure of executive management compensation and firm performance using a sample of 153 manufacturing firms for 1979 and 1980. Firm performance data came from Compustat and compensation data from proxy statements. Pooled OLS regression results indicated an inverse relation between managerial ownership and equity based compensation, as well as a positive relation between CEOs' percentage of equity compensation and firm performance.

Focusing on incentive pay, Bloom and Milkovich (1998) analyzed the relation between cash compensation and firm performance using survey data from a major consulting firm, stock market data from CRSP, and financial data from Compustat.[20] The data used include an average of 45 managers per firm from over 500 companies during the period 1981-1988. Separate regressions were estimated for bonus and for salary on measures of systematic risk, unsystematic risk, the presence (or absence) of a major outside stockholder, interaction terms, and a variety of control variables.[21] Firm performance (proxied by shareholder return) was regressed on salary, bonus, the same

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[19] Other independent variables included the log of sales, variation in executive team member salary, the proportion of the team with profit center responsibility, an interaction term as well as dummy variables for firm, industry, and year.

[20] Incentive pay was defined as the annual bonus and was viewed as being tied to short-term firm performance. However, Leonard observed that roughly one-third of the annual bonus is persistent year to year (i.e., behaves as though it were part of salary).

[21] The bonus variable was expressed as a percent of salary and the log of salary was used for base pay.

two measures of risk, interaction terms between risk and incentive pay, and firm performance lagged by one year. The authors found that the amount of bonus pay was inversely related to systematic risk and positively related to unsystematic risk. The interaction between unsystematic risk and the presence of ownership control was negative and had the largest coefficient of all the variables. Bonus pay was not a significant factor in firm performance except in interacting with unsystematic risk. In that case, bonus pay had a large, negative effect on performance. R^2 for the firm performance regression was six percent indicating an underspecified model.

The effects of firm size on pay-performance sensitivity were explored by Schaefer (1998) using 1991-1995 data from ExecuComp, CRSP, and Compustat. Examining CEO pay as measured by salary plus bonus and change in wealth, Schaefer found an inverse relation between firm size and pay-performance sensitivity. However, using a partitioned sample between large and small firms, Schaefer found support for a firm size effect when using salary plus bonus as the dependent variable. Subsequent tests using non-linear least squares led to the conclusion that the relation between pay-performance sensitivity is inversely related to the square root of firm size. Finally, Schaefer tested the possibility that the presence of team based incentives and size of the management team might cause the observed effects of firm size on CEO pay-performance sensitivity. To perform this test he ran all previous analyses conducted for CEO compensation again using compensation for groups of the four highest paid executives at each firm. The results were qualitatively consistent with the findings using CEO compensation. Thus, no support was found for group compensation causing the observed firm size effects on CEO compensation.

In another study using tournament theory to explain hierarchical pay gaps within the top levels of organizations, Bognanno (2001) examined the pay gap between the CEOs and the CEOs' direct reports.[22] The researcher used salary plus bonus as the measure of compensation for executives of 600 firms during the period 1981-1988. The database used for this study was maintained by Cornell University and included a variety of compensation and executive demographic data as well as stock market data from CRSP and company financial data from Compustat. The focus of this study was pay gaps (not TMT compensation) and no firm performance variables were used. Bognanno implicitly provided support for human capital theory in executive compensation by demonstrating significant associations between age, tenure, and education as compared to compensation for the four highest management levels. Furthermore, Bognanno found evidence supporting tournament theory in top management compensation differences.

Henderson and Fredrickson (2001) use TMT compensation to investigate the pay gap between CEOs and the next lower hierarchical level of management. The authors test tournament theory versus the competing behavioral theory of relative deprivation to explain the pay gap.[23] Using data from 1985 and 1990, they obtain a final sample that has 189 firm-years for firms representing four industries. The pay gap was calculated separately for long-term, cash, and total pay using the difference between the CEO and the next four highest paid executives. A series of OLS regressions of proxies for the need to coordinate activities, average TMT pay, and various control variables on CEO pay found support for tournament theory. Regressions with ROA as the dependent variable

[22] See also Main et al. (1993) and Lambert et al. (1993).

and pay gaps as independent variables produced mixed results regarding support for tournament versus behavioral theory. In the first series of regressions, average TMT pay was significantly associated with the CEO pay gap, however, the small coefficients indicated little practical significance. In the regressions on ROA average TMT pay was not significant.

Conyon and Sadler (2001) examined the relation between compensation and firm performance for a sample of 532 executives employed at 100 of the largest United Kingdom companies for the fiscal year 1997/8. This study examined the CEO and the next two lower levels of management. The measure for compensation was pay-performance sensitivity (PPS) that was based on a composite of different equity holdings.[24] Results from quantile regressions found a larger, significant PPS for the CEO level than the next lower organization level across all quantiles. The level below the CEO (in this case divisional CEOs) had a significant PPS quantile only at the 50th percentile. Regressions of the PPS on measures of company performance were aggregated for all Board members. The results suggested significant associations for two performance measures: return on capital employed and shareholder return.

Carpenter and Sanders (2002) examined the effects of top management team (TMT) pay on CEO pay and subsequent firm performance. Data sources included compensation data from ExecuComp, firm performance data from Compustat and board

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[23] The authors' analysis of relative deprivation theory was based on the fraternal form, in which a higher echelon (the CEO) is the referent (Martin 1981).

[24] Conyon and Sadler (2001) use the following PPS formula: (Shares held as a percentage of firm shares) + (Options held as a percent of firm shares) x (Option Delta) + LTIP shares as a percent of firm shares) x LTIP Delta).

structure from Standard & Poor's *Register of Directors and Executives*. All data used are for 1992, except firm performance, which is defined as average ROA from 1993-1995. The authors defined compensation as total compensation, and top management team as the four highest paid executives reporting to the CEO. Three hypotheses were tested: (1) the level and structure of CEO pay will be positively associated with the management team pay; (2) the proportion of management team pay that is long-term will be positively associated with future firm performance[25]; and (3) the residuals of regressing CEO pay (and control variables) on management team pay will be positively associated with future firm performance.[26] The CEO was not included in the definition of "team" and team compensation was not included in the hypotheses tests that included firm performance. All hypotheses were supported. Results of regressions on firm performance found the following variables to be significant: CEO pay and pay structure, internal and external alignment of management team pay, and prior firm performance.[27]

In a study of the pay-performance sensitivities for different management levels within firms, Aggarwal and Samwick (2003) included regression results of the pay-performance sensitivities for the five highest paid executives as a "team." Data sources included compensation data from ExecuComp for 1992-1997, and stock returns from CRSP. The net sample size for the "team" regressions was not reported; however, the sample would be the same 6,793 firm-year observations reported for CEOs. Pay-performance sensitivities for the management team were significant based on stock plus

[25] This is referred to as external alignment of management team pay.
[26] This is referred to as internal alignment of management team pay.
[27] The "best" model resulted in explaining 28% of the variation in firm performance.

options, flow compensation, and total compensation.[28] Since the pay-performance sensitivity for the team was an aggregation of the CEO and the next four highest paid executives, the team results were predictably higher. Tests for equality of coefficients across management levels were not reported for the team.

Hanlon et al. (2003) tested the association between stock option grants to the top five company executives and subsequent firm performance for the years 1992-2000. Compensation data for this study were obtained from ExecuComp and company financial data from Compustat. The regression formula specified five years of lagged grant data, netting a sample of 2,627 firm-year observations from 1998-2000. The results showed strong positive associations between the Black-Scholes grant values and future operating income. The results were sensitive to linear versus non-linear specification and the non-linear specification was preferred. Qualitatively similar results were obtained using two-stage least squares regression to control for potential endogeneity.[29]

Carpenter and Sanders (2004) examined the effects of top management team compensation (paid in 1992) on subsequent company performance for 224 multinational corporations. Top management team was defined as the four highest paid non-CEO executives and the TMT pay measure was the natural log of all compensation (from ExecuComp). Company financial information was drawn from Compustat and CRSP, and size of the management team and board information was obtained from Standard and

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[28] Flow compensation is annual compensation as reported in the proxy statement. The stock plus options measure is a measure of change in wealth (see footnote 18), and total compensation in this context is the sum of sum of the first two measures.

[29] Larcker and Rusticus (2005) note that the instrumental variables are not likely to be good instruments and that results could be quite different based on changes in model specification and instrumental variable choice.

Poor's *Register of Directors and Executives*. Market-to-book value for 1993 (the year following compensation data) was used for company performance. Other independent variables of interest included: long-term incentive pay (LTIP) structure, the pay gap between the CEO and TMT members, and the degree of internationalization. LTIP structure was measured by the level of LTIP and by the ratio of LTIP to total compensation. The CEO to TMT pay gap was measured as the natural log of the difference in total CEO compensation and average TMT member compensation. Degree of internationalization was measured using a composite metric developed by Sullivan (1994). Control variables for firm size, diversification, CEO pay and pay structure, industry, and board vigilance were also included. Using two-stage least squares regressions the authors found the control variables insignificant ($p>.05$). TMT pay level and structure were both significant across all models tested. The pay level was positively associated with firm performance but the LTIP structure was negatively associated with performance. The degree of internationalization was positively and significantly associated with firm performance. All interactions with degree of internationalization were significant and positive only when the other variable in the interaction had a positive association with performance as well. The authors concluded that firm performance is driven by pay parity instead of the large gaps proposed by tournament theory. Although the TMT pay coefficients were larger than the CEO pay coefficients, this finding does not suggest that TMT members are more important than a high quality CEO to firm performance. This caution seems appropriate both from the practical perspective presented and because the model did not test for significance between the coefficients.

In another test of pay gaps within management groups, Siegel and Hambrick (2005) employed a sample of 67 U.S. based firms from a compensation database gathered by a consulting firm. Top management group (TMG) was defined as the top three hierarchical levels within each company and included both short and long term compensation in their measures of pay. The primary focus of the study was the relation between measures of pay disparity and technological intensiveness (TI) as independent variables versus measures of subsequent firm performance as the dependent variable. All OLS regressions were performed on each of two measures of subsequent firm performance (the market-to-book ratio and total shareholder return) with each measured as an average for the two years following compensation. The independent variables included three measures of vertical pay disparity (differences in pay *between* hierarchical levels), one measure of horizontal pay disparity (differences in pay *within* a hierarchical level), and two measures of overall pay disparity (coefficient of variation for all TMG members). TI was measured by R&D to sales ratios according to SIC code as reported in Schonfeld's *R&D Ratios and Budgets* (1991, 1992). Interactions between TI and each of the pay disparity measures were also tested as a factor in subsequent firm performance. The results supported the hypotheses that greater pay disparity among management members was associated with lower subsequent firm performance in technology intensive companies because most pay disparity measures were significant only as they interacted with technological intensiveness. The strongest and most consistent results were found using market-to-book ratio as the measure of firm performance.

Bebchuk and Grinstein (2005) analyzed increases in compensation separately for CEO compensation and the total compensation for the five highest paid executives for the

period 1993-2003. Using panel data from ExecuComp, control variables for firm size and performance along with yearly dummy variables were regressed on total compensation to explain increases in executive pay over time.[30] The control variables were firm size (lagged sales) and past firm performance, measured by a one-year lag for ROA and both one- and two-year lags for market return. Firm specific fixed effects are used (but not reported). Separate controls for industry are not included nor are potential endogeneity issues addressed. The researchers found significant unexplained increases in compensation by year after controlling for firm size and performance for both the CEO and the top five management group. The only significant firm performance effect for the top five executives was stock return for the year prior to compensation. ROA for the year prior was significant in the CEO compensation regression in addition to the one-year lagged stock return. The authors also execute separate regressions for equity and for non-equity compensation with substantially similar results. Graphic representations of the changes in compensation over time indicated increasing divergence between CEO compensation and that of the top five executives. Attempts to explain observed results using "arm's-length bargaining" or "managerial power" perspectives were inconclusive.

Following Bebchuk and Grinstein (2005), Conyon (2006) evaluated executive compensation data for the same time period and source (ExecuComp 1993-2003) but focused on contracting theory rather than growth in executive pay, CEO incentives, or compensation committees. Information presented for non-CEO executives is limited to tabular summaries of compensation components, wealth, and incentives. The tables

[30] Total compensation is defined as the annual grant-date compensation as reported in ExecuComp.

showed non-CEO salaries increased faster (3.9%) than CEO salaries (2.5%) but stock based compensation (option grants and restricted stock) increased faster for CEOs.[31] Conyon's analyses and results were all oriented to CEO compensation which provided no evidence of CEO control over compensation committees as a factor in CEO pay.

A new CEO compensation variable representing the CEO's proportion of the compensation earned by the five highest paid executives (CPS) was introduced to the literature by Bebchuk, Cremers, and Peyer (2006). CPS or the "CEO's pay slice" was presented as an important compensation variable for firm performance as measured by Tobin's Q and firm governance characteristics. The authors use compensation data from ExecuComp for 1993-2003, stock return data from CRSP, and governance data from both the Investor Responsibility Research Center (IRRC) and the Thomson 13F database. The primary analytical method used was a fixed-effect regression. The models used CPS as the dependent variable to separately control for industry-specific, firm-specific, and CEO-specific effects. Each set of CPS regressions separately tested board characteristics and combined CEO-firm variables.

The authors' findings are generally consistent with prior CEO research except for the "CEO age missing" variable and the low R-squared values. The "CEO age missing" was a dummy variable representing missing data for the CEO's age in ExecuComp.[32] This "CEO age missing" dummy variable was significant in all the firm fixed-effects

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[31] Over the 1993 to 2003 time frame, mean option grant increases are 8.8% (8.0%) and mean restricted stock increases are 12.1% (8.4%) for CEOs and for (non-CEO executives), respectively.

[32] Bebchuk et. al. (2006) show roughly half of the potential CEO age observations as missing in their sample statistics (6,234 of 13,094 possible observations are present). Prior research using executive age as a variable use data from surveys from consulting firms (e.g., Bognanno 2001) or *Forbes* (e.g., Gibbons and Murphy 1992).

regressions and has one of the largest coefficients of the independent variables in these models; however, the authors did not explain the potential impact on these results. Although R-squared is not normally a primary concern, these regression models have extremely low values (5% and below) compared to R-squares in prior CEO research such as 29 percent in Bebchuk and Grinstein (2005) and 98 percent in Bognanno (2001). This disparity from prior research may suggest problems in the specification of the Bebchuk et al. (2006) models, which may affect their findings.

The Bebchuk et al. (2006) findings relevant to this study are limited to three points. First, by studying the slice of executive team pay that goes to the CEO, they provide some additional evidence on the potentially deleterious effects of pay differences within the executive team. Second, they find CPS to be negatively associated with Tobin's Q indicating that the greater the share of pay that goes to the CEO the lower the value of the firm. Third, they find lagged CPS to be significantly associated with Tobin's Q providing some evidence for the direction of causality flowing from pay to performance. This third point is important because the preponderance of compensation studies use models with compensation as the dependent variable and remain silent on both causality and endogeneity. Exceptions in the executive compensation literature include Palia (2001) who addressed endogeneity, Carpenter and Sanders (2002) who tested subsequent firm performance and control for endogenous CEO pay, and Core, Holthausen, and Larcker (1999) who tested subsequent firm performance and excess CEO pay.

Summary and Conclusions of Extant Literature Relevant to this Study

In the context of today's environment, early executive compensation studies enhance our understanding of the origins and evolution of this research stream but do not address the issues of statistical methodology, data availability, and theoretical applicability. Researchers during this time period sometimes recognized these limitations, but they lacked the requisite tools to address the issues. Murphy (1999) characterized early compensation research findings as ". . . the answer proving to be both relatively uninteresting and hopelessly lost in multicollinearity problems." A summary of this early research, including information on samples, measures, and findings is shown in Table 1.

[Insert Table 1 about here]

Contemporary empirical studies of firm performance and executive compensation that go beyond the CEO level are limited in number and do not directly address the association between compensation of the executive management team and performance of the firm. Many of these studies only include non-CEO executive compensation as a mechanism to evaluate hierarchical pay gaps (O'Reilly et al. 1988; Lambert et al. 1993; Main et al. 1993; Bognanno 2001; Conyon and Sadler 2001; Henderson and Fredrickson 2001). Other studies focus on subsets of the TMT such as individual executives (Murphy 1985) or the three highest paid executives (Antle and Smith 1986). Conversely, some studies group together combinations of managers and directors outside the top management team (Abowd 1990; Leonard 1990; Mehran 1995; Bloom and Milkovich 1998; Aggarwal and Samwick 2003).

Still other research focuses on compensation structure or select components of TMT compensation such as Hanlon et al.'s (2003) study of stock option grants, Mehran's

(1995) study of the proportion of compensation in equity, Abowd's (1990) study of cash compensation, and Beatty and Zajac's (1994) study of non-cash compensation in IPO firms. A few studies include mostly descriptive information about executive compensation beyond the CEO such as Bebchuk and Grinstein (2005) and Conyon (2006) that graph increases in compensation over time and provide tables showing the composition of executive pay by the components reported in corporate proxy statements for both CEOs and non-CEO executives. The limited quantity of published research relating firm performance to compensation of the executive management team and the mixed results of those studies make salient conclusions on TMT compensation difficult. Table 2 summarizes the modern top management team compensation literature including the samples, performance measures, compensation measures, and primary findings.

[Insert Table 2 about here]

The contemporary literature on top management team compensation and firm performance also has several issues. For example, researchers do not focus on the top management team which led to mixed results. In most of these studies TMT compensation is include only as a way to better analyze the effects of pay gaps or CEO compensation. As a result, models involving the TMT are not properly specified for analyzing the association between firm performance and management team compensation. The primary variables of interest for most executive compensation studies are not intended to analyze the effects of the TMT even when TMT compensation is included as a variable in the study. Also, the theoretical basis for most of these studies does not consider team-based performance because the focus is on other subjects (usually

the CEO) or selected components of compensation (e.g., stock options, cash pay, and long-term pay).

Another issue is differences in statistical methods. In spite of the fact that Murphy (1985) demonstrated the shortcomings of cross-sectional analysis in executive compensation, much of the published research continues to use cross-sectional or pooled OLS methods. In cases where panel data and longitudinal methods are used, firm specific fixed-effect models predominate. However, Bloom and Milkovich (1998) used a random-effects model and some researchers reported minimal differences in coefficients using firm specific fixed-effects (Bognanno 2001). The use of different specifications and observations of minimal differences creates a concern as to which approach is correct. The existence of firm-specific time-invariant unobservables is logical and argues in favor of fixed-effects models (Murphy 1985). In fact, Palia (2001) tested the firm-specific fixed-effects specification as compared to random effects or pooled OLS and concluded that the fixed-effects model was superior. Most studies did not report testing to confirm the choice of model specification.

CHAPTER 3

HYPOTHESES DEVELOPMENT

Management Team Compensation

Theoretical motivation for studying the relationship between TMT compensation and firm performance is based on agency theory, small group theory, and the theory of teams. The agency theory literature notes that the principal-agent relationship of the modern corporation contains multiple agents to be considered when contracting to align the interests of the agents (managers) with those of the principals (owners) (Berle and Means 1932; Cyert and March 1963; Jensen and Meckling 1976; Fama 1980). The most common operationalization of these interests is compensation and firm performance for managers and owners, respectively. Small group theory (Hill 1982; Michaelson, Watson and Black 1989) and the theory of teams (Marschak 1955, Marschak and Radner 1972) suggest that the performance of a team will be better than that of any single individual team member. The theoretical direction of causality between compensation and performance is less clear than the theoretical support for the existence for the association. However, motivation theories and agency theory provide insight on causal direction as do current executive compensation structures observed in practice. Each of these theories is reviewed in more detail below with regard to how they support the management team compensation hypothesis which follows.

Agency Theory

One of the most significant changes in the evolution of the modern corporation is the separation of ownership and control with effective control ending up in the hands of "management." Berle and Means (1932) liken the "dozen or so men in control" as

"agents running a business" for the owners. These agents are given authority by the owners as well as certain legal rights by state charters such that certain agents (the officers) are recognized as legally able to conduct business for the corporation. The potential to pursue one's self interest on the part of management at the expense of owners was identified by presenting legal cases wherein management was enriched by actions that resulted in firm bankruptcy. In their "behavioral theory of the firm," Cyert and March (1963) further develop the concept of conflicts between managements' interests and owners' interests by suggesting that a firm is a set of coalitions of members, each with individual goals. Effective control of the organization is viewed as being held by a dominant coalition (top management). This coalition consists of managers, each of whom will attempt to maximize his personal utility.

In describing a theory of large managerial firms, Monsen and Downs (1965) make three key points regarding the role of executive management in modern corporations. First, they echo agency theory in observing a divergence of interests between managers and owners of firms. Second, they suggest that organizational complexity, in the form of the quantity of information to process, exceeds the capability of any single individual. Last, they observe that the administration of large firms requires a bureaucratic structure. These early theorized behaviors developed into modern agency theory in which the firm is viewed as a "nexus of contracts" (Jensen and Meckling 1976) or as "a team with bounded self-interests" (Fama 1980).

Agency theory identifies the need to establish contracts that efficiently and effectively bond the interests of the management team to the interests of the owners of the firm. Compensation is the most objectively measurable aspect of managerial interests

or utility and various measures of firm performance are used to operationalize the interests of the owners. In spite of the explicit presentation of the management team as the agents whose interests need to be bonded to the owners of the firm, the most common empirical application of agency theory has been to motivate tests of the association between CEO compensation and firm performance. Based on agency theory, the expectation should be that firms implement contracts or other bonding mechanisms to effect a positive association between TMT compensation and firm performance.[33]

Small Group Theory

Modern business education emphasizes that teams and teamwork produce better results than individuals working alone. Early theory on group decision-making suggests the presence of an assembly bonus effect resulting from team member information pooling, information integrating, and error checking. However, early empirical findings on group decision-making generally suggest that group decisions are often no better than decisions made by the most competent member of a group (Hill 1982; Michaelson et al.1989; Beach and Connolly 2005). In a survey of the literature on group decision-making, Hill (1982) notes that individuals perform equal to or better than groups in solving simple problems whereas groups tend to perform better in solving abstract problems. Michaelson et al. (1989) study 222 teams and find that groups outperform the most proficient individual 97 percent of the time. The authors attribute mixed results in the literature on group effects to the use of *ad hoc* groups solving artificial problems

[33] Bebchuk and Grinstein run a regression model that arguably tests a form of association between TMT pay and firm performance. However, their model is designed to measure annual compensation increases and implicitly assumes unidirectional causality from firm performance to TMT pay.

versus real groups solving relevant problems. Managing today's modern corporation is the epitome of abstract, complex, problem solving.

The Theory of Teams

The theory of teams suggests that team decisions are likely better than individual decisions (Marschak 1955). Marschak also asserts that separate decisions of executives jointly determine a firm's profit and that these decision-outcome combinations can be modeled as a set of score tables and probability distributions. In the progeny to the theory of teams, the "economic theory of teams," states:

> It is intuitively evident that, by adding to a team member's knowledge the knowledge of some or all of his partners, the (gross) expected payoff of the team cannot be decreased, and may be increased (Marschak and Radner 1972, 129).

Marschak's theory of teams motivated a variety of empirical studies of teams which includes: teams in a sales organization (Nojiri 1981), production worker teams in a garment factory (Hamilton, Nickerson, and Owan 2003), and cross-functional teams working on capital budget projects (Chalos and Poon 2000). However, the extant research is silent with respect to this theory and the study of TMT pay or performance.

Direction of Causality

Most executive compensation studies do not explicitly address the direction of causality. The most common practice is to use some measure of compensation as the dependent variable with a fairly common set of controls and factors of interest as independent variables. Regressions most often use contemporaneous measures of the variables (e.g., Lambert et al. 1993; Bloom and Milkovich 1998; Palia 2001). The

combined selection of compensation as the dependent variable and the absence of using lagged variables imply causality flowing from firm performance to compensation.

There are a few exceptions to the models implying causality from firm performance to compensation. Carpenter and Sanders (2002) use future firm performance, measured by ROA averaged for three years following annual CEO compensation. Findings suggest that CEO compensation is significant, but the study covers only one year's compensation and does not control for firm specific fixed-effects. Carpenter and Sanders (2004) also use subsequent firm performance as a dependent variable in a study of executive compensation in multinational firms with similar findings and the same limitations. Core et al. (1999) find excess CEO compensation (as an independent variable) and future firm performance (as the dependent variable) to be negatively associated. They test average future firm performance one year, three years, and five years following compensation. The association is significant for each period but attenuates over time.

Carpenter and Sanders (2002, 2004) suggest agency theory motivates the relation between compensation and subsequent firm performance because long-term pay (e.g., options and restricted stock) better aligns the interests of managers and owners (Jensen and Murphy 1990). Murphy (1999) notes the increased use of long-term pay as a component of CEO compensation during the 1990s. Bebchuck and Grinstein (2005) and Conyon (2006) show increases in equity based executive compensation through 2001. Reported long-term components of executive compensation are based on values estimated when granted even though the actual value realized by the executive depends on future performance.

Expectancy theory (Vroom 1964) states that people are motivated by a function of their perceptions of the probability that effort will lead to achieving some performance which will in turn lead to receiving a valued reward. Porter and Lawler (1968) provide an expanded model of Vroom's expectancy theory which includes a feedback loop from rewards to future efforts. This loop indicates that the satisfaction from receiving a reward (such as compensation) motivates efforts towards future accomplishments and more rewards. In the case of TMTs, expectancy theory suggests that compensation can motivate subsequent performance if the team members perceive that the relationship between effort, performance, and further rewards is favorable. This theory suggests causal direction from pay to performance for all forms of compensation (long-term and short-term) and is tested with the following hypothesis, stated in the alternative form:

H1: TMT compensation is positively associated with future firm performance.

Top Management Team Pay Disparity

TMT compensation disparity exists when team members' pay levels are different from one another. Equity theory (Adams 1963) suggests that when people perceive the ratio of their outcomes (e.g., pay, promotion, recognition) as compared to their inputs (e.g., effort, education, experience) are different than the ratio for other people there is perceived inequity. Compensation is arguably the most persistent, measurable outcome for individuals in business. Effort or performance metrics are likely the most common inputs. Therefore, pay disparity that is perceived to be inequitable can cause employees to modify their performance behavior as they attempt to resolve the perceived inequity (Carrell and Dittrich 1978). An important factor in the determination of inequity is

choosing a person or group as a referent to use as a comparison. Thus, equity theory is sometimes referred to as a form of social comparison theory. Alternatively, because equity theory considers the distribution of outcomes, this theory is also considered a form of distributive justice (Greenberg 1987).

Relative deprivation theory, a form of distributive justice closely related to equity theory, is potentially more useful for TMT compensation research because it is explicit regarding the choice of referents and it uses readily measurable outcomes (such as pay).[34] Referents for this theory fall into one of two categories, which determine the specific type of deprivation. Comparing to an upward or dissimilar referent is called fraternal deprivation whereas comparing to a similar or lateral referent is egoistic deprivation. In a TMT context, the most likely fraternal referent might involve comparing upward to the CEO. The most likely egoistic referent would be the highest paid member of a person's TMT who is in the same hierarchal level of the company. This comparison is cognitively and administratively straightforward as it involves relatively few individuals as potential referents, all of whom are at the same organizational level in the same company.

Selecting a referent from TMTs at other companies is less likely as it requires mentally sorting out potential dissimilarities due to company, industry, and responsibility. A fraternal referent is also less likely because of dissimilarity. In fact, a fraternal referent is the basis for tournament theory in which large pay gaps are theorized to provide motivation for enhanced performance (Lazear and Rosen 1981). Martin (1981) notes that

[34] Presumably inputs are subsumed into the more explicit choice of referents.

people tend to select the highest paid individual within a similar group as the referent.[35] Lazear (1989) presents an argument similar to relative deprivation theory for pay compression (minimizing disparity) in competitive environments in which it is possible for one worker to sabotage another's efforts.[36] This argument suggests that the behavioral effect of pay compression is to reduce the potential for uncollaborative actions by workers which could reduce firm performance.

TMT rewards (compensation) are published in publicly available corporate proxy statements for referents (TMTs members). The relative ease of identifying and comparing compensation to the egoistic and the public display of the pay disparity for executives will likely exacerbate the effects of relative deprivation. Empirical executive compensation studies that include pay disparity as a variable produce mixed results. Contrary to theory, Main et al. (1993) find a positive association between TMT pay disparity and firm performance. This may be due to including the CEO in the calculation or using a coefficient of variation measure instead of the highest paid lateral referent.[37] Using non-CEO pay dispersion as a control variable, Henderson and Fredrickson (2001) found a negative but insignificant association with firm performance.[38] Carpenter and Sanders (2004) include a CEO to non-CEO TMT pay gap in a regression on firm

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[35] "Similar group" in this case constitutes managers of similar age, education, and position in the firm.
[36] This seems to run counter to tournament theory (Lazear and Rosen 1981). However, the key is in the choice of the referent. In tournament theory the referent is a higher hierarchical position in which case pay disparity is hypothesized to be favorable to performance.
[37] Including the CEO in the pay disparity measure in essence blends two theories, tournament and the egoistic form of relative deprivation, which predict opposing effects on firm performance.
[38] Using a coefficient of variation weakens the measure of relative deprivation as compared to using the highest paid lateral referent.

performance, and the findings are contrary to fraternal deprivation theory but consistent with tournament theory.

Following the egoistic form of relative deprivation theory, the next hypothesis tests the relationship of disparity in pay between the highest paid non-CEO TMT member and the average compensation of all other non-CEO members. Hypothesis two is stated in the alternative form:

> **H2:** The compensation gap between the highest paid non-CEO member and the other non-CEO TMT members will be negatively associated with future firm performance.

In summary, this chapter provides theoretical support for two central themes regarding the association between executive management team compensation and firm performance: (1) TMT pay is positively associated with future firm performance, and (2) pay disparity within the team is negatively associated with future firm performance. Multiple theories provide support for each theme and the proposed direction of causality. The hypotheses represent these two themes. The next chapter presents the empirical models as well as the underlying analytical methods, variables, and data to test the hypotheses.

CHAPTER 4

RESEARCH METHODOLOGY

The level and structure of executive compensation are subject to many unobserved factors that may be logically associated with individual firm characteristics which do not change over time (Murphy 1985, 1999). Examples of such characteristics specific to a given firm include: compensation policies, corporate culture, unique products, markets, and strategies. Because these firm-specific effects are largely unobservable and are likely correlated with measures of firm performance and compensation, they create a correlated omitted variables problem that can seriously bias regression coefficients in pooled or cross-sectional regressions (Hsiao 2003).

Panel data is a methodology that has the potential to mitigate the problem of correlated omitted variables.[39] Using panel data and applying a fixed- effects transformation can control for many omitted variables by creating "time-demeaned data" which eliminates the time invariant factors (Wooldridge 2003). Murphy (1985) empirically demonstrated the importance of controlling for time-invariant unobservables in his study of the compensation of individual executives. In a study of CEO compensation, Palia (2001) statistically tested alternate methods (fixed-effects, random-effects, pooled OLS) resulting in identification of the fixed-effects transformation as the best approach. In addition to providing ways to control for omitted variables, panel methods also increase control for multicollinearity and provide more degrees of freedom than either time-series or cross-sectional methods (Hsiao 2003).

Data Sources and Sample Selection

Panel data for executive compensation are available in the proxy statements for publicly traded companies in compliance with SEC regulations. Standard and Poor's maintains a machine readable data base, ExecuComp, which contains compilations of compensation and related data from proxy statements beginning in 1992.[40] Researchers also obtain panel data from compensation consulting firms. The present study uses ExecuComp data for the ten years beginning with 1995 to capture data for all firms in the S&P 1500. All firms in Standard Industry Classification codes (SIC) in the 6000 series (financial services firms) are excluded because of differences in financial reporting measures that are unique to those industries.

All firm-year observations containing valid data for the variables specified in each regression model are included in the analyses for the present study. This approach produces different numbers of observations by firm-year because not all firms are in business for all years, which is referred to as "unbalanced panels." Although it may seem intuitive to extract balanced panels from the data such that each year has the same number of observations, this is generally not advisable for two reasons. First, imposing this condition on most datasets will result in substantial loss of data and hence efficiency. Second, in evaluating why data are not present for all years it is important to consider whether bias is more likely using the unbalanced panel or the extracted balanced panel

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[39] Panel data is sometimes referred to as longitudinal data. The more common term "panel" is used throughout this paper. Each panel refers to a cross-section of variables by subjects. The cross-sectional panels are usually by time period and are repeated for each subject for multiple time periods.

(Kennedy 2003). Both the number of firms and the number of executives change across years as new firms and executives enter or exit the Standard and Poor's 1500. Excluding all of these changes to extract a balanced panel would introduce survivorship bias. To the extent that including the unbalanced data introduces some other form of bias the fixed-effects transformation should act as a control, providing the bias is time invariant (Wooldridge 2003). The present study assumes that bias is less likely using unbalanced panels, however, balanced panels are tested and reported in the supplemental analysis section.

All variables specified in the models are included in (or can be calculated from) ExecuComp except for the control variable for financial leverage (LEV), which is operationalized as the debt ratio.[41] Additionally, consumer price index information is extracted from the Federal Bureau of Labor statistics to deflate all dollar denominated variables to 1995 constant dollars. Each variable used in the empirical models is described next. Table 3 provides functional definitions of all these variables along with formulas that include the variable names as shown in the source databases.

[Insert Table 3 about here]

Firm Performance – Dependent Variable

The executive compensation literature uses various proxies for firm performance. Currently, the two most commonly used measures are shareholder returns, usually

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[40] According to documentation for ExecuComp, data prior to 1994 is "mostly" the S&P 500 firms. The database also excludes firms listed on the stock exchanges as ADRs (American Depository Receipts) because ADR firms are not required to file proxy statements that are the source for ExecuComp data.

defined as annual stock appreciation plus dividends (RET), and return on assets (ROA). The "performance" columns of Table 1 and Table 2 show the firm performance proxies used in the extant literature discussed in this paper. Less common proxies that are used for firm performance include: profit, return on equity, market-to-book ratio, shareholder wealth, Tobin's Q, and cash flow. RET is an equity based measure of performance whereas ROA is an accounting based measure of performance. Researchers sometimes test both an accounting based and an equity based measure to see if the results are qualitatively similar (e.g., Mehran 1995; Core et al. 1999; Conyon and Sadler 2001; Carpenter and Sanders 2002; Bebchuk and Grinstein 2005). Based on Hypothesis 1 and the related theoretical support, the present study examines average firm performance one year, three years, and five years subsequent to compensation for both ROA and RET (Core et al. 1999).

Control Variables – Firm Performance

Commonly applied variables from the empirical executive compensation literature are used to control for factors that may confound the associations between compensation and subsequent firm performance. These factors are firm size, growth opportunities, and capital structure. Industry controls are not necessary because the analysis is a firm specific fixed-effects transformation.[42] Firm size controls used in the literature include

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[41] ExecuComp data begins in 1992, but coverage of the full S&P 1500 is not in place until 1994. As of the date of this writing, data for 2005 is incomplete due to non-calendar year-ends and lags between fiscal year-ends and proxy statement filings.

[42] The fixed-effects transformation impounds all time invariant factors into the firm specific intercepts. Because firms seldom change industries any industry control variables would be differenced out in the transformation.

sales, assets, market value, as well as the natural logs of each of these.[43] Market-to-book ratio (defined as market capitalization divided by book value as of fiscal year end) is commonly used to represent growth opportunities and is a significant factor in firm performance (Core et al. 1999). Capital structure is also a common control variable in firm performance studies, such as the debt-to-assets ratio, which is defined as total liabilities divided by total assets as of fiscal year end (Palia 2001; Bebchuk et al. 2006). The present study uses the natural log of sales (SALES), market-to-book ratio (MBR), and debt-to-assets ratio (LEV) as control variables.

Top Management Team – Independent Variables

Definition of the TMT

The management literature argues that the definition of the TMT or TMG depends on certain attributes and behavioral characteristics such as complementary skills, commitment to a common purpose, and mutual accountability to common goals (Katzenbach and Smith 1992). Under this argument many corporations would not have a "true" top management team. However, a TMT clearly exists in every firm. The real issue is the degree to which team member behavior exhibits team-like characteristics. Survey and empirical work suggest that the team, as perceived by either the CEO or others in the firm, ranges from five to fourteen members (Hambrick 1995) or four to twenty-two members (Siegel and Hambrick 2005). Small group theory suggests that the increasing number of possible human interrelations which occur as the number of team members increases places a practical limit on the size of a team, and suggests that the

[43] Tosi et al. (2000) reports firm size variables used in the CEO compensation literature and in a principal

optimal size of a team is five to seven members (Shull et al. 1970). This is consistent with the four or five member team size assumed in much of the TMT empirical research, although this selection is likely driven by data availability. Henderson and Frederickson (2001) define the TMT as the CEO and the next four highest-paid executives, acknowledging that these five executives may either inappropriately include or exclude members without causing a serious problem. As long as the compensation of the executives included is a reasonable proxy for the actual team this proposition is likely true. The present study defines the TMT as all executives whose compensation is reported in the proxy statement, and includes a control for potential effects of different size teams: a firm-year TMT size variable (TSIZE) equal to the number of executives reported in ExecuComp, which ranges from one to fifteen. This TMT definition is a departure from the extant literature, which uses data from the proxy statements. However, using the added data disclosed by some companies is based on the aforementioned empirical and theoretical considerations.

Executive Compensation

Executive compensation data is available for seven components that comprise total pay: salary, bonus, other annual pay, stock options, restricted stock grants, long-term incentive pay, and all other pay. Some research focuses on increases in executive wealth instead of reported annual compensation (Aggarwal and Samwick 2003; Antle and Smith 1986); however, the majority of executive compensation studies use the "flow" or "grant date" compensation reported in the proxy statements. Unlike wealth

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components analysis show that many of the measures strongly load on the same factor.

measures, grant date compensation does not include the effects of increases in prior stock related grants. The present study uses grant date compensation.

Some executive compensation studies of performance focus on short-term (cash) compensation (e.g., Abowd 1990; Leonard 1990, Main et al. 1993; Bloom and Milkovich 1998; Bognanno 2001) whereas others focus on long-term (equity) compensation (e.g., Beatty and Zajac 1994; Conyon and Sadler 2001; Hanlon et al. 2003). Although the choice of a compensation measure is increasingly dependent on the specialized nature of the research question, most studies examine total compensation as well as short-term versus long-term compensation components (e.g., Mehran 1995; Henderson and Fredrickson 2001; Carpenter and Sanders 2002; Bebchuk and Grinstein 2005). The present study uses total pay as well as total short-term pay and long-term pay as variables. The short-term versus long-term distinction is important because long-term pay is generally expected to more closely relate to agency theory and stock based measures of firm performance. Short-term pay often shows more of a fixed or "sticky" behavior, especially when firm performance declines. Thus the association between compensation and performance may vary based on a firm's performance as well as which measure is used to measure or proxy for performance. Following contemporary executive compensation research, this study uses the natural log transformation for all compensation variables. For a given firm-year, the firm's TMT pay is the total pay of all executives reported in ExecuComp. The CEO compensation variable is labeled CEO$ for total compensation, TMT$ for total pay, TMTS$ for short-term pay and TMTL$ for long-term pay.

Models of TMT Compensation and Future Firm Performance

Most executive compensation research models use compensation as the dependent variable and proxies for firm performance along with various controls as the independent variables.[44] The present study uses firm performance as the dependent variable to more closely model current theory and practice. All dollar-denominated variables are natural log transformations to help control for potential non-linearities and scale effects. Such transformations are commonly used in extant executive compensation studies (Murphy 1999). All base models are tested using the firm specific fixed-effects transformation with supplemental analysis, as required. Hypothesis 1 is tested using the two different proxies of firm performance. The expectation is that β_1 will be positive and significant in both models (1) and (2) below.

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 TSIZE_{it} + \beta_3 SALES_{it} + \beta_4 LEV_{it} + \beta_5 MBR_{it} + \varepsilon_{it} \quad (1)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 TSIZE_{it} + \beta_3 SALES_{it} + \beta_4 LEV_{it} + \beta_5 MBR_{it} + \varepsilon_{it} \quad (2)$$

In each equation presented above the subscript *i* refers to a firm and the subscript *t* refers to a year such that each *it* represents a firm-year observation for a variable. The *it** subscript is used for the dependent variables to denote that the time component for future firm performance will be modeled for each of three time dimensions : average one year, three years, and five years subsequent to compensation. The variable α_i represents the firm-specific fixed-effects, which are the intercepts of each firm's regression across the panels for each time period. The variable ε_{it} represents the firm-year error term.

[44] Murphy (1999) provides a review of common methods used in CEO compensation research along with a discussion of the advantages and disadvantages of the more commonly used methods.

Next, Hypothesis 1 is tested to determine if results for total TMT compensation are robust to using short term compensation or long-term compensation. The expectation is that both β_1 and β_2 will be positive and significant. However, the *a priori* expectation is also that β_2 will be larger and a test of the coefficients will support $\beta_1 \neq \beta_2$. This prediction is consistent with agency and expectancy theory predictions regarding the benefits of using equity compensation to contract for long-term firm performance. Models 3 and 4 below are used to empirically test effects of the short versus long term compensation elements of TMT pay on performance of the firm.

$$ROA_{it*} = \alpha_i + \beta_1 TMTS\$_{it} + \beta_2 TMTL\$ + \beta_3 TSIZE_{it} + \beta_4 SALES_{it} + \beta_5 LEV_{it} + \beta_6 MBR_{it} + \varepsilon_{it} \quad (3)$$

$$RET_{it*} = \alpha_i + \beta_1 TMTS\$_{it} + \beta_2 TMTL\$ + \beta_3 TSIZE_{it} + \beta_4 SALES_{it} + \beta_5 LEV_{it} + \beta_6 MBR_{it} + \varepsilon_{it} \quad (4)$$

Subsequently, incremental team performance effects are examined. Each team member's contribution, as proxied by their compensation, may be more or less correlated with firm performance. Team theory and small group theory suggest team decisions are superior to individual decisions. Since the association between CEO compensation and firm performance is well documented in the literature, the present study tests for the incremental team effects by adding a control variable for the CEO's compensation to the original models (1) and (2). Based on theory, the expectation is that both β_1 and β_2 will be positive and significant.

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 CEO\$ + \beta_3 TSIZE_{it} + \beta_4 SALES_{it} + \beta_5 LEV_{it} + \beta_6 MBR_{it} + \varepsilon_{it} \quad (5)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 CEO\$ + \beta_3 TSIZE_{it} + \beta_4 SALES_{it} + \beta_5 LEV_{it} + \beta_6 MBR_{it} + \varepsilon_{it} \quad (6)$$

Models of TMT Pay Disparity and Future Firm Performance

Prior executive compensation research, which includes pay disparity measures, often uses the coefficient of variation as a proxy for relative deprivation (Siegel and Hambrick 2005; Main et al. 1993; Henderson and Fredrickson 2001). By not using the highest paid lateral referent in calculating pay disparity the coefficient of variation understates the perceived magnitude of disparity of team members. To examine this understatement, the present study constructs a measure of a team's degree of relative deprivation (DSP$) as the difference between the compensation of the highest paid non-CEO executive listed in ExecuComp to the average of all other non-CEO executives. This variable definition follows the egoistic form of relative deprivation as described by Martin (1981). As with the other compensation variables, DSP$ is natural log transformed. Models (7) and (8) test Hypothesis 2. The expectation is that the coefficient of β_2 will be negative and significant in both models.

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 DSP\$ + \beta_3 TSIZE_{it} + \beta_4 SALES_{it} + \beta_5 LEV_{it} + \beta_6 MBR_{it} + \varepsilon_{it} \quad (7)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 DSP\$ + \beta_3 TSIZE_{it} + \beta_4 SALES_{it} + \beta_5 LEV_{it} + \beta_6 MBR_{it} + \varepsilon_{it} \quad (8)$$

Supplemental Analyses

The Effect of Losses versus Profits

Empirical evidence suggests that either firm losses do not flow through to affect CEO compensation (Gaver and Gaver 1998) or that losses cause the association between performance and compensation to be asymmetric (Leone, Wu, and Zimmerman 2006). Based on these findings in studies of CEO cash compensation, the present study partitions the data by excluding observations of current firm-years with losses and retests

the models. In testing the partitioned data, the expectation is that excluding firm-year observations with losses will show stronger significance and larger coefficients for the independent variables than the coefficient found using the complete dataset.

Testing the Fixed-Effects Transformation

The fixed-effects transformation dominates the empirical executive compensation literature for those studies that attempt to control for omitted variables. However, Bloom and Milkovich (1998) use random-effects estimation and Bognanno (2001) claims that using the fixed-effects transformation does not substantially change the estimated coefficients. Only Palia (2001) reports testing the fixed- versus random-effects assumption in a model regressing CEO pay-performance sensitivity on Tobin's Q, and finds the fixed-effects estimation superior. Hsiao (2003) asserts that "Whether to treat the effects as fixed or random makes no difference when T is large . . . When T is finite and N is large . . . It can make a surprising amount of difference in the estimates of the parameters" (p. 41). With large compensation datasets available from ExecuComp or consulting firms, N (the number of observations) is often in the thousands and T (the number of time periods) is often less than fifteen. Therefore, it is important to test whether the fixed-effects or random-effects specification is appropriate.

Because this study uses data from specific firms over time as opposed to random draws of observations from a population, the fixed-effects transformation seems most appropriate. Many firm characteristics that are relatively stable over years could contribute to a firm-specific fixed-effect (i.e., compensation policy, corporate culture, regulatory environment, products). To confirm that the fixed-effects transformation best represents the data, models (1) and (2) are separately estimated using a fixed-effects

transformation, a random-effects transformation, and pooled OLS. The Breusch-Pagan test is used to verify the choice of the random effects model over pooled OLS, followed by the Hausman specification test (Hausman 1978) to verify the choice of a fixed-effects model over a random-effects model.

Alternate Measure of TMT Pay

If the compensation of multiple team members is positively correlated with firm performance, then the TMT compensation coefficient (β_1) in models (5) and (6) could be greater than the CEO compensation coefficient solely due to more executives being included in TMT$. In order to clarify potential findings I run both models using an average or "per capita" pay in place of total pay for the TMT

Endogeneity between TMT Pay and Firm Performance

Endogeneity between performance measures and compensation is a potential issue that may result from "gaming" accounting based measures (Indjejikian 1999). Recent evidence of stock option backdating indicates that equity based performance measures are also not immune to similar endogeneity issues. Even without corporate misconduct the question remains as to whether firm performance drives compensation or compensation drives firm performance. In spite of this question most extant executive compensation research uses compensation as a dependent variable and treats measures of firm performance as exogenous determinants. Exceptions include Palia (2001) and Carpenter and Sanders (2002). Each of these two studies addresses endogeneity regarding CEO compensation. The more likely expectation, consistent with Palia (2001), is that executive compensation and firm performance are jointly determined.

Testing and controlling for endogeneity requires instrumental variables that are not correlated with the error term but are correlated with the independent variable suspected to be endogenous. Correct use of instrumental variables can reduce inefficiency in coefficient estimates caused by correlated omitted variables (Larcker and Rusticus 2005). In the case of executive compensation, human capital theory suggests several potential instrumental variables (Mincer 1958; Bognanno 2001; Palia 2001).

Human capital theory developed out of attempts to explain observed differences in personal income as the result of an accumulation of investments that people make in themselves. These investments are made by forgoing current earnings to spend time in training with the expectation of "returns" in the form of higher future wages (Mincer 1958). Mincer successfully explained wage differentials observed in U.S. census data by using human capital variables which included age, education, and experience. The resulting function exhibited an inverted U-shape suggesting a quadratic function with diminishing returns (Mincer 1958, 1970). As part of his test of tournament theory in executive management Bognanno (2001) found education, age, company tenure, and job tenure to be significant. Age was the dominant factor in a firm-specific fixed-effects model. Human capital variables have been successfully used to control for endogeneity in a model of firm value and CEO compensation (Palia 2001).

Based on human capital theory, as applied in prior CEO compensation studies, the present study predicts that the human capital variables of age and company tenure will provide satisfactory instruments for TMT compensation. Consistent with Bognanno's (2001) findings, executive management team members are advanced in their careers such that experience dominates job performance capability and formal education is less of a

criterion in determining compensation. Further, top executives most likely possess relatively homogenous education levels. As a result, education should provide little information on variation in pay or performance across managers at the executive level. Thus, education is not included as an instrumental variable for TMT compensation. To develop controls for endogeneity, two variables from human capital theory and their quadratic forms are used as instruments for compensation. These variables are age of the executive (AGE, AGE^2) and tenure with the company (TNR, TNR^2).

The problem with endogeneity is that it represents an omitted correlated variables problem, which can cause biased and inefficient estimates. Using a fixed-effects transformation or first differences estimation model controls for omitted variables that are time invariant, but these methods do not address omitted variables that change over time. Thus, endogeneity is an important consideration in models in which one or more explanatory variables may be jointly determined with the dependent variable.

The first test of theorized instrumental variables for TMT compensation is accomplished by regressing the instruments and the control variables from model (1) on TMT$. For the hypothesized instrumental variables to be appropriate, they must be correlated with the suspected endogenous explanatory variable (TMT$), only incidentally correlated with the dependent variable (firm performance), and uncorrelated with the error term of the original equation being estimated. Although higher correlations between an instrument and the explanatory variable are desirable, even small correlations can produce useful instruments. Equation (9) provides a measure of the quality of the instruments for TMT$ by examining the significance of the coefficient for each instrument and the partial R^2 of the instruments, the endogenous variable, and the

dependent variable (Larcker and Rusticus 2005). A power test is used to determine the significance of the instruments in the specification shown in model (9). The variable TMT$I represents the predicted values from using the instrumental variables to estimate TMT compensation.

$$TMTI\$_{it} = \delta_i + \gamma_1 AGE_{it} + \gamma_2 AGE^2_{it} + \gamma_3 TNR_{it} + \gamma_4 TNR^2_{it} + \gamma_5 SIZE + \gamma_6 LEV + \gamma_7 MBR + \gamma_8 \varepsilon_{it} \quad (9)$$

To test for endogeneity (testing if the instrumental variable estimation is better than the OLS fixed-effects estimation), the predicted values from equation (9), labeled as $TMT\$I_{it}$, are used to re-estimate equations (1) and (2).[45] The restated equations using the instrument for TMT$ are shown as models (10) and (11):

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$I_{it} + \beta_2 TSIZE_{it} + \beta_3 SALES_{it} + \beta_4 LEV_{it} + \beta_5 MBR_{it} + \varepsilon_{it} \quad (11)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$I_{it} + \beta_2 TSIZE_{it} + \beta_3 SALES_{it} + \beta_4 LEV_{it} + \beta_5 MBR_{it} + \varepsilon_{it} \quad (12)$$

Next, the Hausman specification test (Hausman 1978) is used to test for the presence of endogeneity. Cases in which the test indicates endogeneity suggests the instrumental variable estimation is more appropriate and all related models should be re-estimated using the instrumental variables.

The next chapter discusses the findings from executing the empirical models using the variables and research methods described in this chapter.

CHAPTER 5

EMPIRICAL RESULTS AND ANALYSES

Sample Selection and Description

ExecuComp provides data that details each stock grant for each executive for each year for each company listed. The level of analysis for this study is per firm-year therefore after calculating the team and CEO compensation variables for each firm year, unnecessary observations are deleted before testing the regression models. The initial sample includes all 134,199 firm-year-executive-grant observations from the ExecuComp database for the 10 years from 1995 to 2004. After deleting financial service firms (SIC codes 6000-6999), observations detailing multiple grants per executive year, and observations missing data for dependent or independent variables 92,024 firm-year-executive observations remain. The detail for individual executives is used to calculate firm-year values for TMT compensation, pay disparity, and CEO compensation as shown in Table 3. Next, the dataset is collapsed to 15,166 firm-year observations by removing data on individual executives. This step ensures that no duplicate observations for a given firm-year remain in the data. Compustat provides data on total liabilities to enable calculation of debt ratios and consumer price index data allows deflation of dollar denominated variables to 1995 constant dollars. The influence of outliers is mitigated by trimming extreme observations at the 1 percent and 99 percent levels (2,001 observations) and removing all observations with common equity less than $1 million

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[45] Stata (release 9) provides commands that combine calculating predictions from the instruments with re-estimating the model (xtivreg).

(144 observations). These procedures produce data from 2,039 firms, with maximum usable firm-year observations of 13,021 as reported in Table 4.[46] Of these 2039 firms, 614 firms have data for all 10 years. Supplemental tests comparing balance versus unbalanced panels use these 6,140 firm-year observations.

[Insert Table 4 about here]

Descriptive statistics for the data are shown in Table 5. This information is presented for the raw data after removing outliers, but before deflating to constant dollars, applying the log transformation, or making the fixed-effect transformation. Providing descriptive information for the raw data allows for easier evaluation of data reasonability and interpretation with regard to commonly reported business metrics. The descriptive statistics are comparable to other research using the same variable for similar time frames. The compensation descriptive statistics are most comparable to Bebchuk and Grinstein (2005) due to their use of the same data source for a similar time period. The large differences between means and medians indicate that many of the variables are strongly right-skewed (e.g., all compensation variables, sales, income, market value).[47] Although these raw data violate the normal distribution assumption, histograms and skewness metrics indicate that the transformed data used in the regressions exhibit a normal distribution.

[Insert Table 5 about here]

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[46] Actual firm-year observations used in each regression varies based on the number of years for which the dependent variable has data. The 1, 3, and 5 year average firm performance measures have progressively fewer usable observations due to the number of future years required to calculate the variable.

[47] The non-normal distribution of the raw data was also confirmed graphically as was the normality of the transformed data used in the regressions. The graphs are not included in this paper.

One serious problem in the extant executive compensation research prior to the mid-1980s is multicollinearity (Murphy 1999). Multicollinearity is a characteristic of data that can arise as a problem when two or more independent variables in a regression are highly correlated such that the coefficients become unstable (Fox 1991). Unstable coefficients can change substantially as a result of minor changes in the data or model specification. These changes result from the regression not being able to adequately distinguish the separate effects of the collinear variables. Correlation matrices for the independent variables used in this study are shown in Table 6. Only two pairs of variables which appear together in a regression model are highly correlated enough to cause collinearity concerns: TMTT$ with CEO$ at 88.8 percent and TMT$ with DSP$ at 71.2 percent. These correlations in the raw data are reduced by the natural log and fixed effects transformations to 78.6 percent and 63.8 percent, respectively. Panel models are less prone to the effects of multicollinearity because of the statistical power provided by the large number of observations typical of panel data sets. Panel methods further improve precision of estimates, which cause coefficient instability by controlling for correlated omitted variables and using time-series components to mean-center firm specific data. The models that contain potential multicollinearity are examined before and after dropping one of the highly correlated variables; however, no substantial change resulted in the magnitude of the remaining coefficient. Therefore, the problem of multicollinearity is not considered in subsequent analyses.

[Insert Table 6 about here]

TMT Compensation and Future Company Rates of Return

The first test of Hypothesis 1 estimates the relation between total top management team compensation (TMT$) and firm performance as proxied by an accounting rate of return (ROA) and a market based rate of return (RET). The predicted direction of causality suggests that compensation for work today affects future results. Table 7a provides coefficients and significance levels for estimating models (1) and (2) using firm performance measures averaged for one, three and five years following the year of grant date compensation. TMT$ shows a strong association with future firm performance in both measures of firm performance in each time period. There is attenuation in the magnitude and significance of the coefficients over time consistent with Core et al. (1999). However, contrary to prediction, the signs of the coefficients are negative. These results suggest that, on average within firms, higher TMT compensation is associated with lower returns to shareholders and lower return on assets in the future.[48]

[Insert Table 7a about here]

To confirm that these results are not the result of a model specification problem, the Bruesch-Pagan test is used to compare pooled OLS to random-effects. The test results strongly support the random effect model as the better specification. Next, the Hausman specification test is used to compare a fixed-effects model (which produced the results n Table 7) with a random-effects model. Test results strongly support the fixed-effects

[48] Models 1(a) and 2(a) are tested for endogeneity using the Hausman specification test with the instrumental variables average TMT age, average TMT tenure, and their quadratics similar to Palia (2001). After cleaning the data for missing and erroneous observations for age and tenure 3,916 usable firm-year observations remain, representing 677 different firms. The null hypothesis of no difference between the regression model using instrumental variables for TMT pay and the model using TMT pay cannot be rejected. Thus, no evidence of endogeneity between TMT pay and future firm performance was found.

model as the best specification. Testing models (1) and (2) using balanced panels produced similar results although with slightly smaller coefficients. Qualitatively similar results are obtained using a sub-sample excluding years with losses, and running the models using robust standard errors. All models are significant as indicated by F-test results that are significant at the $p<.0001$ level. Adjusted R^2 values reported in the tables are the panel model values produced by STATA for "between" and "overall" model fit. Although intuitively equivalent to OLS R^2 values, the computation for the panel R^2 values is different and generally produces lower values.[49]

One possible explanation for the negative returns to TMT pay is the law of diminishing returns. In their study of stock option grants on future firm performance Hanlon et al. (2003) found negative coefficients on stock option compensation in a linear model. In a model with both stock option pay and its square they find positive coefficients on the linear form and negative coefficients on the quadratic form. Accordingly, the present study uses the log transformation on the sales and compensation variables to control for nonlinearity.[50] An alternate set of models with quadratic variables is tested for compensation and sales to see if the law of diminishing returns is causing the unexpected negative coefficients on TMT$ and SALES. Results for models (1b) and (2b) with quadratics for TMT$ and SALES are shown in Table 7b. Including the quadratics only changes the sign of ROA1 (from negative to positive) and causes only RET1 to become insignificant. This indicates that diminishing returns is either not a factor or is

[49] See STATA (version 2.2) documentation for more detail on the calculation for R^2 values provided by the xtreg command.

not the primary factor causing the negative association between TMT$ and firm performance shown in Table 7a.

[Insert Table 7b about here]

Another possible explanation for the negative coefficients in Table 7a is that higher compensation of the TMT results in increased profits, but requires disproportionately more resources (e.g., assets) per dollar of return generated such that "rates" of return decline. Possible causes for this could be that higher paid executives face a reduced investment opportunity set, focus on current year results at the cost of long-term performance, or are unable to "earn" their higher pay. To evaluate the possibility that higher compensation for executive management teams increases profits, but not rates of return, the dependent variables in models (1a) and (2a) are tested using dollar denominated measures of firm performance (deflated to constant dollars and log transformed). Net income before extraordinary items and discontinued operations is used as the accounting-based metric, and market value of the firm is used as the market-based metric for these models (shown as models 1(c) and 2(c). The firm specific fixed-effects transformation controls for comparing across firms of different sizes whereas the SALES variable controls for size variations within a firm over time. Results for these models (shown in Table 7c) provide support for the notion that higher paid TMTs increase profits (or market value) for one year after compensation. Subsequently, there is neither a relation between pay and net income nor pay and market value.

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[50] Hanlon et al. (2003) scale their variables by sales because they are using industry fixed-effects and must control for different size firms within a given industry. Since the present study uses firm specific fixed-effects, scaling the variables by a measure of firm size (e.g., sales) is inappropriate.

[Insert Table 7c about here]

Short-Term versus Long Term TMT Pay

Models (3) and (4) represent further tests of Hypothesis 1 by replacing total TMT pay in models (1) and (2) with the short-term and long-term components of total pay. Thus, two models investigate the differential effects of short-term TMT pay versus long-term TMT pay on future firm performance.[51] A summary of the results for short-term and long-term pay components is shown in Table 8a. Table 8a is more informative when reviewed in conjunction with Table 7a due to the incremental insight that may be obtained by examining the decomposition of total pay into short-term and long-term components. As a result, the component of pay that is driving the results is more obvious.

[Insert Table 8a about here]

Long-term TMT pay has a persistent negative effect on both ROA and RET across all time periods modeled. Short-term pay has a positive and significant effect on the year-ahead return on assets (ROA1). The effects of short-term pay on shareholder return are negative for the three periods modeled and are strongly significant for RET3 and RET5. These results suggest that higher short-term pay produces only short-term results for the company (ROA), but are associated with decreased returns to shareholders over the following three to five years. This latter finding could be caused by market perceptions driving down share prices or lower dividend payouts. Balanced panels using these same models show larger more persistent positive associations between short-term pay and ROA. Long-term pay continues to be negative and significantly associated with

both firm performance metrics for all periods, although the coefficients are small. This suggests that a characteristic common to the companies present in all ten years may exist that causes this persistence between short-term pay and performance.

Because of the unexpected negative sign of the coefficients on short-term and long-term pay, the models are also tested using quadratic terms for these two pay components and for SALES. The quadratic terms for short-term pay are positive and significant in four of the six regressions (the exceptions are ROA1 and RET5) although the linear terms remain large and negative. This result suggests a negative relation between short-term pay and firm performance and the relationship is decreasing at a decreasing rate. The quadratic terms for long-term pay are negative and significant in five of the six regressions (except for ROA5) whereas the linear terms become positive and significant in two of the regressions and less negative in the others. This suggests that the relationship between long-term pay and firm performance is positive, but increasing at a decreasing rate. This finding regarding long-term pay is consistent with Hanlon et al. (2003) and is robust to using either balanced panels or excluding loss years from the regressions.

Another supplemental test of models (3) and (4) was conducted using the same dollar denominated measures of firm performance shown in Table 7c to test models (1) and (2). The results from this test of long- and short-term pay on future NIBX and MKVL indicate that short-term pay (TMTS$) is a positive and significant factor for both

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[51] Short-term pay is the sum of salary, bonus and other annual compensation. Long-term pay is the sum of stock options, restricted stock grants, long-term incentive payouts, and other long-term compensation.

measures of firm performance across all time periods modeled whereas long-term pay has a small and mostly insignificant effect on these same measures of firm performance. A summary of the results is reported in Table 8c. Using either a balanced panel or excluding loss years to test these models increases the size and significance level of the coefficients.

[Insert Table 8c about here]

Incremental Effects of TMT Pay Over CEO Pay

The last set of models for testing Hypothesis 1 is designed to determine if the association between TMT compensation (which includes the CEO along with all other executives reported in ExecuComp) and future firm performance is driven by the TMT or the CEO. Models (5) and (6) add the CEO's compensation as a control variable to evaluate any incremental team effects. The following model variations are tested: future rates of return as a dependent variable, adding quadratic forms for compensation and sales, and using dollar denominated measures of future firm performance. Results for the regressions using linear independent variables regressed on rates of return are shown in Table 9a. The effects of TMT pay on firm performance are either larger and/or more significant than the models without CEO pay as a control. The signs of the coefficients remain negative and of the same order of magnitude; therefore, the instability often associated with multicollinearity is not present. CEO pay coefficients are smaller than those for the TMT and are not significant. Results from using balanced panels or excluding years with losses are qualitatively similar.

[Insert Table 9a about here]

Adding quadratic forms of the compensation and sales variables to the regressions reduces the significance levels for TMT$ such that only two of the six regressions (ROA3 and RET1) show marginal significance. The only quadratic term showing significance is $TMT\$^2$ in the regression on ROA3. Taking into consideration the prior models with and without quadratic terms, the results indicate that nonlinearities not controlled for by the log transformation are limited to the short- and long-term components of TMT pay. Since the short-term and long -term nonlinearities are opposite in direction, the nonlinear effects on total TMT pay are not discernable.

[Insert Table 9b about here]

Tests using dollar denominated dependent variables instead of rates of return produce results qualitatively the same as the TMT effects on firm performance without including CEO compensation as a control variable. These findings are robust to using balanced panels or excluding years with losses. The coefficient for CEO compensation is small and not significant for both net income and market value dependent variables across all time periods tested. The findings presented in Tables 9a – 9c suggest that, contrary to conventional wisdom, the compensation of the top management team drives future firm performance instead of the CEO. This is consistent with theory although in the opposite direction when using rates of return as measures of firm performance.

[Insert Table 9c about here]

Summary of Results for Hypothesis 1 Tests

The results shown in Tables 7a, 8a and 9a represent the findings of the three models specified *a priori* for testing the Hypothesis 1 prediction that TMT compensation is positively associated with future firm performance. The findings consistently support:

(1) the presence of a strong association between pay and future performance; (2) a differential effect between the short- and long-term pay components; (3) firm performance driven by TMT pay not just CEO pay; and (4) a negative association, which is contrary to predictions.

The unexpected finding that higher paid teams result in lower firm performance motivated additional analysis to understand this negative association. The model variants shown in Tables 7-9 (a), (b), and (c) explore possible nonlinearities as the cause for the initial findings.[52] Results shown in variant (b) of the tables suggest that the cause is not a simple law of diminishing returns problem because adding quadratic forms of the dollar denominated independent variables does not materially change the findings, unless both the long- and short-term components of compensation are included. The (c) model variants suggest that higher TMT pay is positively associated with dollar based measures of performance such as market value or net income after controlling for firm characteristics including size. The primary implication is that higher paid TMTs drive future firm performance by increasing profits and market value, but they do so by executing decision sets which reduce rates of return for shareholders (RET) and reduce the effectiveness of company assets (ROA).

The Effect of Team Member Pay Disparity on Firm Performance

Models 7 and 8 are used to test for the effects of perceived pay inequity between the non-CEO members of the top management team. The prediction is that greater differences in pay among "equal" team members will result in reduced team behavior and

negatively affect future firm performance. Results for these regression models are shown in Table 10a. The expected result is found only for ROA1, but is only marginally significant ($p<.10$). Significant results having the opposite sign are found for RET3 and RET5. All other results are not significant. Supplemental analysis using balanced panels and excluding loss years produces similar results.

[Insert Table 10a about here]

Variants of models (7) and (8), using quadratics for compensation and sales variables are reported in Table 10b. Table 10c displays the same dollar denominated dependent variables used in the prior (c) variant of models 1-6. Adding quadratics to the models eliminates the positive coefficients on pay disparity (see Table 10a) and results in a coefficient that is both larger and more significant using ROA1. Dollar denominated dependent variables produce coefficients of DSP$ that are negative and significant at the $p<.01$ level, but only for one year ahead firm performance. The results across model variants (a, b, and c) produce mixed results. However, support is indicated for a pay disparity effect that is negative and transitory (most of the significant coefficients occur only in the one year ahead measures of firm performance).

The next chapter summarizes this study, notes several limitations and suggests areas for future research.

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[52] These potential nonlinearities would be in addition to those controlled for by the log transformation used on all dollar denominated variables.

CHAPTER 6

SUMMARY AND CONCLUSIONS

This research draws from extant research in labor economics, small group behavior, motivation, and executive compensation to address the under-researched area of how (or if) top management team compensation affects future firm performance. Published research in this area is minimal with mixed results due to one or more shortcomings: econometrically sound methods, adequate data, clear causal direction, or sound theoretical support. The primary objective of this study is to provide empirical results that contribute to a better understanding of top management team compensation and firm performance.

The corporate form of business dominates the current world economy. Because of the diffusion of stock ownership, effective control of a corporation rests in the hands of a relative small number of individuals who comprise the top management team. The complexity inherent in modern corporations requires that these management teams consist of experts in different aspects of business. The pooled expertise of these team members determines the strategic direction of the corporation. Subsequent application of this expertise is also used to manage staff in executing actions necessary to achieve operational and strategic goals. Theory, conventional wisdom, corporate behavior, and business school behavior all lend support to the expectation that executive management teams determine the long-term performance, if not survival, of a company.

The motivation for this study is based largely on the paucity of research on top management team compensation as well as the importance to these teams in the successful operation of corporations. Although the business press and academic research

focus primarily on CEO compensation, theory and practice suggest that the team is the impetus of firm performance. Top management's strategic nature further indicates that their decisions today will affect future firm performance. Most executive compensation research examines contemporaneous or even past firm performance with respect to compensation.

The present study uses multiple tests of Hypothesis 1 to establish the following: (1) the existence of an association between management team compensation and future firm performance, (2) the existence of a differential effect of short-term and long-term pay components of compensation, and (3) the existence of an incremental effect that the team's compensation has on firm performance beyond any CEO effect. Hypothesis 2 focuses on whether pay equity issues among the executive team affect firm performance. Public disclosures of executive pay provide data which enables well defined tests of equity theory. Pay equity (also called disparity) issues could impact the performance of the executive team and hence the corporate performance. The number of extant studies on this issue is minimal and the results are mixed.

The present study uses panel data with 13,021 firm-year observations for the ten year period from 1995-2004 and two measures of firm performance that are analyzed across three time periods of increasing length. The firm specific fixed-effects regression models provide evidence that greater management team compensation is associated with future rates of return to assets and returns to shareholders. Results indicate that this relationship is negative, which suggests that higher paid management teams are related to lower rates of return.

Supplemental analyses with either quadratic terms or dollar denominated measures of firm performance helped to explore this negative relationship that was opposite the prediction. Results from the models with quadratic terms indicate that the negative sign is not a simple nonlinearity issue such as diminishing returns.[53] Models with dollar denominated dependent variables exhibit the predicted positive coefficients for the effect of TMT pay on firm performance. Taken in combination these results indicate that higher paid executive teams increase future firm profits and market values, but with a decrease in how efficiently they consume resources to achieve those profits. Although the present study cannot explain whether this outcome results from characteristics of the higher paid teams and how they operate or the investment opportunity sets these teams face, these results do present an opportunity for future research.

Regression results from replacing total management team pay with the short-term and long-term components support the prediction that these components are significant and affect firm performance differentially. Short-term pay exhibits a positive association with short-term return on assets and a negative association with longer term shareholder returns. Long-term pay increases future firm performance at a decreasing rate, and exhibits weak negative affects on return on assets. Shareholder returns are positively affected for three years following the year compensation is granted.

Results from controlling for CEO pay in a regression of top management team pay on firm performance do not show CEO compensation to be significant. However, the

[53] However, the short- and long-term pay components appear to be nonlinear in opposing directions.

team compensation coefficients remain significant. The tests of Hypothesis 1 support an interesting and robust association between the level and method of compensating the top management team and the future performance of their corporation.

Limitations

The results of this study are subject to several limitations. Although fixed-effects models provide powerful controls for factors that are unobservable and time-invariant, they are subject to errors-in-variables issues. The test for endogeneity may be problematic due to issues with instrumental variable selection and data quality. Over half of the executive observations for age and tenure in ExecuComp were missing. Most of the age observations were incorrect when compared to the source data in the proxy statements. Because of the aforementioned issues with some of the few extant TMT compensation studies, this scope of study was necessarily broad. As additional TMT compensation research is reported, the ability to identify and focus on more specific issues should be beneficial.

Contributions

The present study extends prior research regarding the association between executive management team compensation and firm performance in the following ways. First, the present study is the first that focuses on the effect top management team compensation has on future firm performance, using sound econometric methods and panel data. Second, this study provides evidence supporting the existence of a strong relation between total compensation of the team and firm performance, as well as how those effects change over time. Third, results from the present study identify the differential impact of short-term versus long-term pay components. Fourth, results also

show that even though total team pay is highly correlated with total CEO pay, the effects on firm performance are not the same. Finally, the present study provides a more robust analysis of how executive pay inequities may affect firm performance.

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TABLE 1: Executive Compensation – Early Empirical Research

Author(s)	Period	Sample	Performance	Compensation	Findings
Taussig and Barker 1925	10 years 1904-1914	400 Mfg firm executives	Sales, earnings	Salary	1. Salaries greater in firms with more capital 2. Salaries increase slowly based on profits 3. Poor results do not result in salary decreases 4. Bonuses common in Europe, rare in USA
Baker 1939	1928-1936	Executives of 104 firms as reported to FTC and SEC	Sales, Profits	Salary, Bonus	1. Compensation greater in firms with more assets 2. Wide disparity in pay between executives 3. Bonuses are common, especially in large firms 4. Total compensation behaves as a fixed cost
Gordon 1940	1935	264 executives from 149 of the 200 largest non-financial firms	N/A	Salary, Bonus, Earnings on Stock ownership	Earnings on stock holdings can be major part of compensation. Large variation by industry.
Patton 1951	1945-1949	Officers & directors of 411 firms from SEC filings	Profits	Salary, Bonus, Insurance	1. Compensation proportional to firm profits 2. High growth firms pay higher EMT salaries 3. Industry affects EMT salaries
Roberts 1956	1945,'48,'49 1950 1935-1950	410 firms' officers & directors 939 firms' officers & directors 65 firms' officers & directors	Sales, Stock Ratings, Profits	Salary, Bonus, Deferred Comp.	1. Compensation relates to firm size in net sales. 2. Profit or industry related to comp. only via sales. 3. Exec. turnover not related to compensation.
McGuire, Chiu, & Elbing 1962	1953-1959	The chief executive of 45 of the 100 largest firms	Sales, profits	Stock grants at year end market value & "other" compensation	1. CEO compensation lags sales and profits 2. Compensation & sales are correlated 3. Compensation & profits are not correlated
Lewellen & Huntsman 1970	1942-1963 at 3 year intervals	Highest paid executive (as a proxy for Sr. management) of 50 of the 100 largest firms	Profits, sales, market value	Salary, bonus, all major deferred & contingent.	1. Compensation related to profits and market value 2. Compensation not related to sales 3 Salary + bonus better "fit" than total compensation
Masson 1971	1947-1966	Top 3-5 executives from 39 firms representing 3 industries	Sales, earnings per share, and return on stock	Present value of all forms of compensation for each year	1. Stock price primarily drives compensation 2. No incremental compensation effect due to profits 3. Sales maximization theory not supported
Ciscel 1974	1969-1971	Officers and directors of 210 of 250 largest industrial firms	Sales, profits	Salary, bonus, and other direct payments	1. TMT highly correlated with 3 measures of size 2. Correlations with income are lower 3.Correlations to CEO pay are smaller than TMT
Ciscel and Carroll 1980	1970-1976	CEOs of 221 of the 230 largest industrial firms	Sales, profits	Salary, bonus	1. Compensation related to both sales and profits 2. Base salary set by market for executives

TABLE 2: Executive Management Team Compensation – Contemporary Empirical Research

Author(s)	Period	Sample	Performance	Compensation	Findings
Murphy 1985	1964-1981	461 executives from 72 of the Fortune 500 manufacturing firms	Sales, stock return(RET), industry relative performance	All pretax compensation listed in proxies	1. Executive compensation strongly related to firm performance measured by sales and stock price 2. Coefficients vary significantly by position 3. Firm and individual specific effects significant
Antle and Smith 1986	1947-1977	Three highest paid executives from 39 firms in 3 industries	Industry adjusted, (RET) & ROA	All forms of after-tax increases in "wealth" including effects of stockholdings.	1. Executives are compensated for both industry level changes in return on assets and "incremental" performance, but more so for the "incremental." 2. Results do not hold for the RET measure.
O'Reilly et al. 1988	1984	CEOs and Vice Presidents of 105 large industrial firms.	ROE	Cash compensation.	1. Cash pay for VPs and CEO are positively but imperfectly correlated. 2. Number of VP's negatively associated with CEO pay. 3. CEO tenure not associated with CEO pay.
Abowd 1990	1981-1986	75 top managers for each of 600 firms, partitioned by level	ROA, ROE, RET, Gross Cash Flow all after-tax	% increase in annual salary, bonus as a % of salary	Cash compensation for managers relates to year ahead market based firm performance
Leonard 1990	1981-1985	75 to 100 managers from 439 firms	Profits and ROE	Salary plus bonus	1. Difference in pay between management levels is consistent with tournament theory. 2. Pay to performance function is U-shaped. 3. Executive pay is largely unrelated to changes in sales or profits
Lambert et al. 1993	1982-1984	Consulting firm survey data for 4 hierarchical levels of management in 303 firms	ROA and RET	Cash, total, and total with upper bound on options	Support found for both tournament theory and managerial power theory.
Main et al. 1993	1980-1984	Officers of 210 firms from consulting firm survey	RET and ROA	Salary	1. TMT mean salary is associated with RET & ROA 2. Salary dispersion positively associated with ROA
Beatty and Zajac 1994	1984	"Top management" of 435 IPO firms	(un) profitability as an independent variable proxying for firm risk	Stock options, all non-cash pay	1. Firms with greater risk use stock options in management compensation less. 2. Management ownership is negatively associated with the use of stock option in management pay

TABLE 2 (continued): Executive Management Team Compensation – Contemporary Empirical Research

Author(s)	Period	Sample	Performance	Compensation	Findings
Mehran 1995	1979-1980	153 manufacturing firms: CEOs, top executives, officers and directors	Tobin's Q and ROA	% of total pay in: new options, equity based, salary + bonus	1. Firms with higher managerial ownership have lower % of pay in executive compensation packages 2. Higher % of CEO pay in equity associated with higher firm performance
Bloom and Milkovich 1998	1981-1988	46 managers per firm for over 500 companies in a compensation survey	RET	Bonus as a % of salary, salary	1. Firms with greater unsystematic risk place less emphasis on bonus relative to salary 2. The use of bonus incentives is associated with lower performance in firms with unsystematic risk.
Schaefer 1998	1991-1995	CEO and 4 best paid executives for nonfinancial firms in ExecuComp	Shareholder wealth	Salary plus bonus, change in pay related wealth	CEO pay-performance sensitivity decreases with firm size and does not appear to relate to size of TMT.
Bognanno 2001	1981-1988	Managers for 12 hierarchical levels for over 600 firms	Human capital determinants of pay used, not firm performance	Present value of salary plus bonus pay gap to next hierarchical level	1. Increasing pay gaps as organizational level increased support tournament theory. 2. Age, education, tenure (and the quadratic forms) were significantly associated with compensation.
Conyon and Sadler 2001	1997/8	532 executives from 100 of the largest United Kingdom firms	Return on capital employed, RET	Stock based compensation	Support for tournament theory in U.K. firms.
Henderson and Fredrickson 2001	1985, 1989	CEO and next 4 highest paid officers for	ROA	Cash, long term, and total from proxy statements	1. Mean TMT pay not associated with ROA 2. TMT to CEO pay gaps are not significantly associated with ROA except when used in an interaction term with other variables.
Carpenter and Sanders 2002	1992	CEO and TMT (4 highest paid non-CEO executives) for 199 random firms in the S&P 500	Mean ROA and Tobin's Q for 3 years after compensation	Total and % long term compensation (ExecuComp)	1. CEO and TMT pay levels and structure are positively associated with each other. 2. The alignment of TMT pay to CEO pay and the % long term pay of TMTs is positively associated with firm performance.

TABLE 2 (continued): Executive Management Team Compensation – Contemporary Empirical Research

Author(s)	Period	Sample	Performance	Compensation	Findings
Aggarwal and Samwick 2003	1993-1997	5 highest paid executives for firms in ExecuComp, classified into: oversight executives, divisional executives	Shareholder wealth	Change in executive wealth from equity holdings, annual compensation	Pay-performance sensitivity is significant for all management levels tested, including CEO and executive team. (regression formula not given for team results)
Hanlon et al. 2003	1992-2000	5 highest paid executives for 1,069 firms from ExecuComp	Operating Income scaled by sales	Lagged stock option grants	1. Strong, positive relation between lagged grant values and future operating income. 2. Economic determinants, not governance, are associated with grant values.
Carpenter and Sanders 2004	1992	CEO and TMT (4 highest paid non-CEO executives) for 224 multinational firms	Market to book ratio lagged + 1 year	Total compensation from ExecuComp	1. Non CEO TMT pay associated with performance 2. CEO pay not associated with performance 3. TMT size not significant 4. Firm size (sales) not significant 5. Degree of internationalization and its interactions with compensation are all significant. 6. CEO-TMT pay gap negatively affects performance
Siegel and Hambrick 2005	1991-1993	Groups consisting of officers within top 3 management levels for 67 high technology firms	Mean firm market to book ratio and total shareholder return less industry mean for each	Disparity in pay: vertical, horizontal, & overall.	1. Pay disparity not associated with performance. 2. Interactions between pay disparity and technological intensiveness were significant and negative for all forms of pay disparity.
Bebchuk and Grinstein 2005	1993-2003	CEO and Top-5 Executives for all firms in ExecuComp	ROA (1 year lag), Stock return (1 and 2 year lag)	Total, equity, non-equity	1. Growth in pay (both CEO & Top-5) exceeds what can be explained by firm size and performance. 2. Recent pay growth is greater for CEOs than Top-5 3. Both CEO and Top-5 pay are positively associated with firm performance.
Conyon 2006	1993-2003	CEO and Non-CEO Executives for all firms in ExecuComp	Stock Returns	ExecuComp pay components and wealth measures	Regressions only include CEO compensation: association with performance significant as is association with firm size (ln market value)

TABLE 3
Variable Labels and Definitions

Variable Type	Variable in Model	Variable Description	Variable Source
Dependent	RET1 RET3 RET5	Fiscal year total return to shareholders including monthly reinvestment of dividends and stock price appreciation. Average returns are for 1, 3 and 5 years following the year of compensation and reported as a percentage.	Source data is trs1yr, trs3yr, and trs5yr reported in ExecuComp. These variables were time lagged to the appropriate year.
Dependent	ROA1 ROA3 ROA5	Return on assets measured as net income before extraordinary items and discontinued operations divided by total assets. Average returns are for 1, 3 and 5 years following the year of compensation and reported as a percentage.	Source data used to calculate variables are from ExecuComp: nibex, assets.
Dependent	MKVL1 MKVL3 MKVL5	The natural log of the firms' average market value for 1, 3, and 5 years after the year of compensation. Values are deflated to 1995 constant $000s before the log transformation. [a]	The total market value data used are "mktval" fiscal year end values from ExecuComp.
Dependent	NIBX1 NIBX3 NIBX5	The natural log of the average net income before extraordinary items and discontinued operations for 1, 3, and 5 years after the year of compensation. Values are deflated to 1995 constant $000s before the log transformation. [a]	The net income data used are "nibex" values fiscal year end values from ExecuComp.
Independent	CEO$	The natural log of total grant-date compensation given to the CEO for the year, stated in 1995 constant $000s. [a b]	Total compensation is the "tdc1" variable from ExecuComp. The CEO is identified by the "annCEO" flag. The TMT is all executives reported in ExecuComp.
	TMT$	The natural log of total grant-date compensation given to the TMT for the year, stated in 1995 constant $000s. [a b]	
Independent	TMTS$	The natural log of short term pay for all executives reported in ExecuComp, defined as salary + bonus + other annual pay in 1995 constant $000s. [a]	Short-term pay is the sum of "tcc" and "othann" as reported in ExecuComp.

Note: [a] The consumer price index reported by the National Bureau of Labor Statistics is used to convert all variables measured in dollars to 1995 constant dollars before taking the natural log. [b] "Grant-date" compensation is pay valued as of the date it is granted. This measurement point is especially important with regard to valuation of stock option grants, which use the Black-Scholes value as of the date the options are granted.

TABLE 3 (continued)
Variable Labels and Definitions

Variable Type	Variable in Model	Variable Description	Variable Source
Independent	TMTL$	The natural log of long-term grant-date compensation given to the TMT for the year, stated in 1995 constant $000s. [a b]	Long-term pay is calculated as total pay less short-term pay. The long-term component of pay includes stock options, restricted stock grants, long-term incentive plans and other long term pay.[c]
Independent	TSIZE	Size of the top management team defined as the number of executives whose pay is reported in the annual proxy statement.	The team size is calculated by doing a count of reported in ExecuComp for each firm-year.
Independent	DSP$	The natural log of the difference in total pay for the highest paid executive other than the CEO less the average pay of all other non CEO executives by firm year. Stated in 1995 constant $000s.	Based on ExecuComp total compensation "tdc1."
Control	SALES	Natural log of net fiscal year sales (in 1995 constant $millions) used to control for firm size.	"sales" as reported in ExecuComp.
Control	LEV	Leverage as measured by total liabilities/total assets. Expressed as a %.	DATA181 from Compustat divided by "assets" from ExecuComp times 100.
Control	MBR	Growth opportunities as measured by the market-to-book ratio.	ExecuComp variables : prccf /(commeq/shrsout). Fiscal year end market price per share divided by book value per share.
Instrumental	TNR	TMT years of tenure with the company caculated as the average tenure for TMT members per firm year.	Using ExecuComp variables: year – year_joined_co and averaged for all reported executives per firm year.
Instrumental	AGE	Average age of top management team members per firm year.	Summed values of ExecuComp variable p_age_2 for all reported executives divided by TSIZE per firm year.

Note: [a] The consumer price index reported by the National Bureau of Labor Statistics is used to convert all variables measured in dollars to 1995 constant dollars before taking the natural log. [b] "Grant-date" compensation is pay valued as of the date it is granted. This measurement point is especially important with regard to valuation of stock option grants, which use the Black-Scholes value as of the date the options are granted. [c] See Murphy (1999) for more detail on the components of executive pay.

TABLE 4
Sample Selection
Process of Removing Unnecessary and Unusable Data
from the ExecuComp Database

Total Firm-Year-Executive-Grants from ExecuComp	**134,199**
Less observations deleted due to:	
Missing Value for Year	13
Financial Service Firms	8,980
Missing Value for Common Equity	4,591
Remove Detail Observations for Individual Grants	26,737
Missing Value for Total Compensation	1,854
Subtotal: Firm-Year-Executive Observations	**92,024**
Less: Remove Detail Observations for each Executive	76,858
Subtotal: Firm-Year Observations	**15,166**
Less:	
Outliers at 1% and 99%	2,001
Common Equity < $1million	144
Maximum usable Firm-Year Observations	**13,021**

Note: Primary data source is ExecuComp for 1995-2004. The level of analysis is firm-year observations. Therefore detail for individual stock option grants and individual executives is deleted after computing the needed firm level information as per the variables defined in Table 3. Actual sample size varies per each regression model based on the number of firm-year observations available for each dependent variable.

TABLE 5

Descriptive Statistics
statistics shown are for raw data (before transformations)

variable	usable observations	mean	median	standard deviation	min	max
Dependent Variables:						
ROA1	11,167	4.05	5.08	9.24	-76.75	28.50
ROA3	7,764	3.88	4.58	7.72	-60.05	21.86
ROA5	5,026	3.91	4.42	6.87	-49.87	21.11
RET1	11,009	18.59	11.56	54.52	-83.20	371.50
RET3	7,638	6.53	5.69	25.04	-66.39	111.31
RET5	4,937	4.76	4.89	17.37	-51.78	60.50
NIBX1	11,167	140.84	36.41	524.90	-5,972.10	9,888.62
NIBX3	7,764	148.03	38.44	538.34	-8,602.03	7,768.66
NIBX5	5,026	171.20	42.02	611.01	-5,956.61	7,993.80
MKVL1	11,048	4,307.86	931.54	14,360.31	1.18	421,070.50
MKVL3	7,628	4,749.16	996.13	15,987.31	4.91	377,251.00
MKVL5	4,934	5,367.57	1,077.94	17,761.93	6.66	326,474.90
Compensation Variables:						
TMT$	13,021	9,580.79	5,959.59	10,268.59	691.77	83,796.88
TMTS$	13,021	3,756.19	2,910.80	2,947.19	187.55	44,027.36
TMTL$	13,021	5,824.60	2,740.22	8,532.19	0	82,318.27
CEO$	11,995	3,639.04	2,065.83	4,451.15	151.67	35,136.70
DSP$	11,995	1,103.30	467.81	2,010.04	0	41,782.85
Control Variables:						
SALES	13,017	2,948.20	928.60	5,537.73	11.34	43,917.00
MBR	12,888	3.31	2.43	2.96	0	26.45
LEV	12,969	49.83	51.42	19.48	7.78	125.25
TSIZE	13,021	6.09	6.00	1.42	1.00	15.00
Instrumental Variables:						
AGE	5,766	58.70	58.00	7.18	36.00	89.50
TENURE	10,258	10.28	7.00	9.82	0	59.00

Note: Variable definitions are provided in Table 3. The descriptive statistics are based on observations after removing outliers at the 1% and 99% levels. The information shown is before applying transformations (deflation to constant dollars, natural log, and fixed-effects) to facilitate interpretation of the information relative to information reported in company proxy statements and annual reports. All data is based on the maximum usable firm-year observations per individual variable.

TABLE 6
Correlation Matrices for Independent Variables (before and after transformations)

Panel A: Raw Data before transformations

	TMT$	CEO$	TMTS$	TMTL$	DSP$	SALES	MBR	LEV	TSIZE
TMT$	1.0000								
CEO$	0.8882***	1.0000							
TMTS$	0.6797***	0.5850***	1.0000						
TMTL$	0.9680***	0.8662***	0.4738***	1.0000					
DISP$	0.7119***	0.4724***	0.4293***	0.7078***	1.0000				
SALES	0.4923***	0.4141***	0.5796***	0.3926***	0.2710***	1.0000			
MBR	0.2583***	0.2227***	0.1328***	0.2646***	0.1741***	0.0841***	1.0000		
LEV	0.1160***	0.1008***	0.2593***	0.0505***	0.0541***	0.2907***	0.0473***	1.0000	
TSIZE	0.1737***	0.0693***	0.2076***	0.1375***	0.1914***	0.1327***	0.0076*	0.1272***	1.0000

Panel B: Fully transformed data used in the regressions (deflated, natural log, fixed-effects)

	dTMT$	dCEO$	dTMTS$	dTMTL$	dDSP$	dSALES	dMBR	dLEV	dTSIZE
dTMT$[dlf]	1.0000								
dCEO$[dlf]	0.7857***	1.0000							
dTMTS$[dlf]	0.5244***	0.3865***	1.0000						
dTMTL$[dlf]	0.7817***	0.6003***	0.1952***	1.0000					
dDISP$[dlf]	0.6378***	0.3173***	0.3255***	0.5248***	1.0000				
dSALES[dlf]	0.3666***	0.2776***	0.4262***	0.2267***	0.1838***	1.0000			
dMBR[f]	0.0739***	0.0623***	0.0655***	0.0207	0.0563***	-0.0984***	1.0000		
dLEV[f]	-0.0057	-0.0231***	0.0080*	0.0012	0.0049	0.1284***	0.1616***	1.0000	
dTSIZE[f]	0.2214***	-0.0138	0.3056***	0.1281***	0.3271***	0.1007***	-0.0413***	0.0555***	1.0000

Note: [d] - denotes that the variable has been deflated to 1995 constant dollars.
[l] - denotes that the variable has been transformed using the natural log function.
[f] - denotes that the variable has been demeaned by using the fixed-effects transformation.
Significance at the .10, .05, and .01 level is denoted by *, **, and ***, respectively.

TABLE 7a

The Effect of TMT Total Compensation on Future Firm Rates of Return
Results for Firm-Specific Fixed-Effects Regressions

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 SALES_{it} + \beta_3 MBR_{it} + \beta_4 LEV_{it} + \beta_5 TSIZE_{it} + \varepsilon_{it} \quad (1a)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 SALES_{it} + \beta_3 MBR_{it} + \beta_4 LEV_{it} + \beta_5 TSIZE_{it} + \varepsilon_{it} \quad (2a)$$

		ROA1	ROA3	ROA5	RET1	RET3	RET5
TMT$		-.30* (-1.90)	-.66*** (-5.27)	-.35*** (-3.59)	-8.00*** (-6.63)	-6.92*** (-12.81)	-2.61*** (-6.98)
SALES		-2.41** (-2.41)	-2.05*** (-10.88)	-1.74*** (-10.66)	-31.84*** (-19.00)	-15.64*** (-19.15)	-8.93*** (-14.23)
MBR		.95*** (24.47)	.33*** (10.23)	.06** (2.08)	-6.53*** (-22.06)	-5.17*** (-36.61)	-3.55*** (-34.28)
LEV		-.05*** (-6.09)	.01*** (1.82)	.04*** (7.03)	.88*** (13.76)	.63*** (20.60)	.44*** (19.56)
TSIZE		-.54*** (-8.03)	-.50* (-9.29)	-.15*** (-3.60)	-1.14** (-2.22)	-.64*** (-2.75)	.66*** (4.13)
α_i		13.04*** (8.37)	24.88*** (19.92)	17.49*** (16.54)	289.43*** (24.45)	164.07*** (30.27)	74.94*** (18.39)
n		10,997	7,624	4,919	10,958	7,596	4,909
Adjusted R^2	within	.081	.087	.069	.110	.294	.110
Adjusted R^2	overall	.051	.000	.021	.010	.008	.010

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 level is denoted by *, **, and ***, respectively.

TABLE 7b

The Effect of TMT Total Compensation with Quadratics on Future Firm Rates of Return
Results for Firm-Specific Fixed-Effects Regressions

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 SALES_{it} + \beta_3 TMT\$^2_{it} + \beta_4 SALES^2_{it} + \beta_5 MBR_{it} + \beta_6 LEV_{it} + \beta_7 TSIZE_{it} + \varepsilon_{it} \quad (1b)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 SALES_{it} + \beta_3 TMT\$^2_{it} + \beta_4 SALES^2_{it} + \beta_5 MBR_{it} + \beta_6 LEV_{it} + \beta_7 TSIZE_{it} + \varepsilon_{it} \quad (2b)$$

		ROA1	ROA3	ROA5	RET1	RET3	RET5
TMT$		2.87* (1.68)	-2.28* (-1.75)	-3.92*** (-3.87)	-9.40 (-.72)	-14.66*** (-2.59)	-4.77 (-1.22)
SALES		-.96 (-.98)	-3.52*** (-4.24)	-2.04*** (-2.85)	-68.83*** (-9.32)	-27.13*** (-7.55)	-20.82*** (-7.36)
TMT$²		-.18* (-1.86)	.09 (1.26)	.20*** (3.54)	.08 (.11)	.44 (1.38)	.12 (.56)
SALES²		.03 (.42)	.12* (1.85)	.03 (.50)	2.90*** (5.16)	.90*** (3.32)	.40* (1.91)
MBR		.95*** (24.50)	.33*** (10.08)	.05* (1.78)	-6.61*** (-22.32)	-5.19*** (-36.80)	-3.56*** (-34.28)
LEV		-.05*** (-6.11)	.01* (1.88)	.04*** (7.19)	.90*** (14.03)	.63*** (20.71)	.45*** (19.62)
TSIZE		-.56*** (-8.19)	-.48*** (-8.97)	-.13*** (-3.07)	-1.06** (-2.05)	-.57** (-2.42)	.68*** (4.26)
α_i		.68 (0.09)	36.25*** (6.45)	33.58*** (7.57)	405.36*** (7.28)	231.49*** (9.51)	99.18*** (5.79)
n		10,997	7,624	4,919	10,958	7,596	4,909
Adjusted R^2	within	.081	.088	.072	.113	.296	.334
Adjusted R^2	overall	.051	.001	.023	.013	.010	.010

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as $\alpha_{i.}$ Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 7c

The Effect of TMT Total Compensation on Future Firm Profits & Market Values
Results for Firm-Specific Fixed-Effects Regressions

$$NIBX_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 SALES_{it} + \beta_3 MBR_{it} + \beta_4 LEV_{it} + \beta_5 TSIZE_{it} + \varepsilon_{it} \quad (1c)$$

$$MKVL_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 SALES_{it} + \beta_3 MBR_{it} + \beta_4 LEV_{it} + \beta_5 TSIZE_{it} + \varepsilon_{it} \quad (2c)$$

		NIBX1	NIBX3	NIBX5	MKVL1	MKVL3	MKVL5
TMT$		.09*** (5.07)	.01 (.65)	-.02 (-1.08)	.08*** (7.40)	-.00 (-.22)	.01 (.76)
SALES		.65*** (24.78)	.31*** (9.90)	.19*** (5.12)	.45*** (30.31)	.19*** (11.92)	.08*** (5.02)
MBR		.07*** (15.13)	.04*** (6.78)	.02*** (2.69)	.08*** (29.16)	.04*** (13.93)	-.00 (-.13)
LEV		-.01*** (-11.67)	-.00*** (-4.00)	-.00 (-.90)	-.01*** (-24.28)	-.01*** (-11.28)	-.00*** (-3.47)
TSIZE		-.04*** (-5.67)	-.06*** (-7.47)	-.04*** (-3.96)	-.04*** (-8.14)	-.04*** (-9.65)	-.03*** (-7.38)
α_i		-.63*** (-3.47)	2.36*** (11.54)	3.27*** (13.90)	3.87*** (36.59)	6.28*** (60.78)	6.85*** (68.34)
n		9,141	6,292	4,130	10,915	7,519	4,850
Adjusted R^2	within	.129	.040	.015	.205	.075	.023
Adjusted R^2	overall	.667	.634	.575	.704	.629	.466

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 8a
The Effects of Long-Term versus Short-Term TMT Compensation on Future Firm Rates of Return
Results for Firm-Specific Fixed-Effects Regressions

$$ROA_{it*} = \alpha_i + \beta_1 TMTS\$_{it} + \beta_2 TMTL\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (3a)$$

$$RET_{it*} = \alpha_i + \beta_1 TMTS\$_{it} + \beta_2 TMTL\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (4a)$$

		ROA1	ROA3	ROA5	RET1	RET3	RET5
TMTS$		2.16*** (7.77)	.03 (.15)	-.02 (-.12)	-.18 (-.09)	-4.94*** (-4.94)	-3.00*** (-4.18)
TMTL$		-.20*** (-3.55)	-.19*** (-4.27)	-.15*** (-4.71)	-2.01*** (-4.71)	-1.37*** (-7.17)	-.59*** (-4.69)
SALES		-1.27*** (-5.57)	-2.26*** (-11.73)	-1.76*** (-10.58)	-34.26*** (-19.61)	-16.75*** (-19.95)	-8.85*** (-13.82)
MBR		.90*** (23.17)	.32*** (9.59)	.05 (1.82)	-6.72*** (-22.58)	-5.24*** (-36.55)	-3.56*** (-34.20)
LEV		-.04*** (-5.31)	.02** (2.21)	.04*** (7.15)	.91*** (14.17)	.64*** (20.94)	.45*** (19.55)
TSIZE		-.73*** (-10.39)	-.54*** (-9.51)	-.15*** (-3.52)	-1.60*** (-3.00)	-.67*** (-2.73)	.77*** (4.55)
α_i		.86 (.44)	21.97*** (13.34)	15.96*** (11.51)	255.44*** (16.97)	160.99*** (22.43)	79.34*** (14.83)
n		10,997	7,624	4,919	10,958	7,596	4,909
Adjusted R^2	within	.087	.086	.071	.108	.285	.333
Adjusted R^2	overall	.050	.001	.021	.010	.007	.009

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 8b

The Effects of Long-Term versus Short-Term TMT Compensation with Quadratics on Future Firm Rates of Return
Results for Firm-Specific Fixed-Effects Regressions

$$ROA_{it*} = \alpha_i + \beta_1 TMTS\$_{it} + \beta_2 TMTL\$_{it} + \beta_3 SALES_{it} + \beta_4 TMTS\$^2_{it} + \beta_5 TMTL\$^2_{it} + \beta_6 SALES^2_{it} + \beta_7 MBR_{it} + \beta_8 LEV_{it} + \beta_9 TSIZE_{it} + \varepsilon_{it} \quad (3b)$$

$$RET_{it*} = \alpha_i + \beta_1 TMTS\$_{it} + \beta_2 TMTL\$_{it} + \beta_3 SALES_{it} + \beta_4 TMTS\$^2_{it} + \beta_5 TMTL\$^2_{it} + \beta_6 SALES^2_{it} + \beta_7 MBR_{it} + \beta_8 LEV_{it} + \beta_9 TSIZE_{it} + \varepsilon_{it} \quad (4b)$$

		ROA1	ROA3	ROA5	RET1	RET3	RET5
TMTS$		2.90	-7.28***	-3.97**	-48.51**	-49.53***	1.28
		(.94)	(-2.88)	(-1.97)	(-2.07)	(-4.52)	(.16)
TMTL$		.33*	.22	-.22*	2.92*	3.37***	.20
		(1.64)	(1.43)	(-1.93)	(1.91)	(5.00)	(.45)
SALES		-1.40	-3.34***	-2.22***	-67.55***	-26.14***	-14.93***
		(-1.41)	(-3.95)	(-3.07)	(-8.94)	(-7.15)	(-5.38)
TMTS$^{2}		-.04	.46***	.25**	3.04**	2.82***	-.26
		(-.22)	(2.92)	(1.96)	(2.09)	(4.13)	(-.54)
TMTL$^{2}		-.04***	-.03***	.01	-.42***	-.40***	-.07*
		(-2.74)	(-2.74)	(.64)	(-3.34)	(-7.32)	(-1.85)
SALES^2		.01	.09	.04	2.68***	.82***	.48**
		(.19)	(1.47)	(.69)	(4.68)	(2.98)	(2.30)
MBR		.91***	.32***	.04	-6.73***	-5.20***	-3.54***
		(23.30)	(9.58)	(1.61)	(-22.59)	(-36.35)	(-33.83)
LEV		-.05***	.01**	.04***	.92***	.63***	.44***
		(-5.46)	(2.09)	(7.29)	(14.27)	(20.62)	(19.42)
TSIZE		-.73***	-.51***	-.14***	-1.37**	-.51**	.78***
		(-10.30)	(-9.04)	(-3.28)	(-2.54)	(-2.07)	(4.60)
α_i		-3.36	52.46***	32.93***	528.79***	347.72***	78.10***
		(-.29)	(5.52)	(4.30)	(5.97)	(8.44)	(2.64)
n		10,997	7,624	4,919	10,958	7,596	4,909
Adjusted R^2	within	.088	.089	.073	.112	.294	.334
Adjusted R^2	overall	.054	.001	.024	.013	.009	.009

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variable. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 8c

The Effects of Long-Term versus Short-Term TMT Compensation on Future Firm Profits & Market Values
Results for Firm-Specific Fixed-Effects Regressions

$$NIBX_{it*} = \alpha_i + \beta_1 TMTS\$_{it} + \beta_2 TMTL\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (3c)$$

$$MKVL_{it*} = \alpha_i + \beta_1 TMTS\$_{it} + \beta_2 TMTL\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (4c)$$

		NIBX1	NIBX3	NIBX5	MKVL1	MKVL3	MKVL5
TMTS$		.38*** (11.92)	.14*** (3.88)	.19** (2.35)	.27*** (14.60)	.12*** (6.48)	.10*** (5.67)
TMTL$		.01 (1.38)	-.01 (-1.59)	-.02*** (-3.06)	.01 (1.49)	-.01* (-1.68)	-.01* (-1.86)
SALES		.55*** (20.17)	.28*** (8.86)	.17*** (4.52)	.40*** (25.58)	.15*** (9.50)	.06*** (3.62)
MBR		.06*** (13.99)	.03*** (6.20)	.01** (2.31)	.07*** (27.98)	.03*** (12.67)	-.00 (-.96)
LEV		-.01*** (-11.01)	-.00*** (-3.79)	-.00 (-.70)	-.01*** (-23.74)	-.01*** (-10.65)	-.00*** (-3.07)
TSIZE		-.07*** (-8.61)	-.07*** (-8.17)	-.04*** (-4.41)	-.05*** (-11.44)	-.05*** (-11.49)	-.04*** (-8.80)
α_i		-2.10*** (-9.27)	1.68*** (6.33)	2.65*** (8.75)	2.84*** (21.42)	5.65*** (41.76)	6.35*** (48.64)
n		9,141	6,292	4,130	10,915	7,519	4,850
Adjusted R^2	within	.143	.043	.020	.220	.082	.032
Adjusted R^2	overall	.675	.640	.575	.707	.648	.455

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 9a

Incremental TMT Effects on Future Firm Rates of Return after Controlling for CEO Pay

Results for Firm-Specific Fixed-Effects Regressions

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 CEO\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (5a)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 CEO\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (6a)$$

		ROA1	ROA3	ROA5	RET1	RET3	RET5
TMT$		-.69** (-2.40)	-.43** (-1.99)	-.23 (-1.24)	-10.10*** (-4.75)	-6.31*** (-6.60)	-3.11*** (-4.38)
CEO$		.36* (1.71)	-.06 (-.35)	.02 (.17)	1.36 (.87)	-.55 (-.78)	.60 (1.13)
SALES		-.40* (-1.65)	-1.96*** (-9.68)	-1.94*** (-10.51)	-29.47*** (-16.53)	-14.01*** (-15.67)	-8.89*** (-12.37)
MBR		.99*** (23.97)	.35*** (10.36)	.06** (2.14)	-6.51*** (-21.37)	-5.13*** (-34.87)	-3.56*** (-31.56)
LEV		-.05 (-5.77)	.01 (1.47)	.04*** (6.26)	.83*** (12.58)	.57*** (18.00)	.46*** (18.43)
TSIZE		-.49*** (-6.66)	-.40*** (-7.05)	-.10** (-2.25)	-1.43*** (-2.62)	-.29 (-1.16)	.74*** (4.16)
α_i		12.36*** (6.80)	22.38*** (15.57)	17.79*** (13.78)	286.03*** (21.32)	152.53*** (24.01)	74.02*** (14.71)
n		10,127	6,979	4,412	10,090	6,953	4,404
Adjusted R^2	within	.079	.064	.054	.104	.271	.320
Adjusted R^2	overall	.056	.002	.023	.004	.003	.006

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 9b

Incremental TMT Effects on Future Firm Rates of Return with Quadratics after Controlling for CEO Pay
Results for Firm-Specific Fixed-Effects Regressions

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 CEO\$_{it} + \beta_3 SALES_{it} + \beta_4 TMT\$^2_{it} + \beta_5 CEO\$^2_{it} + \beta_6 SALES^2_{it} + \beta_7 MBR_{it} + \beta_8 LEV_{it} + \beta_9 TSIZE_{it} + \varepsilon_{it} \quad (5b)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 CEO\$_{it} + \beta_3 SALES_{it} + \beta_4 TMT\$^2_{it} + \beta_5 CEO\$^2_{it} + \beta_6 SALES^2_{it} + \beta_7 MBR_{it} + \beta_8 LEV_{it} + \beta_9 TSIZE_{it} + \varepsilon_{it} \quad (6b)$$

		ROA1	ROA3	ROA5	RET1	RET3	RET5
TMT$		2.66	3.77*	-.31	-36.28*	-13.17	-.49
		(.96)	(1.81)	(-.18)	(-1.79)	(-1.44)	(-.07)
CEO$		1.92	-1.58	-.99	8.00	1.89	-3.71
		(1.13)	(-1.21)	(-.89)	(.64)	(.33)	(-.87)
SALES		-.17	-2.49***	-2.97***	-61.61***	-19.21***	-14.17***
		(-.15)	(-2.66)	(-3.55)	(-7.52)	(-4.66)	(-4.36)
TMT$^{2}		-.19	-.24**	.00	1.48	.39	-.15
		(-1.18)	(-2.03)	(.04)	(1.28)	(.75)	(-.40)
CEO$^{2}		-.10	.10	.07	-.44	-.16	.28
		(-.91)	(1.18)	(.91)	(-.53)	(-.43)	(1.01)
SALES^2		-.02	.04	.08	2.45***	.39	.40*
		(-.24)	(.58)	(1.28)	(4.03)	(1.29)	(1.68)
MBR		.99***	.35***	.06**	-6.57***	-5.14***	-3.57***
		(24.08)	(10.41)	(1.98)	(-21.59)	(-34.90)	(-31.54)
LEV		-.05***	.01	.04***	.85***	.58***	.46
		(-5.87)	(1.41)	(6.40)	(12.87)	(18.06)	(18.51)
TSIZE		-.50***	-.41***	-.10**	-1.38**	-.28	.74***
		(-6.80)	(-7.19)	(2.20)	(-2.53)	(-1.11)	(4.15)
α_i		-8.94	11.49*	25.21***	475.21***	189.56***	95.44***
		(-1.00)	(1.71)	(4.53)	(7.23)	(6.38)	(4.40)
n		10,127	6,979	4,412	10,090	6,953	4,404
Adjusted R^2	within	.080	.065	.055	.107	.272	.321
Adjusted R^2	overall	.057	.002	.027	.005	.003	.005

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 9c

Incremental TMT Effects on Future Firm Profits & Market Values after Controlling for CEO Pay

Results for Firm-Specific Fixed-Effects Regressions

$$NIBX_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 CEO\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (5c)$$

$$MKVL_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 CEO\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (6c)$$

		NIBX1	NIBX3	NIBX5	MKVL1	MKVL3	MKVL5
TMT$		.06* (1.72)	.00 (.13)	-.00 (-.13)	.05*** (2.84)	.00 (.09)	.01 (.60)
CEO$		.03 (1.37)	.02 (.77)	.01 (.21)	.02 (1.10)	-.00 (-.35)	-.00 (-.23)
SALES		.66*** (22.35)	.35*** (10.30)	.19*** (4.91)	.47*** (29.16)	.23*** (13.47)	.11*** (5.98)
MBR		.07*** (14.29)	.04*** (6.47)	.18*** (3.02)	.08*** (27.75)	.04*** (12.84)	-.00 (-.69)
LEV		-.01*** (-11.15)	-.00*** (-3.93)	-.00 (-.93)	-.01*** (-22.85)	-.01*** (-11.27)	-.00*** (-3.32)
TSIZE		-.04*** (-4.99)	-.06*** (-5.97)	-.03*** (-3.39)	-.04*** (-8.36)	-.04*** (-7.62)	-.03*** (-6.29)
α_i		-.61*** (-2.80)	1.97*** (8.17)	3.09*** (11.35)	3.89*** (31.98)	5.99*** (48.86)	6.71*** (54.53)
n		8,342	5,731	3,719	10,049	6,881	4,349
Adjusted R^2	within	.120	.045	.018	.204	.080	.026
Adjusted R^2	overall	.670	.643	.603	.712	.666	.494

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 10a

Effects of Pay Disparity on Future Firm Rates of Return
Differences in Pay between non-CEO TMT Members
Results for Firm-Specific Fixed-Effects Regressions

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 DSP\$_{it} + \beta_3 TSIZE_{it} + \beta_4 SALES_{it} + \beta_5 LEV_{it} + \beta_6 MBR_{it} + \varepsilon_{it} \quad (7a)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 DSP\$_{it} + \beta_3 TSIZE_{it} + \beta_4 SALES_{it} + \beta_5 LEV_{it} + \beta_6 MBR_{it} + \varepsilon_{it} \quad (8a)$$

		ROA1	ROA3	ROA5	RET1	RET3	RET5
TMT$		-.04* (-.20)	-.35** (-2.04)	-.31** (-2.21)	-9.35*** (-5.73)	-7.83*** (-10.47)	-3.32*** (-6.05)
DSP$		-.20* (-1.77)	-.12 (-1.36)	.08 (1.19)	.60 (.72)	.73** (1.93)	.66** (2.39)
SALES		-.42* (-1.74)	-1.97*** (-9.75)	-1.92*** (-10.44)	-29.38*** (-16.46)	-13.91*** (-15.54)	-8.80*** (-12.23)
MBR		.99*** (23.94)	.35*** (10.36)	.06** (2.16)	-6.51*** (-21.40)	-5.12*** (-34.86)	-3.56*** (-31.55)
LEV		-.05*** (-5.77)	.01 (1.46)	.04*** (6.25)	.83*** (12.58)	.57*** (18.01)	.46*** (18.41)
TSIZE		-.50*** (-6.85)	-.38*** (-6.73)	-.142*** (-2.62)	-1.66*** (-3.10)	-.35 (-1.41)	.59*** (3.39)
α_i		10.87*** (5.79)	21.89*** (14.76)	18.21*** (13.67)	287.08*** (20.72)	156.82*** (23.92)	76.69*** (14.79)
n		10,127	6,979	4,412	10,090	6,953	4,404
Adjusted R^2	within	.079	.064	.054	.104	.272	.321
Adjusted R^2	overall	.055	.002	.023	.004	.003	.006

Note: Variable definitions are provided in Table 3(i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i (i and t are firm and year subscripts, respectively). Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 10b

Effects of Pay Disparity with Quadratics on Future Firm Rates of Return
Differences in Pay between non-CEO TMT Members
Results for Firm-Specific Fixed-Effects Regressions

$$ROA_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 DSP\$_{it} + \beta_3 SALES_{it} + \beta_4 TMT\$^2_{it} + \beta_5 DSP\$^2_{it} + \beta_6 SALES^2_{it} + \beta_7 MBR_{it} + \beta_8 LEV_{it} + \beta_9 TSIZE_{it} + \varepsilon_{it} \quad (7b)$$

$$RET_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 DSP\$_{it} + \beta_3 SALES_{it} + \beta_4 TMT\$^2_{it} + \beta_5 DSP\$^2_{it} + + \beta_6 SALES^2_{it} + \beta_7 MBR_{it} + \beta_8 LEV_{it} + \beta_9 TSIZE_{it} + \varepsilon_{it} \quad (8b)$$

		ROA1	ROA3	ROA5	RET1	RET3	RET5
TMT$		6.69***	2.26	-1.79	-24.73	-13.52*	-8.23
		(3.07)	(1.40)	(-1.34)	(-1.54)	(-1.89)	(-1.58)
DSP$		-.85**	-.13	.14	-1.07	1.12	1.36
		(-2.03)	(-.44)	(.59)	(-.35)	(.90)	(1.42)
SALES		-.17	-2.56***	-2.94***	-61.22***	-18.93***	-13.96***
		(-.16)	(-1.73)	(-3.52)	(-7.48)	(-4.59)	(-4.30)
TMT$^{2}		-.38***	-.15	.08	.84	.32	.28
		(-3.11)	(-1.60)	(1.11)	(.93)	(.80)	(.96)
DSP$^{2}		.06	.00	-.00	.15	-.04	-.06
		(1.58)	(.03)	(-.23)	(-.17)	(-.36)	(-.75)
SALES^2		-.02***	.04	.08	2.43***	.38	.39
		(-.24)	(.63)	(1.27)	(4.01)	(1.25)	(1.64)
MBR		.99***	.35***	.06**	-6.58***	-5.14***	-3.57***
		(24.01)	(10.39)	(1.99)	(-21.62)	(-34.88)	(-31.53)
LEV		-.05***	.01	.04***	.85***	.68***	.46***
		(-5.88)	(1.41)	(6.39)	(12.86)	(18.07)	(18.50)
TSIZE		-.51***	-.38***	-.11**	-1.63**	-.34	.60***
		(-7.01)	(-6.83)	(-2.52)	(-3.03)	(-1.36)	(3.46)
α_i		-17.32*	12.31*	27.62***	458.80***	195.96***	111.88***
		(-1.89)	(1.79)	(4.83)	(6.80)	(6.45)	(5.02)
n		10,127	6,979	4,412	10,090	6,953	4,267
Adjusted R^2	within	.080	.065	.055	.107	.272	.321
Adjusted R^2	overall	.056	.003	.027	.005	.003	.003

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

TABLE 10c

Effects of Pay Disparity on Future Firm Profits & Market Values
Differences in Pay between non-CEO TMT Members
Results for Firm-Specific Fixed-Effects Regressions

$$NIBX_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 DSP\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (7c)$$

$$MKVL_{it*} = \alpha_i + \beta_1 TMT\$_{it} + \beta_2 DSP\$_{it} + \beta_3 SALES_{it} + \beta_4 MBR_{it} + \beta_5 LEV_{it} + \beta_6 TSIZE_{it} + \varepsilon_{it} \quad (8c)$$

		NIBX1	NIBX3	NIBX5	MKVL1	MKVL3	MKVL5
TMT$		.14*** (5.38)	.05** (1.97)	-.01 (-.37)	.10*** (6.47)	.01 (.63)	.00 (.23)
DSP$		-.03*** (-2.59)	-.02 (-1.57)	.01 (.66)	-.02*** (-2.51)	-.01 (-1.35)	.00 (.46)
SALES		.65*** (22.16)	.35*** (10.18)	.19*** (4.94)	.47*** (28.99)	.23*** (13.36)	.11*** (5.99)
MBR		.07*** (14.29)	.04*** (6.46)	.02*** (3.03)	.08*** (27.74)	.04*** (12.83)	-.00 (-.69)
LEV		-.01*** (-11.15)	-.00*** (-3.94)	-.00 (-.95)	-.01*** (-22.86)	-.01*** (-11.28)	-.00*** (-3.23)
TSIZE		-.04*** (-4.84)	-.05*** (-5.90)	-.03*** (-3.68)	-.04*** (-8.22)	-.03*** (-7.31)	-.03*** (-6.48)
α_i		-.82*** (-3.68)	1.84*** (7.45)	3.14*** (11.19)	3.77*** (30.05)	5.94*** (47.01)	6.73*** (53.07)
n		8,342	5,731	3,719	10,049	6,881	4,349
Adjusted R^2	within	.121	.046	.018	.205	.080	.026
Adjusted R^2	overall	.671	.644	.602	.713	.666	.493

Note: Variable definitions are provided in Table 3 (i and t are firm and year subscripts, respectively). The mean firm specific fixed-effect (intercept) is shown as α_i. Sample size (n) varies based on the number of years subsequent to the compensation year necessary to calculate the 1 year, 3 year, and 5 year averages for the dependent variables. The t-statistics are shown in parentheses below the coefficients. Significance at the .10, .05, and .01 levels is denoted by *, **, and ***, respectively.

VITA

Gregory Alan Jonas was born on August 28, 1956, in Kalamazoo Michigan. He graduated with honors from Western Michigan University in 1979 earning a Bachelor of Business Administration with a major in Accountancy. Upon graduation Gregory was inducted into Beta Gamma Sigma. In 1982 he passed the Certification in Management Accounting exam and he has remained a CMA in good standing since. Following nine years of employment as a management accountant, in1988, he completed the requirements for an MBA (Finance) from Western Michigan University. After four years in the PhD program at Virginia Commonwealth University (VCU), Greg completed the requirements for a Doctorate in Business with a major in Accountancy and a minor in Economics. During his time at VCU, Greg was selected to join Phi Kappa Phi and was chosen to be a 2005 AAA/Deloitte/J. Michael Cook consortium fellow.

Greg's business experience began in the cost accounting department of a Gulf + Western Manufacturing Company division in 1980. He moved to Holland, Michigan in 1981 to work for Haworth, Inc., a large office furniture manufacturer, where he held management accounting positions of increasing responsibility until moving to North Carolina in 1993 to accept a position as a CFO. This most recent job in industry was with a privately held office furniture manufacturer located in High Point, North Carolina. Starting as the CFO, he subsequently became president and CEO before resigning in 2002 in order to pursue a lifelong goal of obtaining a PhD. Greg's teaching experience includes a variety of accounting, finance, and management courses.