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Director Compensation and Firm Performance: A Study of S&P 500 Listed Firms

I.   Introduction

In the past 20 years, it seems as though the magnitude and frequency of corporate scandals have dramatically increased. In the early 2000s, we witnessed the collapse of Enron (2001), Tyco (2002), and Worldcom (2002) following our discovery that these companies had used fraudulent accounting methods to manage earnings. Before these events, America had not witnessed corporate carnage at this scale. Ultimately media coverage and investigative reports on these firms revealed the weak systems of governance that had existed within these corporations and had allowed such professional misconduct to occur.

In response to these episodes, the federal government introduced the Sarbanes-Oxley Act, which aimed to prevent future corporate fraud by requiring greater transparency and executive responsibility. This act sought to align the interests of corporate officers and shareholders more closely. However, since 2002, we have continued to witness several high-profile corporate scandals. Consider Volkswagen (2015), Wells Fargo (2016), and, most recently, WeWork (2019). In each case, company managers prioritized short-term gains over shareholders' long-term interests. Oftentimes, this meant executives received massive paychecks and compensation packages at the expense of proper corporate development and growth. These scandals have helped ignite the conversation around executive compensation packages of public companies around the globe.

Since the previous economic crisis, the level of compensation of C-suite executives and directors has also come under fire. A key part of the scrutiny considers the great growth of director and executive compensation in comparison to the growth of firm performance. In November of 2019, Reuters reported that "the average annual compensation for non-executive directors at S&P 500 companies…. [is] 43% higher than it was ten years ago." That figure does not include remuneration from stock options included in the contracts of many directors. According to the same report, S&P 500 boards met, on average, 7.9 times during the year. This

is down from 9 roughly a decade ago. These statistics beg the question: are the current levels of director compensation among large publicly traded companies truly justified? In Enron's case, the company was reported to be paying $380,619 to each member of the board in 2001. Despite such high levels of pay, the company's operations were led astray.

As more information on executive compensation is revealed, shareholders have called for an end to such excessive compensation. Within the political conversations preceding the 2020 election, some candidates called for a wealth tax and had their eyes set on the inequality created by corporate America. Candidates have also called for the voting power of minority shareholders over compensation packages and other decisions carried out by the board of directors (BOD). Finally, the changes in policy surrounding corporate governance, which is heavily impacted by the board of directors, in the past decade spark great interest in the relationship between the compensation of directors and the performance of their respective firms.

The purpose of this paper is to examine the link between director compensation and firm performance. Have director compensation and firm performance historically moved in tandem? That is to say, are the observed increases in director compensation driven by improved firm performance? When exploring the answers to these questions we must keep in mind the directionality of the relationship. These days director compensation often takes the form of both cash and stock ownership. Given that, is it possible that firm performance is in fact driving the levels of director compensation?

This paper will investigate whether, and to what extent, director compensation impacts corporate performance. More specifically, the paper will examine whether or not the experienced growth in executive compensation is correlated with increased firm performance as well. There is no doubt that the BOD plays an essential role in the functions of publicly-traded firms. With the continued scrutiny of corporate America and the increased emphasis on corporate governance, the impact of director compensation on firm performance will remain critical to policymakers and shareholders of companies.

II.   Literature Review

In the past several years, there have been numerous studies which examine the ties between CEO compensation and firm performance. In this paper, we will take an alternative but related approach by examining the link between BOD compensation and firm performance. While this particular relationship is not as well documented, there are a number of conflicting studies on the topic which will inform this paper. However, before we begin our review, we believe that this paper necessitates an understanding of the function of the BOD.

In 1976, Jensen and Meckling published an article in which they formally describe the inherent conflicts of interest that persist between those who manage capital and those who provide it. They dubbed this issue the principal-agent problem. To mitigate the effects of this agency dilemma, American corporate statutes provide that all corporations must be governed by an independent board of directors which operates in shareholders' interests. In this position, the "BOD [serves as] an important part of the governance structure of large business corporations. The board of directors, which has the power to hire, fire, and compensate senior management teams, serves to resolve conflicts of interest among decision-makers and residual risk bearers. This economizes the transaction (agency) costs associated with the separation (specialization) of ownership and control and facilitates the survival of the open corporation as an organizational form" (Baysinger and Butler, 1985). In short, the BOD aims to better align the interests of executives and shareholders. Traditionally, members of the board are compensated through both cash and/or equity. Any stock-based form of payment offers individuals with skin in the game, and is often thought to further reduce agency costs. As such, stock-based director compensation is often considered an important aspect of runemeration. Overall, compensation packages serve as tangible incentives to firm directors who can directly impact performance and profitability.

A proper examination of the relationship between director compensation and firm performance requires that we first look at the determinants of firm performance. In 1989 Gary S. Hansen and Birger Wernerfelt defined firm-level return on assets (ROA)[1] as a function of (i) the performance of the industry in which the firm competes, (ii) the firm's standing relative to its

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[1] Return on Assets (ROA) = Net Income / Total Assets

competitors, (iii) firm size and (iv) firm culture. The following equation gives this model of firm performance:

Firm Performance = f (industry performance, relative market position, size, culture)

Hansen and Wernerfelt's results reveal that ROA is positively correlated with industry profitability and firm market share and negatively correlated with firm size. Hansen and Wernerfelt reason that firm size may be a source of organizational costs and X-inefficiencies[2]. These findings on firm size are consistent with the discoveries made in the following studies: Shepard, 1972; Leibstein, 1976; Hall and Weiss; Becker; and Fama French. Following this literature, we will include a measure of size as a control in our analysis.

Many of the studies that investigate the determinants of firm performance also account for the effects of firm age. In 2010, Loderer and Waelchli investigated this link between firm age and ROA for a sample of 10,000 firms between 1978 and 2004. Their results reveal a declining trend in profitability as companies age. Loderer and Waelchli attributed this inverse relationship to the organizational rigidities and rent-seeking behavior[3] often associated with older firms. (Hannan and Freeman, 1984; Leonard-Barton, 1992; Olson, 1982; Bertrand and Mullainathan, 2003). Older firms often become more bureaucratic, less agile, and thus less profitable. (Coad, Segarra, and Teruel, 2013). However, several studies have found corporate aging to lead to improved profitability. Individuals behind these findings reason that older firms have greater experience, better brand awareness, and stronger investor relationships. All of these factors, they argue, contribute to higher returns. (Bhayani, 2010).

In 2003, Bhagat and Bolton published a well-cited paper entitled *Corporate Governance and Performance.* In their paper, Bhagat and Bolton explore the relationship between governance and ROA for the sample of firms in the Compustat database between 1993 and 2003. The pair test a host of governance metrics including but not limited to board independence, board size, and the median director dollar value ownership. Bhagat and Bolton also control their

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[2] An X-inefficiency is the divergence of a firm's observed behavior in practice from efficient behavior assumed or implied by economic theory.
[3] Rent-seeking behavior refers to the actions of an entity that seeks to increase their own wealth without creating any benefits or wealth to society.

results for industry performance, firm size, growth factors, risk, and leverage. The researchers find that better governance is significantly and positively correlated with better performance. Our study will home in on one of their variables, namely director compensation.

The previously mentioned papers pertain to the literature surrounding the relationship between general corporate governance and firm performance. Understanding the role of corporate governance in firm performance will help to explain some of our results. We must also understand previously found relationships between the independent variable, director compensation, and firm performance. In comparison to the previously mentioned papers, we shall place greater emphasis on one of the many aspects of corporate governance within this paper.

In a 2005 paper, Brick, Palmon, and Wald look more specifically at director and CEO compensation, reporting an inverse relationship between compensation and performance. The compromised objectivity of Enron's directors in 2001 can serve as an example of this relationship. In this particular case, excessive compensation signaled the lack of internal governance structures that existed within Enron. While this paper considered both CEO and director compensation, we chose to solely focus on director compensation as we are primarily interested in examining the agents of governance and their ability to drive performance.

Another 2005 study that surveys the Portugeuse Stock Market finds no significant relationship between board remuneration and company performance (Fernandes 2005). While corporate governance within Portugal differs institutionally from that of the United States, this paper finds that director compensation is not related to shareholder's wealth. If this same relationship is to be found in our data, we could speak to the political conversations taking place within America at this moment.

Finally, a 2018 survey of director remuneration and firm performance of Malaysian listed firms within the consumer product industry serves as a foundation to our paper (Razali et al. 2018). After controlling for firm size, firm age, CEO duality[4], board size, and leverage, the results show a positive relationship between director compensation and firm performance as measured by ROA and Return on Equity (ROE). We will use a model similar to theirs:

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[4] CEO duality occurs when the same person holds both the CEO and board chairperson positions within a corporation.

Firm Performance = f (Director remuneration, board size, CEO duality, firm size, firm age, leverage).

Their results suggest that higher pay coincides with better performance. This speaks to retaining quality talent within the highest levels of firms and, perhaps, a strive to work harder, to earn their compensation.

This paper will examine whether the high levels of director compensation within corporate america coincide with improved performance. Do these high salaries motivate and retain directors, like what has been observed in Malaysian firms, or does overcompensation exist within our corporate structures? With the recent transparency changes in regards to corporate governance, we will consider how new regulations have changed the power of governance structures within US corporations.

III.   Theory of Equations

This paper examines whether, and to what extent, director compensation has an independent marginal effect on corporate performance. The dependent variable in this study will be corporate performance. Following existing literature, we will measure firm performance through return on assets (ROA). ROA is an accounting-based measurement of performance and will be calculated as (Net Income / Total Firm Assets). This ratio shows how efficiently the firm utilizes its asset base to generate earnings. In this study, the first regression specification of interest to us will be:

$$ROA = \beta_0 + \beta_1\, Director\_comp + \mu$$

By beginning with this simple linear regression, we will be able to measure to what extent there is a linear relationship between the two variables of interest. Moving from here, the regression equation that guides our main analysis will be:

$$ROA = \beta_0 + \beta_1\, Director\_comp + \beta_2\, Size + \beta_3\, Age + \beta_4\, Leverage + \mu$$

Any necessary manipulations of the data will be explained below in our analysis of our dataset. Once we run the above regressions, the inclusion of a fixed effects model within our data may be of interest in order to better capture the relationship that exists between our independent variable, director compensation, and our dependent variable, corporate performance as measured by a firm's ROA.

In this study, the size of the firm will be measured as the natural log of the total dollar value of assets. Using the natural log of this variable is consistent with methods found in the body of literature. We expect that firm size and firm profitability will be inversely related because firms with a large asset base may struggle with organizational costs and inefficiencies that result from over-diversification. We should note that for very small private firms, there is strong empirical evidence of a positive correlation between firm size and profitability. However, because the sample only includes data on public firms, we do not consider this positive marginal effect relevant to the study.

Lastly, age will be measured as the number of years since a firm's IPO. Discussion of the relationship between firm age and profitability is contentious and remains ambiguous. On the one hand, as firms age, they're likely to gain improved brand awareness, industry knowledge, and access to financial markets. On the other, older firms might encounter inefficiencies due to organizational rigidity.

We will also run the full regressions with time fixed effects. We expect that adding fixed effects could impact our results in 2009, during which the economy was still struggling from the recession.

IV.   Data Source and Analysis

This study uses panel data on a sample of 150 firms between 2005 and 2020. A list of firms included in this sample, and an explanation for which firms were excluded from the sample can be found in the Appendix.

The data used in this analysis has been aggregated from a variety of sources to be outlined below. The majority of the data in this paper was pulled from three independent financial databases: Compustat, the Center for Research in Security Prices (CRSP) and Execucomp. These sources were all accessed through the Wharton Research Data Services (WRDS) platform. WRDS is an online resource that compiles various databases containing historical and point-in-time data on public companies across the globe. Table 3 lists the set of variables to be used in the regression analyses, along with definitions, data sources, and coverage periods for each variable.

We calculated our dependent variable, ROA, using raw "fundamentals" from Standard & Poor's (S&P's) Compustat database. Since 1962, Compustat has provided financial professionals with accounting-based metrics for publicly held companies across the globe. Most of Compustat's data are sources from quarterly and annual filings. Currently, the database contains over 300 data items reflecting common financial statement line items. Table 1 reveals that, on average, the firms included in this sample yield a 7.8% ROA. This implies that the average firm in the sample earns $0.078 for every $1 invested in assets. Compustat also supplied raw fundamentals which were used to calculate a number of control variables, including the firm's age, size, and leverage. Table 1 shows that the average age among firms in our sample was approximately 23 years. To address concerns over whether size and age may exhibit a strong correlation, we looked into the correlation between age and firm size and concluded that the variables are distinct enough to warrant their joint inclusion in the model. The average firm size – as measured by the natural log of total assets – among our sample was approximately 9.19. Some of the larger firms in this sample include Apple and Goldman Sachs. Smaller firms in the sample include Ulta Beauty and IPG Photonics Corp. Keep in mind that this variable contains relatively less variation because we're only looking at the sample of S&P 500 firms.

Finally, all data on director compensation was obtained through Execucomp. Since the late 1960s, Execucomp has provided data on executive compensation and characteristics. For this analysis, we obtained a record of individual director compensation for each of our sample firms across our sample period. We were then able to calculate the average director compensation by firm and year. Upon examining the data, we found one large outlier within total compensation

that was creating a heavy skew within the data, so we decided to drop that data point from the regressions. We then chose to take the natural log of our total compensation variable. This decision was motivated by the fact that a histogram of the variable displayed a particularly long tail.

V. Results

When using a single, naive linear regression, the coefficient of the natural log of total compensation is not significant. For every time total compensation is doubled, ROA can be expected to increase by 0.75 percentage points. Given the varied results found in previous literature regarding this relationship, this lack of significance within the most basic regression can be accepted. In general, through our first regression, we find that the natural log of total compensation cannot be said to be different from a 0 effect.

This same level of significance does not hold once adding in the controls for firm size, age, and leverage. Upon doing so, ROA becomes statistically significant at the .1% level ($p<.001$). Every time that total compensation is doubled, ROA can be expected to increase by 2.1 percentage points. Moving on to the control variables, as expected, firm size exhibits a high level of significance ($p<.01$). This significance holds true even upon the introduction of fixed effects later in our model. The age of the firm holds no statistical significance. A firm's leverage is shown to be negatively and weakly correlated ($p<.05$) to ROA within our model. This is in line with the pecking-order theory, implying that firms mainly use internal financing over external financing in order to achieve higher levels of profitability.

Moving on, it is necessary that we control for relationships over time due to the nature of our panel dataset. Therefore, we must control for year effects through introduced year fixed effects into our model. We do not want aggregate trends influencing our cross-firm regression. Thus, we finally run a regression using firm fixed effects in addition to the year fixed effects in order to see if anything changes through this control.

For the regression that includes the year fixed effects, the natural log of total compensation remains significant, albeit only at the 1% level ($p<.01$). Here, every time that total

compensation is doubled, ROA can be expected to increase by 1.9 percentage points. Firm size remains statistically significant at the same level and firm leverage remains negative and significant at the 1% level (p<.01). Once again, we can attribute that inverse relationship to the pecking order theory of capital.

Lastly, upon including firm fixed effects within our model, the relationship between total compensation and ROA basically disappears. Here, every time that total compensation is doubled, ROA can be expected to increase by 0.24 percentage points.

Finally, we see growth in the adjusted R-squared values from the primary, more simple regression to the final regression using firm fixed effects. Due to this increase in the adjusted R-squared value, we can conclude that each of our modified regressions improves our model by more than would be expected is solely left up to chance. We can also conclude that using firm fixed effects provides our model with a good predictor. With a final adjusted value of 0.607, we can conclude that our model is a good fit to our data. The model proves that there exist statistically significant responses of corporate performance to certain variables, such as firm leverage and firm size, and insignificant responses to total director compensation.

VI.   Conclusion

Our results show that director compensation and firm performance are positively correlated. This may suggest that as directors receive greater compensation, such individuals experience greater incentive to perform well both for themselves and the firm. It is also possible that more hefty director compensation packages attract better talent and expertise, which ultimately contributes to improved performance. It is important that we consider the directionality of this relationship. As we previously discussed, directors are often compensated through stock ownership awards. As such, it is possible that firm performance partially drives director compensation. With that said, our results suggest two primary conclusions. First, it appears as though directors are in fact compensated based on their performance. In addition, our results seem to suggest that director compensation might be an effective tool in creating more robust corporate governance systems.

VII.   Bibliography

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VIII.   Graphs and Tables

Table 1. *Summary Statistics*

	count	mean	sd	min	max
ROA	2198	.0785036	.0658114	.0002222	.6823148
Total_compensation	2198	269.8566	248.9166	8.5416	6286.809
Ln_total_compensation	2198	5.469458	.4696881	2.144948	8.746209
Size	2198	9.192732	1.32235	5.537775	13.92866
Age	2198	23.46724	7.791641	5	52
Leverage	2198	.5684736	12.96052	-388.0864	322.4591

Table 2. *Regressions*

	(1)	(2)	(3)	(4)
	ROA	ROA	ROA	ROA
ln_totalcompensation	0.00758	0.0213***	0.0188**	0.00248
	(0.00598)	(0.00565)	(0.00613)	(0.00369)
Size		-0.0188***	-0.0195***	-0.0328***
		(0.00297)	(0.00314)	(0.00559)
Age		0.000208	0.000240	0
		(0.000446)	(0.000437)	(.)
Leverage		-0.000206*	-0.000213**	-0.000131***
		(0.0000817)	(0.0000805)	(0.0000275)
Constant	0.0371	0.130**	0.149**	0.366***
	(0.0329)	(0.0420)	(0.0483)	(0.0567)
Observations	2198	2198	2198	2197
Adjusted R^2	0.002	0.136	0.140	0.607
Year Fixed Effects			Yes	Yes
Firm Fixed Effects				Yes

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 3. Variables

	Description	Source	Years Available
ROA, annual	Calculated as Net Income divided by Total Assets.	Compustat	(2005-2020)
Median director compensation	For each board, we use the mean dollar value of compensation owed to the directors	Execucomp	(2005-2020)
Mean director compensation, log	We take the natural logarithm of the dollar value of the mean director compensation	Execucomp	(2005-2020)
Firm age, years	The number of years since the firm IPO'ed	Compustat	(2005-2020)
Firm size, $ value	The dollar value of the firm's total assets	Compustat	(2005-2020)
Leverage	Calculated as Total Debt divided by Shareholder's Equity	Compustat	(2005-2020)