$1 CEO SALARIES AND R&D SPENDING AS A FORM OF EXTREME INCENTIVE COMPENSATION AND INVESTOR SIGNALING

by

BROOKE GARDNER

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While gaining popularity in mainstream media, the $1 CEO salary is a trend whose motives and impact remain largely misunderstood. This paper examines a dataset of 155 companies that have implemented the $1 salary. Statistical testing is used to analyze the relationship of $1 salaries to several variables including company financial measures and descriptive CEO attributes. The trends in research and development spending, capital expenditures, and stock price that result before and during the $1 salary period are also examined. The goal of this research is to understand the relationship between $1 CEO salaries and long-term spending in the form of research and development and capital expenditures. The secondary goal is to understand how the $1 salary acts as a form of extreme incentive compensation and investor signaling by using long-term spending as a proxy for managerial belief in future firm performance. The findings in this thesis suggest that $1 CEOs have strong beliefs in their firms as demonstrated by the $1 salary and increases to long-term spending. However, investors do not appear to share this same belief in the firm which suggests the $1 salary may be an ineffective attempt at signaling.

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Introduction

Notable figures such as Elon Musk and Mark Zuckerberg have made news in recent years joining a small, but growing group of $1 salaried chief executive officers (CEOs). A $1 salary is a stark contrast to the millions of dollars many CEOs receive annually. Many companies are under scrutiny for the increasing pay disparity between wage workers and executives where CEOs' salaries are in the millions while their lowest paid workers struggle to meet ends. Liz Shuler, Secretary-Treasurer of the American Federation of Labor and Congress of Industrial Organizations, commented on the issue saying, "Too many working people are struggling to get by, to afford the basics… while CEOs are paying themselves more and more" (Kimes, 2011). In 2017, a typical CEO at an S&P 500 Index firm made an average of 361 times the salary of their average worker (Hembree, 2018). Some companies like Google and Oracle have taken an opposite approach to executive compensation. These companies have decreased CEO salaries to $1 or less. Often to replace this salary, the CEO's compensation will come in other forms such as stock options and performance-based bonuses.

This $1 CEO salary trend has evolved over time from a cost-cutting sacrificial act in its infancy to a statement made by successful, high-profile companies in more recent years. As the trend has evolved, so too has the motivations behind it and the executive actions taken because of it. This thesis examines this $1 CEO salary trend and its relationship to long-term spending in the form of research and development and capital expenditures. Additionally, the $1 salary is examined as a form of extreme incentive compensation and a form of signaling to investors with long-term spending used as a proxy for management's belief in future firm performance.

Historical Context

The first instance of something resembling the $1 CEO salary occurred in the early twentieth century during World War One. During the war, there were a group of nearly 1,000 wealthy American businessmen who wanted to help the government and serve in the military. Most of these men were independently wealthy and had income over $6,000 ($87,000 adjusted for inflation). Because they were well-off financially, they did not want to take the government's money to serve their country. However, the US military could not have unpaid volunteers, and as a result, the men were compensated with a $1 annual salary. These men were known as Dollar a Year Men (Sacramento Union, 1919).

Chrysler took this dollar a year concept and applied it to CEO compensation in 1978. Lee Iacocca became the CEO of Chrysler with a $1 salary. Chrysler was on the brink of bankruptcy, and Iacocca was tasked with turning the failure around and reviving the company. Iacocca went to the US Congress to make a case for federal loan guarantees for Chrysler. He was successful in his pleas and by 1983, Chrysler paid back the government loans early and was able to turn a profit. While Iacocca started with a $1 salary, by 1980 he made the list for Forbes' Best Paid CEOs with a salary of $868,000 (Weinberg, 2002). In the case of Chrysler, with a $1 salary, Iacocca transformed Chrysler's strategy and returned it to profitability.

The $1 salary initially was a sacrificial act to help struggling companies cut costs and recover financially. CEOs of other large companies followed Iacocca's example and continued this trend. In the past decade, executives from high-profile, successful companies have taken $1 salaries and brought renewed attention to this

trend. In 2004, Google co-founders and current CEO and president, Larry Page and Sergey Brin took a $1 salary. Other notable figures include John Mackey, CEO of Whole Foods, Jeremy Stoppleman, CEO of Yelp, and Mark Zuckerberg, CEO of Facebook. Unlike Chrysler, in many of these recent examples, these companies are not facing financial struggles. This suggests that the meaning behind the $1 salary has shifted. Current motivations could be to signify that the CEO has a large stake in their company and that the compensation they receive is coming only from their stock in the company. John Mackey's comments on his own compensation reveal another possible motivation, altruism. "I have enough money, and the deeper motivations for me are to do service and try to do good in the world," Mackey remarked (Kowitt, 2015).

Background and Existing Literature

Executive Compensation

Chief Executive Officers (CEOs) of large, publicly traded companies bring home up to millions of dollars in total compensation. CEOs are the highest ranking and usually highest paid individuals within a company. The CEO is the top manager responsible for both major strategic decisions as well as approving aspects of day-to-day operations. The CEO is exposed to some amount of risk as they are responsible for failures of the company at the end of the day. As a result, CEOs are paid well to compensate for the risk they assume and the decisions they must make. In large companies, CEO compensation is often determined by a board of directors. The board of directors is created to represent shareholder interest. Shareholders are those who own shares or stock in a company. Because the number of shareholders can be so massive, public corporations have a board of directors to make sure that the company is acting in line with what is best for shareholders and stakeholders. In some cases, the CEO may be on the board of directors and/or hold considerable influence over their decisions.

Executive compensation includes a base salary that can be millions of dollars depending on the size of the company. The compensation may also include bonuses that are dependent on firm performance as measured by profit, growth, or other financial metrics. Stock options give executives the right to buy or sell stock for a certain price within a time period. Common stock may also be included in the compensation package. This stock allows CEOs to own shares and become a shareholder themselves. Common stock may include dividends, money that is paid out to shareholders on a periodic basis from the company's profit. CEOs may also receive ancillary

compensation in the form of security or private jets. Because CEOs are often considered the face of the company, a company may give the CEO certain luxuries to portray an image of wealth or success. All these different elements can make up the CEO's compensation package.

Incentive Compensation

To incentivize managers to make decisions that will be beneficial for the company, compensation can be tied to the firm's overall performance. The goal of incentive compensation is to align manager and firm interests. When certain performance targets are met, the manager receives compensation in the form of bonuses or stock options. These performance indicators may be based on financial metrics such as stock price, net income, and revenue growth or non-financial metrics such as customer relation scores, quality of products, or firm reputation. Often, the performance targets will be set in the beginning of the year or quarter, so the manager will be aware of them. During the year or quarter end review, these targets will be assessed. Depending on how well they are met, the manager may receive none, a fraction, or the total amount of the incentive compensation.

Incentive compensation varies greatly from salary compensation. Often an employee will have both types of compensation. Salaried employees are paid a fixed amount for the total year, divided evenly throughout the company's pay periods. A salary may increase on a year to year basis with improvement in performance through pay raises. However, because of its fixed nature, it does not necessarily motivate CEOs to improve performance. This compensation is guaranteed even if the firm experiences poor performance or the CEO makes decisions that negatively impact the firm. A

CEO's total compensation package usually includes both salary and incentive compensation.

Signaling

In relation to finance and economics, signaling means that one party is conveying information about itself to another party through their actions. In the corporate world of publicly traded companies, investor opinions are important as they reflect to the market how successful the company is expected to be. When companies take actions that suggest they will be profitable in the future, there is often a resulting increase in their stock prices. Investors tend to buy more shares of companies that are projected to be successful and have higher returns in the future. This drives up the prices of these stocks and increases the company's market value. While companies rarely outright say how successful they anticipate they will be in the future, their actions often reflect their predictions of future firm performance. In signaling, the investors notice these actions and use them to make valuation decisions regarding the company. If a company lays off hundreds of employees or an executive makes a sudden exit, the investors may be more inclined to sell the company's stock, decreasing its value.

Signaling is often a deliberate action by the company in which they are aware of how investors will perceive their actions. As Spence (1973) concluded in his research, signaling relates to observable characteristics about a party that are within the control of that party. Companies know what actions investors will notice and can make changes in these areas to gain attention. Publicly traded companies have regular correspondence with investors through quarterly earnings calls. However, if the company wants to reveal something about themselves in a less obvious manner, they may turn to

signaling. This signaling may take the form of adjusting executive leadership or drastically changing executive compensation. If the company wants their stock price to rise, they may take actions that the market will interpret as beneficial for future success and then in turn increase the valuation of the company and its stock.

Long-Term Spending

Two major ways that a company can invest in long-term projects is through research and development (R&D) and capital expenditures (CapEx). R&D is the area of the company dedicated to improving and inventing products and processes. Innovative companies such as Amazon and Google spend billions of dollars on R&D annually, and the average amount of spending varies by industry. R&D spending relates to the long-term future of a company as many of the products it develops will take years before they hit the market and influence a company's financial performance. Not all R&D projects will be profitable, and some may never leave the R&D labs. The return on R&D investments can be difficult to accurately guarantee which causes R&D spending to have an uncertain nature. Because of its uncertain nature and relation to long-term profitability, R&D spending may be a signal of a manager's belief about future firm performance. If a CEO believes their company will be profitable in the future, they may encourage R&D spending as this will help the company remain profitable in the coming years. Alternatively, if the company is struggling, the CEO may decrease R&D spending as its returns may not be realized until much later.

The nature of capital expenditures makes them less risky investments than R&D. Capital expenditures are costs incurred when buying or improving property, plant, and equipment of a company. Spending on capital expenditures indicates that long-term

assets have been acquired or maintained. Often, these assets are necessary for a company's normal operations and may include the offices where employees work, storefronts that sell products to consumers, and machines that produce goods. The return on these investments is more certain than the unpredictable returns of R&D spending.

Existing Literature

In addition to being a matter of public scrutiny, executive compensation is an area that has been extensively studied in academic accounting research. Studies conducted by Abernathy (2015) suggest that powerful CEOs hold strong influence over their firm's compensation systems in the face of regulatory and public pressure. CEOs often have a large amount of power over their compensation. Byun (2016) researched pay dispersion and earnings management. He concluded that executives who believe that their relative level of compensation is unfair are more likely to engage in earnings management. This study provides evidence that CEOs have significant control over their compensation.

Research has also been conducted on the relationship between CEO compensation and firm characteristics. Zajac (1990) concluded that several CEO issues could predict variation in firm performance. Included in these issues was the importance of CEO's perceptions of the linkage between their personal wealth and firm wealth. If this link is perceived to be strong, the predicted firm performance should be higher. Additionally, Gaver (1993) highlights the difference between growth and nongrowth firms in executive compensation matters. Growth firms are more likely to pay higher levels of cash compensation and offer more stock option plans than their nongrowth

counterparts. This research has not been applied to $1 salaries, but the type of firm may play a role into whether the $1 salary exists.

CEO compensation can also be linked to public perception of the company. Maug (2012) examined the connection between CEO compensation and prestige. If the firm is included in Fortune's ranking of most admired companies, CEO pay is generally lower. This is hypothesized to be caused by the non-monetary benefits CEOs receive from working for a prestigious firm or the enhanced career prospects they have. This research suggests CEO compensation goes beyond the monetary items like salaries and stock options.

When it comes to $1 CEO salaries, the research around this topic is more limited. Currently, there are two published accounting research articles centered around $1 CEOs. This research focuses on the situation that cause companies to move to $1 salaries and the stock market returns caused by $1 salaries. Hamm, Jun and Wang (2015) sampled 93 CEOs from 1993 to 2011 looking at the determinants and outcomes of $1 CEO salaries. They concluded that this phenomenon occurs in two main situations. In the first situation, a firm needs to cut costs during a crisis, so the CEO sacrifices his or her salary. In the second scenario, the $1 salary is an indication of better future firm performance. The CEO is expressing faith in the progress of the company. The $1 salary is an attempt to align CEO and company interests.

The second study by Loureiro (2014) looks at the motives and impact of $1 salary on firm performance and CEO compensation. They conclude that $1 CEO firms have lower stock market returns after adoption of the $1 salary. This difference is heightened when firms have these salaries for overconfident CEOs and because of

things other than restructuring. Overall CEO compensation decreases usually for CEOs of restructuring firms. In firms that are not restructuring, $1 CEOs generally have higher bonuses and gains from stock holdings. Additionally, they examined the frequency of the $1 salary by state. California, Texas, and New York had the highest number of $1 CEOs. The most common industries for the $1 CEOs were prepackaged software and computer programming. This study is nearly five years old and several high-profile CEOs have joined the $1 salary trend since, bringing a renewed popularity to this form of compensation. Additionally, Loureiro's research suggests that $1 salaries may not be viewed as a good sign by investors as the $1 salary firms experience lower stock market returns compared to similar firms. These two papers have conclusions that are contradictory, which suggests that research in this area of executive compensation is inconclusive, and there are remaining unanswered questions.

Research Question and Hypotheses

This thesis aims to determine the nature of the relationship between $1 CEOs and long-term spending in the form of R&D and capital expenditures. The proposed hypothesis is that companies with $1 CEOs will have an increase in this type of spending. Additionally, there are two proposed reasons behind this hypothesized increase. The first potential reason is that CEOs with $1 salaries are signaling their belief in and care for the long-term value of the firm. As a result of this belief, they will invest in projects that will benefit the firm in the long term. The other proposed reason suggests that the $1 salary is a form of incentive compensation that then causes the CEOs to make spending decisions that will improve the value of the company long term.

Research Methods

Data Collection

To analyze the $1 salary trend, a dataset was compiled from several different existing databases. Financial data for the companies of interest came from the Compustat database. The Execucomp database was used to obtain information about CEO salaries and other characteristics of CEOs and executive compensation. This data was gathered from 1992 to 2018 and from 3,699 individual companies. This resulted in a dataset of 45,693 entries with 7,938 unique CEOs.

Several aspects of the dataset were reformatted to fit the research goals. For missing data items, zero was entered to complete the dataset. Additionally, there were many companies that had data missing for different years. In these cases, formulas were adjusted to compensate for these missing years. For example, several companies had single year entries with information for the year the CEO joined the company and their age, but this information was missing from the entries of following years with the same CEO. Several new columns were added to this dataset to expand the variables examined. Excel formulas were used to calculate the time that the CEO had been with the company and had been CEO. These variables, “time_in_co” and “time_as_ceo” are a calculation of the months that the CEO had been with the company and in their current position based on the fiscal year of the data entry. The other variable added was “$1 CEO?” This variable takes a value of zero or one depending on the CEO’s salary. If the CEO’s salary is equal to 0 or 0.001 (data in thousands) then the variable is given the value of one. If the salary is greater than 0.001, then it is given the value of zero. This

allowed the data to easily be filtered into $1 salary companies and non-$1 companies. From this dataset, there were 572 entries where "$1 CEO?" equaled one. Within these 572 entries, there were 155 unique companies and 168 different CEOs.

Univariate Testing

Univariate testing was used to compare the $1 CEO companies to non-$1 CEO companies to see what variables change with different CEO compensation. These tests looked at individual variables and their relationship with the variable "$1 CEO?"
A complete list of variables and their definitions can be found in the appendix. To test the relationship of these variables to $1 salaries, the data was divided into two groups, $1 CEO companies and non-$1 CEO companies. For each variable, the mean value was calculated for each group. These means were then compared in a t-test to determine if the variable of interest was statistically significant. The t-test was performed in Excel using the t-test: two sample assuming equal variances tool in the Excel data analysis toolkit. The test statistic was calculated from the two means and the standard deviation and then compared to the corresponding p-level to determine whether to accept or reject its statistical significance. The p-value used was 0.05. The hypotheses were:

$$H_O: \mu_{\$1\ CEO} = \mu_{non\text{-}\$1\ CEO}$$
$$H_A: \mu_{\$1\ CEO} \neq \mu_{non\text{-}\$1\ CEO}$$

Of the 21 variables tested, 14 resulted in p-values small enough to reject the null hypothesis. This means that the probability of the mean values of the variable of interest equaling each other is low enough to suggest that the means are statistically different. The variables that were statistically significant in relationship to the $1 salary were age, bonus, options awarded, salary, total compensation 2, CEO percentage ownership

including options, CEO percentage ownership excluding options, assets, research and development, capital expenditures, revenue, market value of equity, time in company (months), and time as CEO (months). These variables were then further examined in the next round of statistical testing.

Variables	Non $1 CEOs Mean	$1 CEOs Mean	t Statistic	P(T<=t) two-tail
BONUS	462.656663	193.9467	4.31381871	0.00001607
AGE	55.8153770	56.4884955	-2.1317245	0.03303483
OPTION_AWARDS	1190.56177	2988.82216	-4.7245634	0.00000231
OTHANN	27.1624550	21.83581	0.52047654	0.60273399
OTHCOMP	246.294386	361.923	-1.9510163	0.05106120
RSTKGRNT	228.604974	254.6351	-0.1849009	0.85330753
SALARY	714.823871	0.000299	43.9278713	0
TDC1	4984.27734	5573.725	-1.5578362	0.11927901
TDC2	5567.32817	11637.98	-6.4081199	1.4876E-10
SHROWN_TOT_PCT	1.17762237	4.453154	-17.475378	3.6799E-68
SHROWN_EXCL_OPTS_PCT	2.13165912	6.167558	-16.002552	1.7584E-57
Assets	14988.9908	28541.5	-3.3572896	0.00078775
RD	103.708035	376.4974	-10.824758	2.836E-27
Capx	315.473189	567.5329	-4.7496121	2.0443E-06
Revenue	5395.82663	8048.841	-3.6646665	0.00024794
Income_bxi	338.816045	468.3137	-1.6254439	0.10407491
Stockprice	62.5227824	45.31702	0.27206777	0.78557114
Btm	-200.801	0.017969	-0.10298	0.917977
Mve	7455.75918	19305.49	-10.933736	8.6073E-28
Time_in_co	164.176614	102.2727	7.00066108	2.5826E-12
Time_as_ceo	87.7582057	76.32867	3.0841311	0.00204269

Table 1: Results of t-Tests with Two-Sample Assuming Equal Variances

This table represents the output of t-tests for each variable with two samples separated by $1 CEOs and non-$1 CEOs. Variable descriptions can be found in the appendix.

Of interest to this research is the relationship between $1 CEOs and R&D spending. The t-test conducted on these two variables offered the following output.

t-Test: Two-Sample Assuming Equal Variances

Research and Development

	non $1 CEOs	*$1 CEOs*
Mean	103.7080353	376.4974
Variance	332094.571	2461850
Observations	45121	572
Pooled Variance	358710.1006	
Hypothesized Mean Difference	0	
df	45691	
t Stat	-10.82475772	
P(T<=t) one-tail	1.418E-27	
t Critical one-tail	1.644886977	
P(T<=t) two-tail	2.836E-27	
t Critical two-tail	1.960015906	

Table 2: Research and Development t-Test: Two-Sample Assuming Equal Variances

This table represents the statistical output for a t-test with Research and Development spending as the variable. The dataset was divided into two samples by non-$1 CEO and $1 CEO.

This t-test resulted in a p-value significantly smaller than the 0.05 p-value used to test for significance. Because of the small p-value, the null hypothesis that the mean R&D spending of the non-$1 CEOs and $1 CEOs groups are equal is rejected. Based off the mean values, it appears that companies have a higher average R&D spending when they have a $1 CEO compared to the larger dataset.

Other variables that had especially low p-values were Bonus, Options Awarded, Salary, Total Compensation, CEO percentage ownership (including options), CEO percentage ownership (excluding options), Assets, Capital Expenditures, Revenue, Market Value of Equity, and Time in Company. All these variables had p-values less than 0.001. In previous research, the relationship between stock price and $1 CEOs has been studied. In the t-test for stock price, the test statistic was 0.272 which resulted in a p-value of 0.78. Because of the p-value was greater than 0.05, the null hypothesis was

not rejected, suggesting that there is not a statistically significant difference between the mean stock price of the $1 CEOs compared with non-$1 CEOs. On average, $1 CEOs work for companies that are larger, more profitable, and have higher R&D and capital expenditure spending compared to CEOs with more traditional salaries. Additionally, these $1 CEOs have spent less time working for the company but are slightly older than other CEOs.

Introduction and Discontinuation of $1 Salary within Individual Companies

To understand the trends surrounding the $1 salary on an individual company basis, analysis was conducted using a dataset of all the companies that at one point had a $1 CEO. This dataset had 2,253 individual entries with 572 of those being years where the company had a $1 CEO. Basic descriptive statistics such as mean, minimum, and maximum as well as histograms and linear graphs were used to understand the trend of the $1 salary over the past 25 years.

Popularity and Trend of $1 CEOs since the 1990s

The starting years for the $1 CEOs were organized into a frequency distribution chart to identify major trends. The most common five-year period for the $1 salary to start was between 2005 and 2009. The frequency distribution chart is shown below.

Five-Year Period	Number of new $1 CEOs
1990-1994	7
1995-1999	36
2000-2004	33
2005-2009	45

2010-2014	29
2015-2019	15

Table 3: Frequency Distribution of $1 Salary Starting Year

This table shows the frequency distribution of the start of $1 salaries from 1990 to 2019 over five-year periods.

The popularity has decreased since its peak in 2007 when 14 CEOs took on a $1 salary. There were also a high number of new $1 CEOs in 2009 with 11 new members in the $1 salary club. Additionally, another peak period was 1999-2000 where there were 10 and 11 CEOs who adopted a $1 salary, respectively.

As far as the ending of these $1 salaries, 1999 and 2008 were the most popular years with 7 and 9 CEOs in these years respectively reverting to a larger salary.

Three-Year Period	**Number of CEOs leaving $1 salary**
1993-1995	6
1996-1998	9
1999-2001	16
2002-2004	14
2005-2007	13
2008-2010	17
2011-2013	11
2014-2016	9

Table 4: Frequency Distribution of $1 Salary Ending Year

This table shows the frequency distribution of the end of $1 salaries from 1993 to 2016 over five-year periods. Companies who still had a $1 salary at the end of the available dataset were excluded from this table, as it is unknown if the CEO continued or will continue the $1 salary into future years.

The frequency distribution of the ending years shows that the ending years are somewhat evenly distributed across the data period. The highest number of CEOs leaving the $1 salary occurred in the twelve-year period from 1999 to 2010. Many companies still had the $1 salary in effect in the last year that data was reported. To compensate for this, CEOs were only considered to have left the $1 salary if in the following year the company reported a CEO salary above one dollar. 2017 was excluded from the ending year analysis because many companies did not have 2018 data at the time of this study.

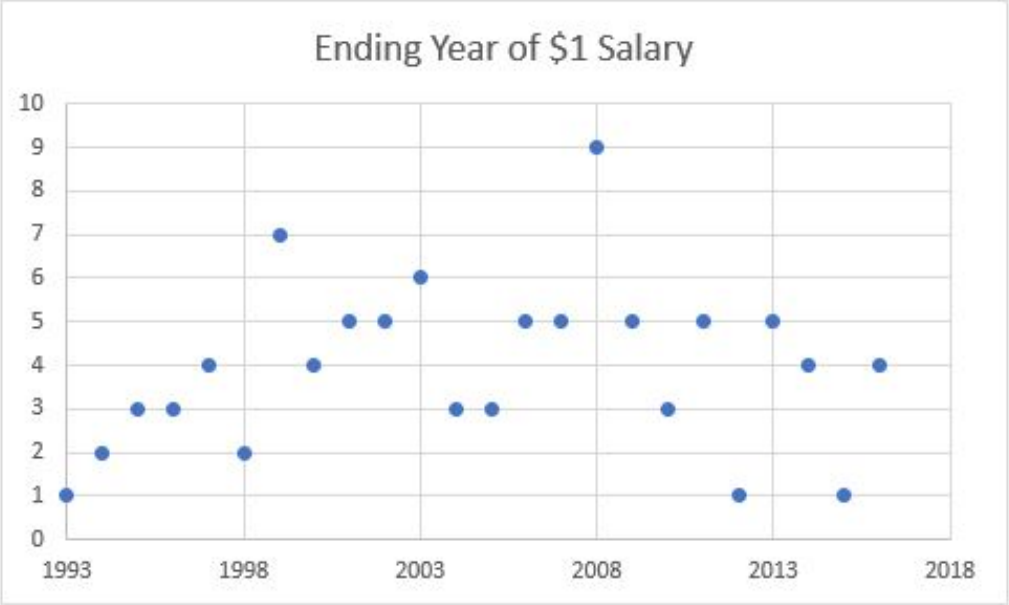

Figure 1: Plot of End Year Date Frequencies

This graph plots the number of CEOs who quit the $1 salary practice for each year from 1993 to 2016.

A graph of the ending year data shows a consistent number of CEOs leaving the $1 salary per year with only a handful of outliers deviating significantly from the mean of 3.9 companies per year.

Length of $1 Salaries

Looking at how long individual companies kept a $1 salary structure shows a strong trend towards shorter $1 CEO time periods. There is a total of 165 observations of consecutive $1 salary periods in this dataset. Of these 165, 82.4% lasted 5 years or less with 36.97% being only a year or less. A histogram of this data shows the clear pattern of a significant decrease in the number of $1 CEOs as the length of time increases.

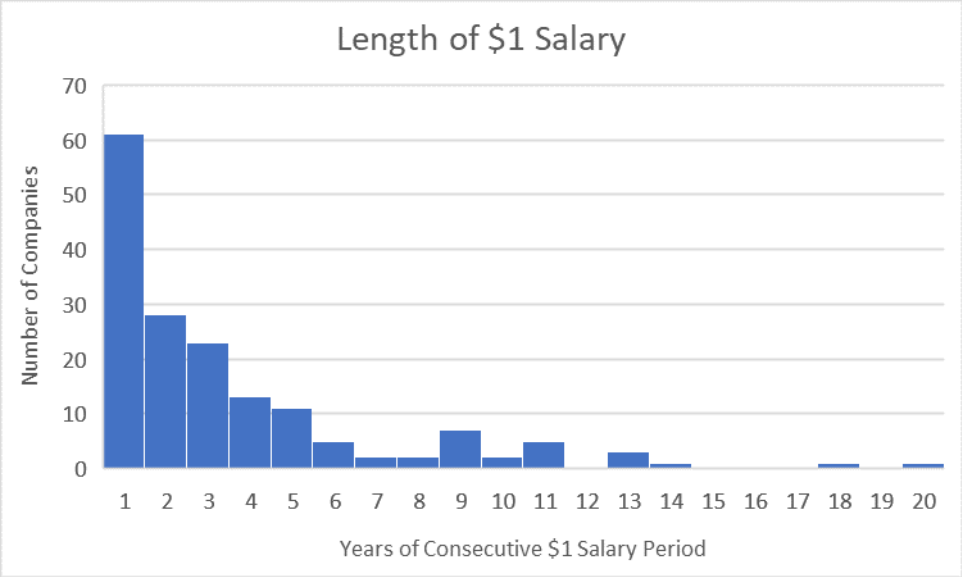

Figure 2: Histogram of Length of $1 Salary

This graph plots the length of consecutive $1 salary periods against the number of companies that had each of these different lengths from a year or less to twenty year-long periods.

The average number of years with a $1 salary is 3.69. There are a handful of outliers in the data with CEOs who have had a $1 salary for 10 to 20 years. Of the data on record for these $1 companies, 33.17% of the years have a $1 salary. As of 2017, 19.35% of the $1 companies have a $1 salary. This percentage is equal to 30 companies.

Some companies had nonconsecutive periods of a $1 salary which led to the sample size being larger than the 155 total companies that had or currently have a $1 CEO. Within the $1 CEO company dataset, 10 companies had 2 nonconsecutive $1 salary periods. The average time between these $1 salary periods was 4.1 years with the maximum time between being 8 years and the minimum 2 years.

Multivariate Testing with R&D, CapEx, and $1 CEOs

Multivariate testing was used to determine what factors can best predict $1 CEOs as well as R&D and capital expenditure spending by using the variables determined to be statistically significant in univariate testing. Using the same data as the univariate tests, this study relies on multiple regression analysis. This test controls for other factors to see how strong of a relationship the variables in question have with the $1 salary, with R&D spending, and with capital expenditures. The multivariate test looks at multiple variables at once to see how the strength of the relationship changes depending on the addition of other control variables. The regression analysis was performed in Excel using the regression tool in the Excel data analysis toolkit. This analysis generates an output that includes coefficient estimates, R squared, p-value, and standard error of the estimates. These statistics are used to determine how well the regression model fits the data. Three separate multivariate tests were conducted with $1 salary, R&D spending, and capital expenditures each being individually examined as the dependent variable.

When $1 CEO? was the y variable, the following variables were examined as potential independent variables: R&D, Options Awarded, Capital Expenditures, Time as

CEO, Percentage of Company Ownership including Options, Bonus, Time in Company, Total Compensation 2, Percentage of Company Ownership excluding Options, and Market Value of Equity. These variables were previously determined to be statistically significant in t-tests. Several multivariate tests were done using various combinations of these variables. The variables that had higher p-values were removed until the regression equation with the highest R-squared value remained. The R-squared value is the percentage of variation in $1 CEO? that is explained by the regression equation.

Regression Statistics	
Multiple R	0.104978302
R Square	0.011020444
Adjusted R Square	0.010933858
Standard Error	0.110574534
Observations	45693

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	6.22478214	1.556195535	127.2782	2.8953E-108
Residual	45688	558.6147338	0.012226728		
Total	45692	564.8395159			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	0.012286547	0.00067625	18.16865643	1.66E-73
rd	9.07004E-06	9.27283E-07	9.781312498	1.43E-22
capx	7.00907E-07	4.41157E-07	1.588792604	0.112114
SHROWN_TOT_PCT	0.00214189	0.0001163	18.41690572	1.81E-75
time_in_co	-2.18683E-05	2.47227E-06	-8.845434936	9.44E-19

Table 5: Multiple Regression Output for $1 CEO as Dependent Variable

This table represents the multiple regression performed with the variable $1 CEO. Variable descriptions can be found in the appendix.

The highest R-squared value resulting from the following independent variables: R&D, Capital Expenditures, Percentage of Company Ownership including Options, and Time in Company. Because the $1 CEO? variable takes a value of either zero or one, the coefficients in the regression equation describe how the probability of being a $1

CEO changes when the amount of the variables change. The intercept is the likelihood of being a $1 CEO without taking any other variables into consideration. In this dataset, the $1 CEO trend occurred about 1% of the time.

The standard deviation of R&D spending is 599.685. Multiplying this amount by the R&D coefficient results in 0.0054. This means that the probability of having a $1 CEO increases by 0.54% for every one standard deviation increase to R&D spending. The percentage of company ownership including options shows an even stronger increase to $1 CEO likelihood. It has a standard deviation of 4.47 which when multiplied by the coefficient 0.00214 results in 0.00957. Therefore, when company ownership is increased by one standard deviation, the likelihood of $1 CEO increases by almost one percent. The influence of capital expenditures is significantly weaker with a one standard deviation increase of 1,261.567 resulting in only a 0.088% increase in $1 CEO probability. Capital expenditures have a high p-value of 0.11 which suggests that this prediction of its influence on $1 CEO probability is not as strong as the other variables. Unlike the previous three variables, an increase to the time in company results in a decrease to the probability of $1 CEO. Increasing the time in company by the standard deviation of 210.3 months results in a 0.46% decrease to $1 CEO probability.

When using R&D spending as the dependent variable, the resulting regression equations did a better job of explaining the variation in y with a higher R-squared value. The following variables were used in various combinations of regression models: $1 CEO?, Capital Expenditures, Percentage of Company Ownership including Options, Revenue, Market Value of Equity, Assets, and Stock Price. With these variables, the

regression equation with the highest R-squared value was 0.357415. This means that the regression equation explained 35.7% of the variation in R&D spending. The Excel output of the regression is shown below.

Regression Statistics	
Multiple R	0.597841796
R Square	0.357414813
Adjusted R Square	0.357358554
Standard Error	480.7370356
Observations	45693

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	5872988448	1468247112	6353.075	0
Residual	45688	10558866752	231108.0973		
Total	45692	16431855200			

	Coefficients	*Standard Error*	*t Stat*	*P-value*	*Lower 95%*	*Upper 95%*
Intercept	4.931496518	2.368423437	2.082185322	0.037331	0.289348901	9.573644135
$1 CEO?	111.3114947	20.25516125	5.495463269	3.92E-08	71.61105637	151.011933
capx	0.019676788	0.002189984	8.984902276	2.69E-19	0.015384385	0.02396919
mve	0.014254777	0.000113882	125.1713441	0	0.014031566	0.014477988
assets	-0.000914748	2.54708E-05	-35.91353673	1.4E-278	-0.000964671	-0.000864824

Table 6: Multiple Regression Output for R&D Spending as Dependent Variable

This table represents the multiple regression performed with the variable R&D Spending. Variable descriptions can be found in the appendix.

In this regression model, all the independent variables have p-values less than the 0.05 mark for significance. The regression as a whole also has a high F value which results in a low p-value. This indicates that the equation describes a statistically significant relationship. The regression equation is as follows:

R&D Spending = 4.9315 +111.3115 ($1 CEO?) + 0.0197 (Capital Expenditures) + 0.0143 (Market Value of Equity) – 0.0009 (Assets)

Because the $1 CEO variable had a p-value less than 0.05, it is statistically significant to the equation. This suggests that whether a company has a $1 CEO has an impact on

what its R&D spending will be. If a company has a $1 CEO, it will spend on average $111 million more on R&D than other companies.

A regression analysis with capital expenditures as the dependent variable resulted in a higher R-squared value. The independent variables were $1 CEO?, R&D, Revenue, and Assets. With these variables, the regression equation had a R-squared value of 0.513. This means that the regression equation explained 51.3% of the variation in Capital Expenditure spending. The Excel output of the regression is shown below.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.716532513
R Square	0.513418841
Adjusted R Square	0.513376241
Standard Error	880.0492922
Observations	45693

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	4	37336418632	9.33E+09	12052	0
Residual	45688	35384750937	774486.8		
Total	45692	72721169569			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	33.46038326	4.347407457	7.696629	1E-14
$1 CEO?	72.6729188	37.07986072	1.959903	0.05
rd	0.222622838	0.007465923	29.81853	2E-193
revenue	0.051872722	0.00028676	180.8925	0
assets	-0.001399106	4.77401E-05	-29.3068	5E-187

Table 7: Multiple Regression Output for Capital Expenditures as Dependent Variable

This table represents the multiple regression performed with the variable Capital Expenditures. Variable descriptions can be found in the appendix.

All the independent variables have p-values less than or equal to the 0.05 mark for significance, and the regression has a high F value which results in a low p-value. Both

these things demonstrate that the relationship described by the regression equation is statistically significant. If a company has a $1 CEO, it will spend on average $72.67 million more on capital expenditures than other companies. Both the univariate and multivariate tests support the idea that having a $1 CEO impacts other financial aspects of a company such as capital expenditure and R&D spending. Additionally, the existence of a statistically significant relationship between $1 CEOs and other executive related statistics such as percentage of company ownership and other forms of compensation suggests that a $1 CEO influences non-financial aspects of a company. This relationship also works the other way where because the company or CEO has certain characteristics, they then are more likely to have a $1 salary.

Changes to Spending and Stock Price after $1 CEO Implementation

Changes in R&D Spending Following $1 Salary

To understand how the $1 salary impacts individual companies, the average R&D spending before and during the $1 CEO period was analyzed. I calculated the average R&D spending for each $1 company before the $1 salary using the year range of the $1 salary. This was then compared with the average R&D spending during the $1 CEO period. The percentage change in R&D was found by dividing the average R&D before by the average R&D after and then subtracting 1. Of the 165 $1 salary periods, only 56 had percentage change in R&D that could be calculated. This was because some companies did not report R&D information or the average R&D before the institution of a $1 salary could not be calculated.

For the companies that could have R&D percentage change calculated, 34 companies (60.7 percent) had an increase in R&D spending during the $1 salary compared with the years prior. The average increase to R&D spending was 104.5% but this mean is skewed because the minimum possible change to R&D spending is a hundred percent decrease. The largest increase was 2,120.9% which also skews the data. The median of 27.7% provides a more accurate picture of the increase to R&D spending that the companies experience after introducing a $1 salary.

Changes in Capital Expenditure Spending Following $1 Salary

The percentage change in capital expenditure spending was calculated in the identical manner as the R&D spending. However, more companies reported capital expenditure spending, so the sample size was larger. Of the $1 CEO companies 116 had capital expenditure spending information both before and during the $1 CEO salary period. These companies were more evenly split between exhibiting positive and negative changes to capital expenditures with 67 companies (53 percent) experiencing increases to spending. Once again, the average percentage change was skewed by the maximum possible decrease of 100%. Additionally, the largest increase was over 1,000% increase. The median change to capital expenditures was a 14.4% increase which suggests that the $1 salary has a slight positive impact on this type of spending.

Changes in Stock Price Following $1 Salary

In a similar manner to R&D and capital expenditure spending, stock price was analyzed. The average stock price was calculated for the period before and during the $1 salary for each company. Stock price was one of the most reported variables and as a

result, the sample size was 130 companies with reporting data available. Of these companies, 74 or 56.9% had a decrease in stock price following the adoption of the $1 salary. The average change was a 16.04% increase. However, this mean appears to be largely influenced by an outlier increase of 994%. The median is less influenced by this outlier and suggests that a decrease of 14.14% better represents the common trend in changes to stock price. These results are consistent with prior research that suggests the $1 salary generally results in lower stock returns.

Impact of Research Findings and Limitations

Relationship to Capital Expenditures and R&D Spending

In this research, long-term spending in the form of R&D and capital expenditures are used as proxies for management's belief in future firm performance. R&D spending increases may signal that the firm is investing in more long-term spending due to a belief in its future prosperity. In the univariate testing, R&D spending had a statistically significant relationship with the $1 salary. This relationship suggested that having a $1 CEO increased the expected R&D spending. This positive relationship was further supported in the multivariate testing where R&D was a statistically significant variable in the regression equation predicting $1 CEOs and vice versa. In the regression equation for the dependent variable R&D spending, having a $1 CEO added an extra $111,311 to the prediction of R&D spending.

As hypothesized, there is a positive relationship between these two variables suggesting that $1 CEOs result in more future-focused spending decisions. R&D spending is not guaranteed to result in profitability and often takes several months to several years to reap any benefits. When a company is facing financial hardship, or the CEO wants to cut costs to save money in the short-term, R&D spending may decrease. By investing more money into R&D, the CEO, who is ultimately responsible for all company decisions including budgetary manners, portrays an image of being invested in the company's future. Because $1 CEOs generally invest more money into R&D, they may be more concerned with the firm's long-term profitability.

Capital expenditure spending further supports this hypothesized long-term mindset of $1 CEOs. When looking at the univariate testing, capital expenditures had a similar relationship to $1 CEOs as R&D spending had. There was a statistically significant relationship between capital expenditures and $1 CEOs where $1 CEOs had higher mean capital expenditures than non-$1 CEOs. Capital expenditures involve investing money into long-term assets such as equipment, buildings, and other similar projects. These assets often require a large amount of money to be spent today for benefits that extend into the future. If a CEO is worried about cutting spending, they may be reluctant to spend thousands of dollars on a machine this year, even if that machine will be used well into the future. The positive relationship between capital expenditures and $1 CEOs and between $1 CEOs and R&D spending suggests that this form of compensation potentially encourages CEOs to be more long-term focused. These CEOs may make spending decisions that may not result in strong short-term benefits but will help the company long-term.

When comparing R&D spending changes to that of capital expenditures, R&D spending increases more dramatically under a $1 CEO than it does for capital expenditures. The median change for R&D spending is over 13% higher than capital expenditures. This difference suggests that $1 CEOs tend to spend more money on riskier investments as R&D has a more unpredictable return than capital expenditures. From this research, it seems that CEOs with $1 salaries have strong beliefs in their firms as demonstrated by the $1 salary and increases to long-term spending. However, when looking at the change in stock price following the $1 salary, it appears that investors do not share this same belief in the firm.

Extreme Incentive Compensation

By eliminating their reliance on a fixed salary, the $1 CEO is subjecting themselves to more incentive-based compensation. Their income is shifted to other sources such as bonuses, which were seen to have a positive statistically significant relationship with $1 salaries. The lack of a statistically significant difference in total compensation suggests that the $1 CEO has more pressure to meet incentives to maintain their level of compensation

However, the length of $1 salaries provides support that the $1 salary may not be a true form of extreme incentive compensation. On average the $1 salary lasted less than four years with nearly 37% of the companies adopting this compensation form for only a year or less. One year may not be quite long enough to convince a CEO to make major changes to the company's long-term strategy as the time between when their decisions significantly impact earnings or stock price may not be seen within just one year. The $1 salary may appear on the surface to be extreme incentive compensation as the CEOs compensation is more incentive-based than average. However, the CEO has considerable power over their compensation and would likely only allow that form of compensation if they believed the company would perform well enough in the future to meet performance targets.

Investor Signaling

Another possible motive behind the $1 salary is investor signaling. As discussed previously, the length of the $1 salary is relatively short, usually lasting for one to three years. The short length suggests that $1 CEOs are used to gain attention for the company. They may be a publicity action or an attempt to get investors to notice the

company. This theory is likely as CEOs have significant power over their compensation and would not be easily forced into an extreme incentive structure against their will. Because, as stated earlier, the CEO would most likely have an awareness of the nature and length of the $1 salary, this salary structure could be a deliberate act by the CEO to signal his or her faith in the company's future.

However, when looking at the stock price, if the $1 salary is for optics, it is not an effective tool for increasing investor perception of the company value. In the majority of cases, the $1 salary companies experienced a decrease in stock price. If the $1 salary is an attempt to signal to investors that the CEO strongly anticipates firm profitability and success, the market is not responding well to it.

Limitations of Research

There are several limitations of this research both in the data used and the scope covered that prevent further conclusions. Many companies within the dataset did not have reported information for many of the variables including R&D spending and capital expenditures. This made the analysis for these variables not as thorough and complete as it could have been. Additionally, there were missing years for some companies, and because the dataset started in the early 1990s, $1 CEO trends prior to this date were not analyzed. Another area that has room for more potential research is understanding the individual situations in which each $1 CEO arises.

Conclusion

In recent years the $1 CEO salary has gained attention as more notable figures join its elite ranks. Many of these $1 CEOs portray it as an altruistic action to combat the growing greediness of executives. Some see this trend as a way to better align executive and company interests with the CEO's income closely linked to company success via stocks and company ownership. This theory may view the $1 salary as a form of extreme incentive compensation designed to force CEOs to make decisions that fit the company's best long-term interests. CEOs with $1 salaries do exhibit a more future-oriented mindset with higher R&D and capital expenditure spending. However, this thesis concluded that it is unlikely that true extreme incentive compensation is the structure behind this trend. Additionally, the $1 salary may be viewed as a form of investor signaling by expressing the CEO's faith in the company and willingness to have their income completely dependent on firm performance in the stock market. This research suggests that while it is a possible motivation, the $1 salary does not result in higher investor valuation. As this trend continues to gain popularity, it will be important to understand its impact and the motivations behind it. While presented as a response to the growing wealth disparity and a solution to realign company and CEO interest, the lack of a significant change in total compensation and short-lived nature of most $1 salaries suggest that this trend may more likely be an ineffective attempt at signaling.

Appendix

Variable	Variable Definition
AGE	Age of CEO
BONUS	Bonus awarded to CEO
OPTION_AWARDS_RPT_VALUE	Options awarded to CEO
OTHANN	
OTHCOMP	Other compensation
RSTKGRNT	Restricted stock grants
SALARY	Salary
TDC1	Total compensation 1
TDC2	Total compensation 2
SHROWN_TOT_PCT	CEO percentage ownership (including options)
SHROWN_EXCL_OPTS_PCT	CEO percentage ownership (excluding options)
Assets	Assets
Rd	Research and development
Capx	Capital expenditures
Revenue	Revenue
Income_bxi	Income before extraordinary items

Stockprice	Stock price
Btm	Book-to-market
Mve	Market value of equity
Time_in_co	Time in company (months)
Time_as_ceo	Time as CEO (months)

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