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ESG DISCLOSURE SCORES AND CEO COMPENSATION

by

Zane Rankin

A Thesis Submitted in Partial Fulfillment  
Of the Requirements for the  
University Honors Program

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Division of Economics and Decision Sciences

The University of South Dakota

May 2023

The members of the Honors Thesis Committee appointed  
to examine the thesis of Zane Rankin  
find it satisfactory and recommend that it be accepted.

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## ABSTRACT

### ESG Disclosure Scores and CEO Compensation

Zane Rankin

Director: Sebastian Wai, Ph.D.

This paper examines the impact of environmental, social, governance (ESG) disclosure scores on chief executive officer (CEO) compensation. I analyze the S&P 500 from 2011 – 2021 utilizing the within estimation method for fixed effects regression models to find that a one point increase in a firm's ESG disclosure score is associated with a 0.49% increase in CEO compensation, *ceteris paribus*. However, certain S&P 500 industries have an advantage in boosting their ESG disclosure score relative to other industries. After including interaction terms between industry and ESG disclosure score, I find that, for the median industry, a one point increase in a firm's ESG disclosure score is associated with a 0.22% decrease in CEO compensation, *ceteris paribus*. When compared to alternative executive compensation packages (chief financial officer, chief operations officer, etc.), I find that a one point increase in a firm's ESG disclosure score is associated with a 0.37% decrease in the average executive compensation for the median industry. Based on my findings, CEOs can gain a better overall understanding of how ESG disclosure effects CEO compensation within the S&P 500.

KEYWORDS: CEO Compensation, Incentives, ESG

JEL Classification: M12, Q56, J33, M52

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## 1 INTRODUCTION

Environmental, social, and governance (ESG) scores have been gaining traction in recent years as investors increasingly consider non-financial factors in their decision-making process. Research suggests that investors have a greater willingness to pay for sustainable investment products, a market Deloitte expects to represent half of the global assets under management by 2024 (Gutsche 2019) [1] [2]. As the market grows, various studies suggest a positive relationship between firm value and a firm's ESG score (Eccles et al. 2014, Cheng et al. 2014) [3] [4]. A firm can take advantage of the growing ESG market and the performance benefits allotted to higher ESG rated firms by focusing its efforts on improving its ESG practices. I hypothesize that if a firm achieves a higher ESG disclosure score, then the CEO's pay will increase, *ceteris paribus*, due to firms linking their CEO's pay to ESG factors.

My main contribution to the literature is investigating if S&P 500 firms are deploying incentives to attain the benefits associated with the status of a higher ESG rated firm. Through a comprehensive analysis of existing literature and empirical data, I find that a one point increase in a firm's ESG disclosure score is associated with a 0.49% increase in CEO compensation, *ceteris paribus*. However, after including an interaction term between ESG disclosure score and NAICS code, I find that a one point increase in a firm's ESG disclosure score is associated with a 0.22% decrease in CEO compensation for the median industry, *ceteris paribus*. By highlighting the importance of ESG disclosure with respect to CEO compensation, I contribute to the ongoing discussion of the role of ESG in driving sustainable corporate behavior and performance.



## 2 BACKGROUND

### 2.1 Sustainable Investing

Milton Friedman (1970) explains that the primary goal for a firm is to maximize its share price for investors, which is now held as common knowledge [5]. A firm’s value is modeled as the present value of all its future cash flows. Through prioritizing share price, other important factors (maximizing profit, increasing market share, strengthening products, innovation, etc.) are combined into a single goal for a company. However, maximizing share price may not achieve non-financial goals investors may have such as a carbon-neutral portfolio.

Sustainable investing, also known as ESG investing, considers potential future risks to improve long-term performance<sup>1</sup>. The fundamental purpose behind ESG investing can be traced back to Andrew Carnegie and John Rockefeller through the idea of corporate social responsibility (CSR). Carnegie started the idea of large-scale philanthropy at the business level, resulting in him and Rockefeller donating over half a billion dollars<sup>2</sup>. CSR was first defined by Bowman (1953) as “the obligation of businessmen to pursue those policies, to make those decisions, or to follow those lines of action which are desirable in terms of objectives and values of our society.” This definition points out a few important aspects of CSR. First, “the obligation of businessmen” refers to the employees of the firm who hold the responsibility to act. Second, they are to make the decisions and listen to appropriate requests that generate value for society [6]. Research in the late 1970s and early 1980s did not find a link be-

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<sup>1</sup>“What is sustainable investing?” *BlackRock*. <https://www.blackrock.com/uk/solutions/sustainable-investing>

<sup>2</sup>“Corporate Social Responsibility: A Brief History.” *Association of Corporate Citizen Professionals*. <https://accp.org/resources/csr-resources/accp-insights-blog/corporate-social-responsibility-brief-history>, Apr 2022.

tween CSR and stock market out-performance (Alexander and Buchholz 1978, Cochran and Wood 1984) [7] [8].

In 2006, the United Nations (UN) coined ESG in “Who Cares Wins,” the first industry-endorsed report that outlined guidance on implementing ESG factors into a firm’s daily operations. The document had the goal of “triggering a broader discussion” and raising awareness for ESG-related benefits. The UN research claims that firms who outperform on ESG issues tend to outperform on increasing shareholder value, citing above-average risk mitigation ability, a higher management quality, and the avoidance of costly changes due to regulatory issues [9]. That same year, UN Secretary-General Kofi Annan brought together institutional investors from around the globe to sign the Principles for Responsible Intertreatment (PRI). The principles were derived “out of the understanding that while finance fuels the global economy, investment decision-making does not sufficiently reflect environmental, social and corporate governance considerations – or put another way, the tenets of sustainable development” [10]. At inception, PRI gained 63 signatures, representative of \$6.5 trillion in assets under management (AuM). As of 2021, PRI has 3,826 signatures and \$121.3 trillion in AuM. [11]

## 2.2 ESG Scores

There is no singular definition of ESG due to the current market-driven environment. Therefore, there are different types of ESG scores. In this paper, I use ESG disclosure scores. According to Deloitte, “the goal of ESG is to capture all the non-financial risks and opportunities inherent to a company’s day-to-day activities” [1]. Although the scores consider the current risks the company faces, a major factor is the contingent risks the firm may face in the future. Larcker et al. (2022) explain that ESG users assume that “ESG

quality improves financial performance by reducing social and environmental factors that pose risk to the company’s business model or operations” [12]. For example, a significant amount of the firms within the S&P 500 have international operations leaving them “exposed to a patchwork of climate change regulations such as carbon taxes, emission trading schemes, and other fossil fuel taxes” (Lord et al. 2021) [13]. If realized, additional expenses from regulation changes can erode the firm’s value (resulting in a lower ESG score).

The three pillars (environmental, social & governance) each have unique components that make up their overall pillar score. The environmental pillar focuses on the firm’s impact on the environment using measures such as pollution, the resource use of the firm, its production processes, and land use. The social pillar includes the firm’s relationship with its employees, affiliates, and the public using measurements on employee compensation, the safety of the work environment, how the firm gives back to the community, and how safe its product is for the public. Some rating agencies may even consider other firms up and down the supply chain that the primary firm utilizes. Finally, the governance pillar focuses on management and encompasses areas such as executive compensation, shareholders’ rights, and board diversity<sup>3</sup>. It is important to note that each rating agency can have different measures included in each pillar. For example, Bloomberg’s database has more than 600 different measurements included in each of the three pillars<sup>4</sup>.

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<sup>3</sup>“Environmental, Social and Governance (ESG) Funds - Investor Bulletin.” *SEC*. <https://www.sec.gov/oiea/investor-alerts-and-bulletins/environmental-social-and-governance-esg-funds-investor-bulletin>

<sup>4</sup>“ESG Data.” *Bloomberg*. <https://www.bloomberg.com/professional/dataset/global-environmental-social-governance-data>

## 2.3 Rating Agencies

There is no industry standard formula to calculate a firm’s ESG score. Like bond ratings, multiple companies fill in the gap and use proprietary formulas to create a rating system. Therefore, credibility is extremely important in choosing which ESG rating company to use, where the big players include Bloomberg, S&P Global, MSCI, and Sustainalytics (Larcker et al. 2022) [14]. The data used to create the scores come from the firms voluntarily disclosing information. Each rating agency is attempting to do the same thing, but there are small differences between them.

Due to the differences among rating firms, one agency could produce a high ESG score for a firm while another produces a low score for the same firm. This is best observed relative to another common product that the rating agencies produce: credit ratings. Berg et al. (2022) find a 99% correlation between credit ratings, while ESG ratings have an average correlation of 54% [15]. These findings are supported by Boffo and Patalano (2020) who find that the scores between ESG providers “can vary greatly” due to “different frameworks, measures, key indicators and metrics, data use, qualitative judgment, and weighting of subcategories, [and] re-weighting scores to ensure ‘best in class’ in industries.” They also find that the variations in the scores across agencies could remove the purpose of an ESG portfolio built upon over-weighting high-scoring firms [16].

I use Bloomberg’s ESG disclosure scores in this paper. Although its not a traditional ESG score, a higher ESG disclosure score means the firm is disclosing more quantitative and qualitative data related to ESG issues. It indicates that management is aware of the measures and is, therefore, more prepared for contingencies and less likely to lose financial value in the future. Firms also have no incentive to disclose negative information voluntarily, and if they

do, they would do so with a plan to combat it or an explanation for why it is reasonable for them, both of which help mitigate the risk. Eccles et al. (2014) finds that firms disclose more non-financial ESG data when they voluntarily introduce environmental and social policies into their business model. They also find that the high sustainability firms (who disclose ESG data) outperform in terms of stock market performance. The same firms are also “more likely to make executive compensation a function of environmental, social, and external perception (e.g., customer satisfaction) metrics” [3]. Bloomberg utilizes over 120 measures that stretch across the three pillars using all available data (including direct communication) and a proprietary method to produce their disclosure scores. With a range of 0 to 100, a score of zero would represent a firm that did not disclose any ESG measures. A score of 100 would be given to a firm that disclosed everything.

## 2.4 The Current ESG Market

Now more than ever, large institutional investors are asking companies to do more in terms of ESG efforts. In April 2021, BlackRock broke the record for the largest exchange-traded fund (ETF) launch with investors placing \$1.25 billion in the BlackRock U.S. Carbon Transition Readiness ETF at launch<sup>5</sup>. PricewaterhouseCoopers (PwC 2022) conducted a survey of 250 institutional investors and 250 asset managers in October 2022, “representing nearly half of global assets under management.” Among those surveyed, 81% of U.S. institutional investors planned on increasing their ESG allocations over the next two years. PwC expects ESG-orientated AuM to grow faster than the AuM market as a whole, where ESG-orientated assets are expected to make up 20% of the market (a base case compound annual growth rate of 12.9%). Of the institutional

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<sup>5</sup>“Building More Resilient Portfolios.” *BlackRock*. <https://www.blackrock.com/ch/individual/en/themes/sustainable-investing>

investors studied, 60% stated they had higher performance with their ESG-orientated funds relative to their non-ESG equivalents. Institutional investors are a driving force for the increase in ESG-AuM, where 39% have stopped investing with an asset manager who has shortcomings in their ESG investment strategies and 50% would consider doing so if such shortcomings came along in their experiences [17]. Deloitte (2021) projects ESG-mandated assets (where the investment decision has an ESG component) to represent half the global AuM market by the end of 2024 (found considering current growth rates and anticipated policy changes) [1]. Gutsche (2019) finds that investors have a greater willingness to pay for sustainable investment products [2]. The ESG market is growing faster than ever, and investors are demanding more.

### 3 LITERATURE REVIEW

#### 3.1 CEO Compensation

CEO's are often compensated utilizing a base salary along with incentives to motivate the employee to make the best business decisions for the firm (Frydman and Jenter 2010) [18]. Incentive effects are the increase in the level or intensity of motivation due to an increase in pay, *ceteris paribus* (Rynes 2005) [19]. Rynes et al. (2005) concludes that there is strong support for the impact of pay-for-performance incentives [19]. Locke et al. (1980) investigated incentive effects and found a 30% increase in productivity when individual pay incentives are introduced [20]. This research is affected by sorting effects, which “reflect the impact of pay on performance via its impact on the composition of the workforce” (Lazear 2000) [12]. Lazear (2000) conducted a study on a firm shifting to an incentive-based compensation program resulting in a 44% increase in productivity, derived roughly evenly from an increase in existing worker productivity and the less productive workers quitting or being replaced.

The replacement is a direct example of the sorting effect. The influence of incentives and the sorting effect are visible in an experiment by Bandiera et al. (2007) where managers had their salary linked to their workers performance, leading to the managers “hiring more productive workers (sorting) and by pushing existing workers (incentive) to be more productive” [21]. Overall, evidence shows that workers tend to respond well to incentives. Although S&P 500 CEOs earn significantly more than the average worker, the relative effects still apply.

Literature investigating the direct link between ESG factors and CEO compensation support the influence of incentives. Maas (2018) finds that firms, no matter the strength of their CSP, often use CSP targets in executive compensation [22]. Baraibar et al. (2019) concludes that compensation packages can affect a firm’s ESG score [23]. Cohen et al. (2022) finds that firms that have explicitly linked ESG metrics to CEO compensation have experienced a reduction in carbon emissions and an increase in ESG scores [24]. Ritz et al. (2022) discusses how linking CEO compensation to ESG metrics can strengthen the link between high-level management and the ESG strategy of the organization [25].

### 3.2 ESG and Firm Performance

A significant portion of the current research conducted reveals a positive relationship between ESG scores and a firm’s performance. Jo and Harjoto (2011) utilize a database of 3000 companies and various ESG factors and find a positive relationship between ESG factors and firm value [26]. Eccles et al. (2014) find that the high sustainability firms (who disclose ESG data) outperform in terms of stock market performance [3]. Cheng et al. (2014) finds that firms with higher CSR performance have lower capital constraints and higher prof-

itability [4]. Similarly, Dhaliwal et al. (2011) finds a negative relationship between ESG factors and a firm's cost of capital [27]. Khan et al. (2016) finds that investment in sustainability issues are shareholder-value enhancing [28]. Likewise, Brogi and Lagasio (2018) finds that ESG “enhances company performance and creates value for the company’s stakeholders” by investigating the impact ESG factors have on a firm’s return on assets [29]. Minutolo et al. (2019) discusses the social contract firms have with various stakeholders, where a higher ESG score leads to out-performance due to the reinforcement of that social contract [30]. Various additional studies have found a positive relationship between ESG factors and firm performance (Gompers et al. 2003, Lee et al. 2016, Godfrey et al. 2009, Harjoto and Laksmana 2018, United Nations 2004, Chen and Lee 2017)[31] [32] [33] [34] [9] [35]. Additional research observes that firms are subject to issues that can affect their value such as if employees strike, customers boycott, or they receive a fine. These firms perform better by meeting the needs of non-shareholding stakeholders to avoid these issues (Freeman et al. 2010, Porter and Kramer 2011). [36] [37].

An alternative viewpoint can be seen through the lens of short sellers. Short sellers borrow an asset and immediately sell it on the open market with the assumption that they can repurchase it at a lower price in the future (Bohl 2022) [38]. Jain et al. (2016) concludes that ESG scores are value relevant due to the negative relationship between ESG scores and short selling, which indicates short sellers avoid firms with high ESG scores (targeting firms with low ESG scores) [39]. This study synthesizes well with Khan et al. (2016) where short sellers are considering ESG scores when calculating a firm’s value [28].

A few meta-analyses have been conducted investigating the relationship between performance and ESG scores. Friede et al. (2015) combines the



findings of 2,200 individual studies, where the majority reported finding a positive relationship between ESG factors and future performance. 90% of the studies found at least a non-negative relationship [40]. Whelan et al. (2021) evaluates over 1,000 research papers from 2015 – 2020 and finds that most studies find a positive relationship between ESG and financial performance and that “improved financial performance due to ESG becomes more marked over long-time horizons” [41]. Both meta-analyses point towards the majority of the observed studies finding a positive relationship between ESG scores and firm performance.

### 3.3 ESG and Downside Risk

Although firms pursue ESG goals to achieve additional shareholder value, some seek ESG goals to mitigate downside risk. Nofsinger (2014) concludes that higher ESG-rated funds outperform conventional funds in market crisis [42]. Hale (2020) reports that during the first quarter of 2020 (the start of the COVID-19 pandemic including the significant fall in asset prices) “24 of 26 environmental, social, and governance-tilted index funds outperformed their closest conventional counterparts.” These results signify that during a downturn, ESG-based funds are viewed as more prepared for future risk and therefore lose less value [43]. Engelhardt et al. (2021) find that high ESG rated firms outperform with less volatility relative to lower rated ESG firms [44]. In support, Broadstock et al. (2020) find that Chinese firms ESG performance were positively associated with short-term performance [45]. This can also be viewed through studies conducted on the 2008 financial crisis, where Lins et al. (2017) find that firms with high CSR ratings outperformed low CSR rated firms by at least 4% [46]. Similarly, Cornett et al. (2016) find a positive link between U.S. commercial bank’s performance and ESG factors during the

crisis [47]. Bouslah et al. (2018) evaluates volatility during the crisis, where firms with higher social performance decreased their volatility [48]. Additional research has shown that asset managers are able to mitigate risk via inclusion of ESG assets into their portfolio (Fan and Michalski 2020, Kaiser 2020) [49] [50].

This paper’s main contribution to the literature is providing empirical evidence that suggests S&P 500 firms deploy incentives to attain the benefits associated with the status of a higher ESG rated firm. To do so, I analyze the S&P 500 from 2011 – 2021 utilizing a fixed effects regression model.

## 4 DATA

### 4.1 Dataset Creation

I created the data set utilizing a Bloomberg Terminal. I used the Standard & Poor’s Depository Receipts (SPDR) S&P 500 ETF Trust to pull the list of firms. The data set features every firm in the S&P 500 as of January 2022. Bloomberg features a relative valuation (“RV”) function <sup>6</sup> that allows the user to pull variables for each firm listed in the index. Utilizing this function, I pulled variables for each firm (as available) for ten years. I exported the data directly into a spreadsheet. Bloomberg did not have a complete list for each firm’s retention ratio and return on equity (ROE). These variables are important to control for due to their effect on CEO compensation. I calculated a firm’s retention ratio and ROE where possible when data was missing. Equation 1 calculates retention ratio and equation 2 calculates ROE.

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<sup>6</sup>The RV function’s purpose is to allow users to perform relative valuation to determine a firm’s value. Therefore, the system is not built to account for changes to the index over time. The user chooses a firm and the firm or group of firms they would like to use for the relative valuation. To create the data set, I chose Goldman Sachs and compared it to the SPDR S&P 500 ETF Trust. The RV function dropped Goldman Sachs from the index.

$$\textit{retention ratio} = (\textit{net income} - \textit{dividends})/\textit{net income} \quad (1)$$

$$\textit{return on equity} = (\textit{net income}/\textit{shareholders' equity}) \quad (2)$$

Utilizing Tableau 7 in Excel, I converted the Bloomberg data into a long-format panel data set and imported it into Stata for analysis. The finished panel data set features 5,467 total annual observations with 497 companies in the S&P 500 as of January 2022, and stretches back to 2011. The biggest restriction on the data set was the inability to alter the index for changes within the S&P 500. For example, VICI Properties was a member of the S&P 500 when the data set was created. However, the firm did not exist in 2016. Therefore, the data set only features VICI observations for 2017 - 2021. These firms make up a small portion of the data set as a whole.

## 4.2 Summary Statistics

Table 1 summarizes the variable statistics. The average ESG disclosure score in the data set was 46.06. Newmont, a gold mining company, holds the highest score at 85.70 in 2021. Newmont is considered the leading firm in their industry for sustainability, where its “purpose is to create value and improve lives through sustainable and responsible mining”<sup>7</sup>. A firm like Newmont with sustainability at the forefront of their operations would disclose a significant amount of ESG data, consequently leading to Newmont holding the top four highest ESG disclosure scores ever rated by Bloomberg. In contrast, Etsy received a low score of 5.09 in 2013. At that time, Etsy had less public infor-

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<sup>7</sup>“Purpose, Values, and Strategy.” *Newmont*. <https://www.newmont.com/about-us/strategy/default.aspx>

Table 1: Summary Statistics

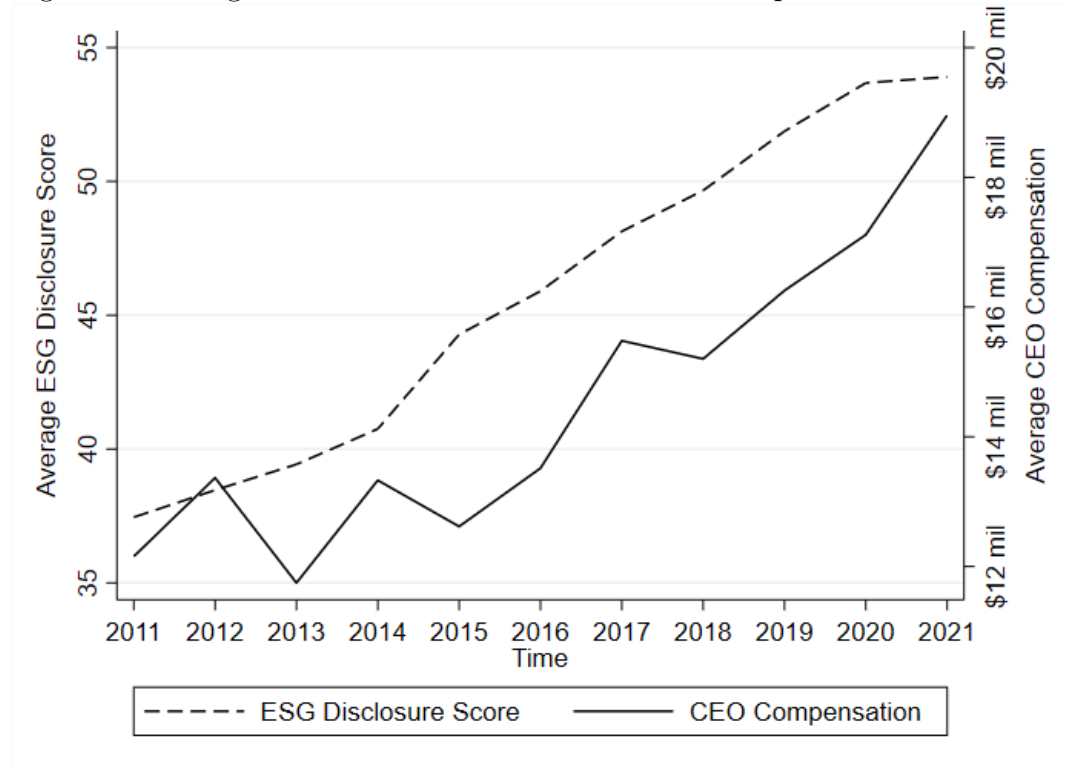
	Obs.	Mean	Std. Dev.	Minimum	Max
ESG Disc. Score	5,262	46.06	12.61	5.09	85.70
CEO Comp.	5,116	\$15 mil.	\$35 mil.	0	\$2.28 bil.
Avg. Exec. Comp.	5,117	\$6.65 mil.	\$9.59 mil.	\$190,961	\$580 mil.
CEO Tenure	5,110	7.24	6.68	0	53
CEO Duality	5,259	0.48	0.50	0	1
Female CEO	5,257	0.05	0.21	0	1
CEO Age	5,443	53.52	7.24	28	92
Market Cap	5,314	\$50.3 bil.	\$119 bil.	\$68.7 mil.	\$2.6 tril.
Return on Equity	5,350	22.99%	669.03%	-10404%	38870%
Return on Assets	5,267	6.69%	7.77%	-61.82%	76.24%
Retention Ratio	5,374	53.49%	847.34%	-56669%	19067%
Stock Return	5,133	19.61%	34.32%	-74.88%	743.43%
Net Income	5,374	\$2.1 bil.	\$5.3 bil.	-\$23 bil.	\$99.8 bil.

mation listed about the firm. After going public in 2015, Etsy’s ESG disclosure score rose to 46.3 which is above the S&P 500 average.

The dependent variable I am interested in is CEO compensation, which is the entire compensation the executives receive, including stock options and bonuses along with their salary. The highest amount of compensation paid to a CEO in a single year belongs to Elon Musk who received \$2.28 billion dollars in 2018. The next highest paid CEO in a single year in the data set is Steve Jobs during his time at Apple, where he peaked at \$378 million. Elon Musk also holds the slot for the lowest CEO compensation in the data set, receiving \$0 in both 2021 and 2020.

Figure 1 shows the average ESG disclosure score and the average CEO compensation from 2011 - 2021. In 2011, the average disclosure score is 37.45 and the average compensation for S&P 500 CEOs is \$12 million. In 2021, the average disclosure score is 53.90, representing a 16.45 increase in the average.

Figure 1: Average ESG Disclosure Score and CEO Compensation 2011 - 2021

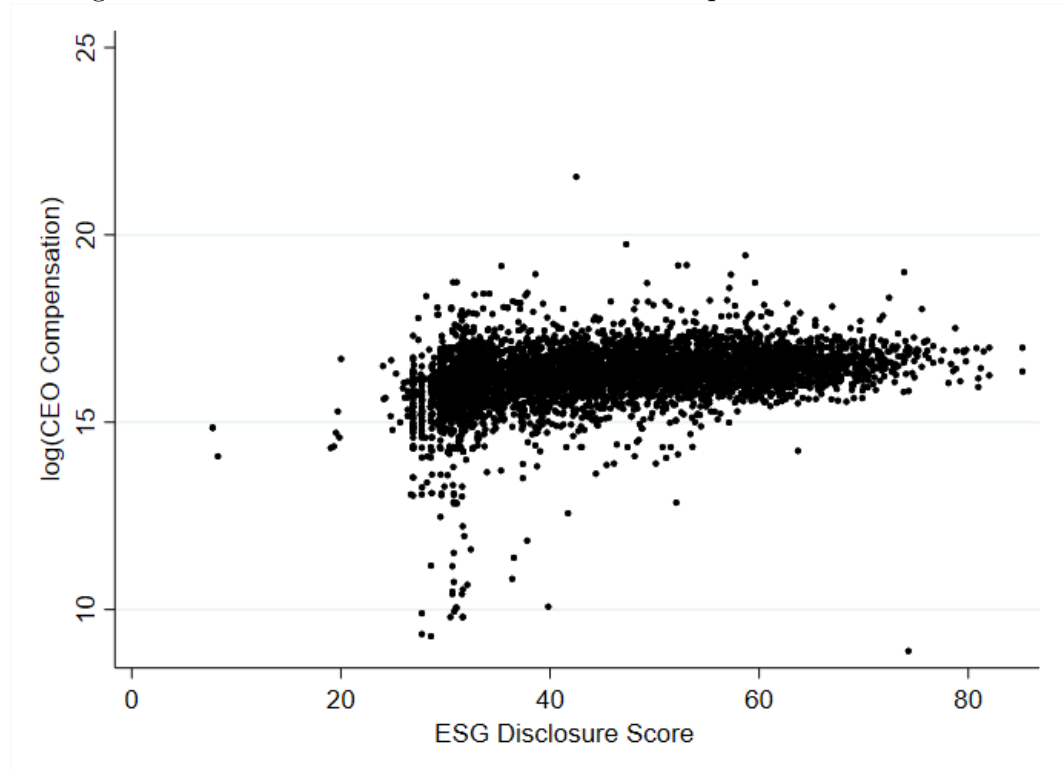


As discussed in section 2.4, investors have increased their demand for ESG based investment options. Therefore, we would expect firms to increase their disclosure due to the increase in demand for ESG disclosure. In 2021, the average compensation is \$18.9 million, representing a \$6.9 million increase from 2011.

Figure 2 shows a scatter plot representing the relationship between ESG disclosure scores and CEO compensation. The graph has a higher concentration of lower paid CEOs near the lower ESG disclose score range. We can visually interpret a slight positive correlation between ESG disclosure scores and CEO compensation.

The smallest company in the data set is Enphase Energy Inc (ENPH) who went public in 2012 and joined the S&P 500 in 2020. The data set features all the firms in the S&P 500 as of January 2022, so although ENPH was not

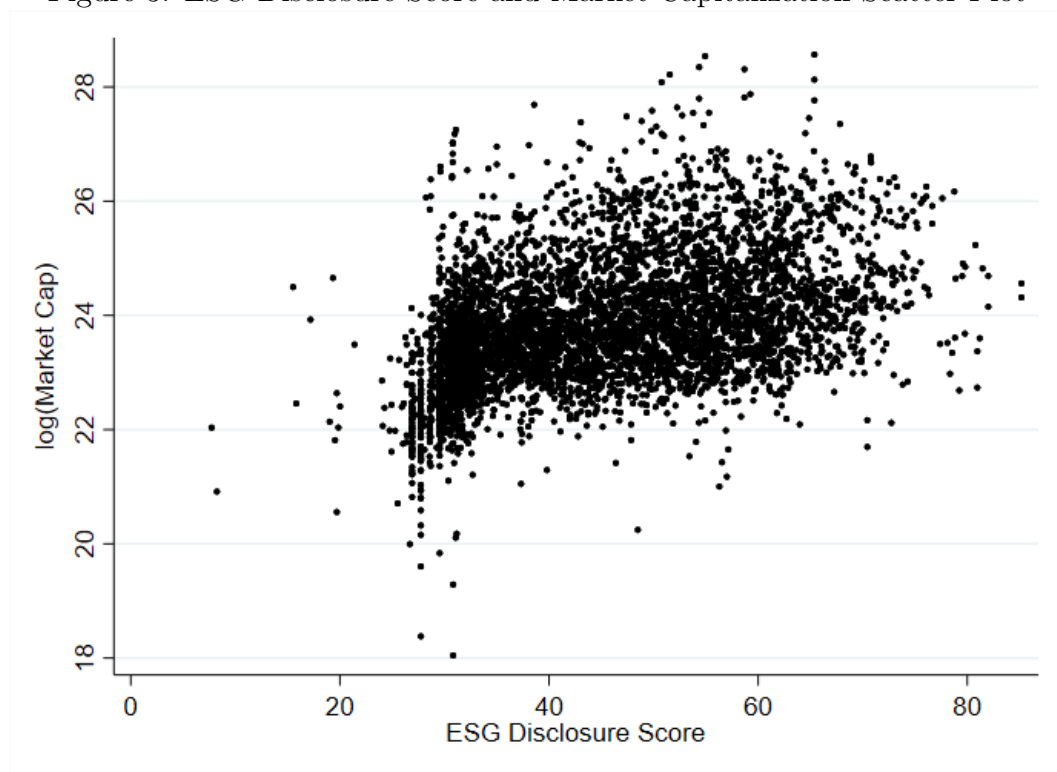
Figure 2: ESG Disclosure Score and CEO Compensation Scatter Plot



a S&P 500 firm at this small size, it is still included. However, Enphase had a high ESG disclosure score of 30.83 in 2015 at a market capitalization of just \$68.7 million. To understand how small Enphase is relative to the rest of the data set, it holds the only observations featuring a market cap under \$200 million. Only ten firms in the entire data set (19 total observations out of 5,467) featured a market capitalization under \$1 billion. At the time the data was recorded, Microsoft held the highest market capitalization in 2021 at \$2.55 trillion. Figure 3 shows a scatter plot of the relationship between ESG disclosure scores and market capitalization. We can visually interpret a slight positive correlation between firm size and ESG disclosure score. In conclusion, the data suggests similar findings to previous studies (Drempetic et al. 2020) where smaller firms may have less resources to disclose ESG data, leading to a lower ESG disclosure score [51]. However, a significant amount of large-cap

stocks have had low ESG disclosure scores, including Facebook (now Meta) and PayPal with scores of 19.3 (2011) and 15.2 (2014) respectively. At the time of receiving those scores, both firms had a market capitalization near \$50 billion, which is the mean for the data set.

Figure 3: ESG Disclosure Score and Market Capitalization Scatter Plot



The profitability leaders, measured by net income, included Berkshire Hathaway, Microsoft, JP Morgan Chase, and Apple who recorded the highest net income at \$99.8 billion in 2021. A significant amount of firms lost money in a given year, resulting in a negative net income. For example, the worst performance came from the APA Corporation at -\$23.1 billion. APA is a oil discovery and production firm who, at the time, had invested heavily in a new basin discovery<sup>8</sup>. The average stock return is 19.61%. Targa Resources Corp,

<sup>8</sup>“APA Corporation History.” *APACorp*. <https://apacorp.com/about/history/>

a natural gas delivery firm, lost 74.35% of its value in 2015 after an acquisition of a rival firm<sup>9</sup>. In 2020, Tesla returned 743.34% to shareholders<sup>10</sup>.

The CEO characteristics vary widely. The CEO tenure variable features Warren Buffet as the leader with 53 years of service as of 2022 to Berkshire Hathaway. In contrast, many firms featured multiple CEO changes where the average CEO tenure in the data set is 7.24 years. CEO duality is defined as a chief executive officer who also serves as the chairman of the board. Out of the 5,259 years observed, 48% of the CEOs also served as the chairman. Out of the 5,257 years observed, only 5% of the CEOs were female. The average CEO age in the data set is 54, with Mark Zuckerberg being the youngest CEO at 28 years of age at Facebook in 2011. Warren Buffett, the longest tenured CEO, is the oldest CEO in the S&P 500 at 92 years old.

I collected data on the average executive compensation for each firm, representing additional employees such as the chief financial officer (CFO) and chief operations officer (COO). The average executive pay in the data set is \$6.65 million. The smallest average executive pay and largest average executive pay both occur at Tesla, due to CEO Elon Musk receiving both the smallest and largest executive compensations packages recorded in the data set (\$0, \$2.28 billion)<sup>11</sup>.

## 5 METHODOLOGY

In a perfect experiment, I would have a randomly selected group of CEOs who work to improve their ESG score and I would monitor their change in

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<sup>9</sup>“Houston midstream companies close major acquisitions.” *Houston Business Journal*. [https://www.bizjournals.com/houston/morning\\_call/2015/03/houston-midstream-companies-close-major.html](https://www.bizjournals.com/houston/morning_call/2015/03/houston-midstream-companies-close-major.html)

<sup>10</sup>“Up 8x, What Really Changed For Tesla Stock in 2020?.” *Forbes*. <https://www.forbes.com/sites/greatspeculations/2021/01/05/up-8x-what-really-changed-for-tesla-stock-in-2020/?sh=5a073ea86594>

<sup>11</sup>Outliers had no effect on regression results whether they were included or not. Therefore, I opted to include them.



CEO compensation over time. Likewise, I would have a randomly selected control group whose CEOs primarily focus on improving shareholder value. I would then evaluate the difference between the two group’s CEO compensation changes. Since this is an experiment that I cannot conduct, I utilized the within estimation method for fixed effects regressions.

A fixed effects regression is an estimation technique used to analyze panel data and control for time-invariant characteristics. The model I used holds each firm, along with firm-invariant time effects, fixed. The model could still suffer from omitted variable bias if unobservable variables change over time within each company, which I address with additional controls. Equation 3 represents a basic fixed effects regression taking into account firm size and the ESG disclosure score.

$$\begin{aligned} \log(CEOCompensation)_{it} = & \beta_0 + \beta_1 ESGDisclosureScore_{it} \\ & + \beta_2 \log(MarketCap)_{it} + \delta_t + \alpha_i + \varepsilon_{it} \quad (3) \end{aligned}$$

Equation 4 implements profitability and CEO characteristics into the regression. Stock return and net income are lagged by one year. These additional variables control for characteristics that do change over time within each company, therefore not controlled for with firm fixed effects. Failure to control for within-cluster error correlation could cause the standard errors to not be correct. Microsoft, for example, may look at Apple or Google’s CEO compensation package to determine their own CEO compensation. Equation 4 clusters by each firm’s North American Industry Classification (NAICS) code.

$$\begin{aligned}
\log(CEOCompensation)_{it} = & \beta_0 + \beta_1 ESGDisclosureScore_{it} \\
& + \beta_2 \log(MarketCap)_{it} + \beta_3 NetIncome_{it} + \beta_4 NetIncome_{it-1} \\
& + \beta_5 RetentionRatio_{it} + \beta_6 ReturnOnEquity_{it} + \beta_7 ReturnOnAssets_{it} \\
& + \beta_8 StockReturn_{it} + \beta_9 StockReturn_{it-1} + \beta_{10} CEOTenure_{it} \\
& + \beta_{11} CEODuality_{it} + \beta_{12} FemaleCEO_{it} + \beta_{13} CEOAge_{it} + \delta_t + \alpha_i + \varepsilon_{it} \quad (4)
\end{aligned}$$

Certain S&P 500 industries may have an advantage in boosting its ESG disclosure score relative to other industries. Therefore, equation 5 builds upon the previous model but includes an interaction term between ESG disclosure score and each firm's NAICS code.

$$\begin{aligned}
\log(CEOCompensation)_{it} = & \beta_0 + \beta_1 ESGDisclosureScore_{it} \\
& + \beta_2 \log(MarketCap)_{it} + \beta_3 NetIncome_{it} + \beta_4 NetIncome_{it-1} \\
& + \beta_5 RetentionRatio_{it} + \beta_6 ReturnOnEquity_{it} + \beta_7 ReturnOnAssets_{it} \\
& + \beta_8 StockReturn_{it} + \beta_9 StockReturn_{it-1} + \beta_{10} CEOTenure_{it} \\
& + \beta_{11} CEODuality_{it} + \beta_{12} FemaleCEO_{it} + \beta_{13} CEOAge_{it} \\
& + \beta_{14} ESGDisclosureScore * NAICS_i + \delta_t + \alpha_i + \varepsilon_{it} \quad (5)
\end{aligned}$$

In addition to CEO compensation data, Bloomberg tracks the average executive compensation for each firm in the S&P 500. I can alter equation five to see if the same results hold when taking into account all the other chief executives. If the results hold, omitted variables could be guiding the results. Equation 6 replicates equation 5 but replaces CEO compensation with average executive compensation. Bloomberg does not record data on average executive characteristics, so those variables are dropped from the regression.

$$\begin{aligned}
\log(\text{AverageExecutiveCompensation})_{it} &= \beta_0 + \beta_1 \text{ESGDisclosureScore}_{it} \\
&+ \beta_2 \log(\text{MarketCap})_{it} + \beta_3 \text{NetIncome}_{it} + \beta_4 \text{NetIncome}_{it-1} \\
&+ \beta_5 \text{RetentionRatio}_{it} + \beta_6 \text{ReturnOnEquity}_{it} + \beta_7 \text{ReturnOnAssets}_{it} \\
&+ \beta_8 \text{StockReturn}_{it} + \beta_9 \text{StockReturn}_{it-1} \\
&+ \beta_{10} \text{ESGDisclosureScore} * \text{NAICS}_i + \delta_t + \alpha_i + \varepsilon_{it} \quad (6)
\end{aligned}$$

The purpose of equation 6 is to see if I can find empirical evidence that an increase in a firm’s ESG disclosure score leads to a similar increase (or decrease) in the average executive compensation. I hypothesize that firms deploy incentives to CEOs related to ESG factors. However, if I observe that an increase in ESG disclosure scores are associated with an increase (or decrease) in average executive compensation that is similar to CEO compensation, an omitted variable could be driving the results. This is because we would be observing the same effects with different dependent variables. Alternative executives have roles that are not necessarily ESG relevant, where it is unlikely for the firm to link their pay to an ESG factor. The CEO, however, as the leader of the firm is a direct component of their ESG outcome. Therefore, we would not expect ESG disclosure scores to have the same relationship with both variables.

## 6 RESULTS

### 6.1 CEO Compensation Results

Table 2 displays the regression results. Equation 3 shows a one point increase in a firm’s ESG disclosure score is associated with a 0.60% increase in CEO

compensation. However, this model is naive as it fails to control for firm-specific and CEO-specific measures that change over time. For example, a firm that grew its net income would have the potential to compensate its CEO more than the previous years where the firm earned less income. To control for these changes, equation 4 holds profitability and CEO characteristics constant while also lagging each firm's stock return and net income by one year. Equation 4 also clusters by NAICS code. ESG disclosure score's statistical significance and impact fall relative to the naive regression. Equation 5, which includes an interaction term between ESG disclosure score and NAICS code, finds that a one point increase in a firm's ESG disclosure score results in a -0.22% decrease in CEO compensation, *ceteris paribus*. Equation 4, therefore, is driven by specific industries where the median industry is associated with a 0.22% decrease.

In the third model, equation 5, market cap and CEO age are statistically significant at the 1% level. A 1% increase in a firm's market cap is associated with a 0.18% increase in CEO compensation. CEO age has a large impact, which may be signaling the CEO's experience level as older CEOs are more likely to have previous CEO experience. Additional statistically significant variables include CEO duality and tenure. CEO duality, a dummy variable with a value of 1 if the CEO serves as the chairman of the firm's board, has a negative effect on CEO compensation. The negative effect is surprising intuitively as a CEO who is also the chairman would have more responsibilities, therefore expecting a higher pay. CEO tenure, in equation 4, is not statistically significant. After including the interaction terms, it becomes statistically significant at the 1% level while its impact increases substantially. The negative effect CEO tenure has in equation 5 is surprising as CEOs who increase their tenure have more experience as the firm's CEO and therefore may be

Table 2: Regression Results

	(3)	(4)	(5)
	log(CEO Comp.)	log(CEO Comp.)	log(CEO Comp.)
ESG Disclosure Score	0.00595** (2.53)	0.00487 (1.27)	-0.00224 (-0.99)
log(Market Capitalization)	0.277*** (10.09)	0.221*** (6.44)	0.184*** (4.26)
Net Income		2.32e-11 (1.07)	1.31e-11 (1.10)
Net Income <sub>t-1</sub>		2.19e-11 (1.42)	1.59e-11* (1.69)
Retention Ratio		-0.000747*** (-2.90)	-0.000327* (-1.73)
Return on Equity		-0.000236 (-0.19)	-0.00101 (-0.78)
Return on Assets		0.00769 (0.03)	0.00114 (0.00)
Stock Return		-0.0217 (-0.87)	0.00695 (0.23)
Stock Return <sub>t-1</sub>		-0.00891 (-0.21)	0.0396 (1.38)
CEO Tenure		-0.00151 (-0.53)	-0.00671* (-1.92)
CEO Duality		-0.126* (-1.89)	-0.140** (-2.02)
Female CEO		-0.0318 (-0.67)	-0.0442 (-0.74)
CEO Age		0.0232*** (2.72)	0.0383*** (5.41)
Time Dummy Variable	Yes	Yes	Yes
NAICS Interaction Terms	No	No	Yes
Observations	5073	4346	4346

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$

more valuable. Retention ratio was statistically significant at the 1% level in equation 4 but fell to the 10% level in equation 5. Finally, net income's low effect on CEO compensation is surprising, as intuitively firms that earn more income would have the potential to compensate its CEOs more. Overall, when clustering via NAICS code, CEO characteristics primarily drive the regression alongside the firm's market cap.

## 6.2 Average Executive Compensation Results

Table 3 displays the results from the average executive compensation comparison. Equation 5 (without CEO and firm specific characteristics) finds that, for the median industry, a one point increase in a firm's ESG disclosure score is associated with a 0.26% decrease in CEO compensation, *ceteris paribus*, which is not statistically significant. Equation 6 finds that, for the median industry, a one point increase in a firm's ESG disclosure score is associated with a 0.37% decrease in the firm's average executive compensation and is statistically significant at the 10% level. By including other executives such as the firm's CFO and COO into the compensation metric, the ESG disclosure score variable has a larger negative impact and statistical significance relative to the results from CEO compensation for the median industries. The average executive compensation includes employees who, arguably, do not suffer from the same job duties with regards to ESG factors. CEOs are tasked with guiding the firm towards long-term success, which involves ensuring the firm is safe from ESG associated risks. CFOs and other executives, however, are not necessarily linked to the firm's ESG standing and therefore would not be rewarded for factors related to ESG. The relative difference between the two regressions signifies a difference in compensation structure in relation to ESG factors, where CEOs

are associated with a lower decrease in compensation when comparing median industries.

## 7 DISCUSSION

### 7.1 CEO Compensation Discussion

Equation 4 finds that a one point increase in a firm’s ESG disclosure score is associated with a 0.49% increase in CEO compensation, *ceteris paribus*. However, equation 5 is the preferred model as it considers that certain industries have an advantage at increasing their ESG disclosure score by including an interaction term between ESG disclosure score and NAICS code. Equation 5 finds that a one point increase in a firm’s ESG disclosure score is associated with a 0.22% decrease in CEO compensation, *ceteris paribus*. Equation 4, therefore, is driven by specific industries where the median industry is associated with a 0.22% decrease.

The difference between equation 4 and 5 suggests that equation 4’s results are being driven by a small significant group. The interaction term between ESG disclosure score and NAICS code reveals which industries reward CEOs with an increase in compensation. The NAICS code 519130, or internet publishing and broadcasting and web search portals<sup>12</sup>, has the largest impact<sup>13</sup> on CEO compensation, where a one point increase in a firm’s ESG disclosure score is associated with a 37.4% increase in CEO compensation, *ceteris paribus*. The interaction term has a t-statistic of 16.14, which is statistically significant at the 1% level. Firms within the data set that belong to this code include Match Group and Meta. These are technology firms whose product is primarily software. These companies, therefore, may opt to disclose more

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<sup>12</sup>“519130.” *NAICS*. <https://www.naics.com/naics-code-description/?code=519130>

<sup>13</sup>I only considered NAICS code groups with more than one firm for discussion. Industries with one firm are still included.

Table 3: Average Executive Compensation Results

	(5)	(6)
	log(CEO Comp.)	log(Average Executive Comp.)
ESG Disclosure Score	-0.00261 (-1.48)	-0.00367* (-1.74)
log(Market Capitalization)	0.174*** (4.31)	0.183*** (5.28)
Net Income	1.29e-11 (1.03)	5.58e-12 (1.53)
Net Income <sub>t-1</sub>	1.66e-11 (1.77)	7.35e-12 (1.64)
Retention Ratio	-0.000224 (-1.13)	-0.000435*** (-3.23)
Return on Equity	-0.000677 (-0.58)	-0.00116 (-1.43)
Return on Assets	0.0635 (0.20)	0.165 (1.09)
Stock Return	-0.0142 (-0.51)	-0.0120 (-0.57)
Stock Return <sub>t-1</sub>	0.0352 (1.16)	-0.0188 (-0.24)
Time Dummy Variable	Yes	Yes
NAICS Interaction Terms	Yes	Yes
Observations	4438	4443

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$



ESG-related data due to their operations not affecting specific ESG factors. For example, Match Group produces phone dating applications. This firm has an advantage relative to a firm that is producing a physical product regarding disclosing information about its operations. The NAICS code 454110, or electronic shopping and mail-order houses<sup>14</sup>, also has a large impact where a one point increase in a firm's ESG disclosure score is associated with a 5.10% increase in CEO compensation, *ceteris paribus*. Firms within the S&P 500 and this industry include eBay and Etsy. These firms operate as online platforms for individuals to buy and sell merchandise, where they have an advantage when compared to a production firm with respect to disclosing ESG data.

The industry that rewards its CEOs the least is represented by the NAICS code 336120, or heavy-duty truck manufacturing<sup>15</sup>. For firms who belong to this industry, a one point increase in ESG disclosure score is associated with a 4.84% decrease in CEO compensation, *ceteris paribus*. The industry has a t-statistic of -33.43, which is statistically significant at the 1% level. Firms representative of this industry in the data set include PACCAR Inc, one of the largest manufacturers of heavy-duty trucks globally. In contrast to Match Group, PACCAR Inc has significantly more barriers to disclose ESG data due to the nature of its operations. For firms belonging to the NAICS code 221112, or fossil fuel electric power generation<sup>16</sup>, a one point increase in a firm's ESG disclosure score is associated with a 4.35% decrease in CEO compensation, *ceteris paribus*. The industry has a t-statistic of -16.60, which is statistically significant at the 1% level. These firms produce power by burning fossil fuels. When compared to a firm like Etsy or Match Group, they have significantly

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<sup>14</sup> "454110." *NAICS*. <https://www.naics.com/naics-code-description/?code=454110>

<sup>15</sup> "336120." *NAICS*. <https://www.naics.com/naics-code-description/?code=336120>

<sup>16</sup> "221112." *NAICS*. <https://www.naics.com/naics-code-description/?code=221112>

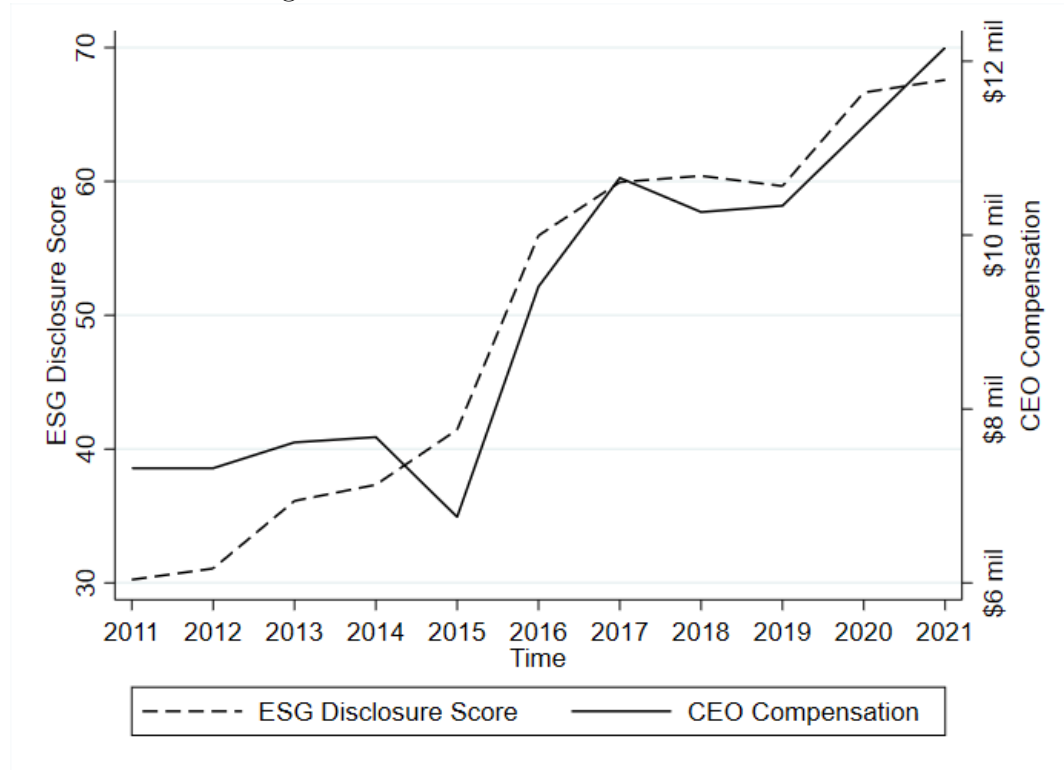
more barriers when it comes to disclosing ESG data. Firms representative of this industry in the S&P 500 include NRG Energy and AES Corp.

ESG disclosure score loses its statistical significance when the model clusters by NAICS code. Johnson et al. (2009) reexamined their previous study which found a positive relationship between ESG factors and a firm's performance. After clustering via an industry code, they found that their results were truly driven by the happenstance of industry classifications and other clustering [52]. I find similar results when comparing clustered regressions versus their non-clustered counterparts.

For firms that reward CEOs for improving their ESG disclosure, ESG disclosure score's effect on CEO compensation is material relative to the size of the average CEO compensation which is \$15 million. The 0.49% increase, from equation 4, is therefore representative of \$75,000. To scale, it would be the equivalent of a \$50,000 salaried employee receiving a \$250 raise. However, the ESG disclosure score can increase by multiple points in a year. Expanding the timeline over a few years, CEOs have the opportunity to increase their ESG disclosure score many times over, resulting in a much larger increase. CEOs, therefore, who are part of an industry that rewards ESG performance, can benefit by focusing on improving their firm's ESG disclosure score.

Figure 4 exemplifies how quickly ESG disclosure scores can increase. Packaging Corp of America (PKG) increased its ESG disclosure score by almost 38 points from 2011 - 2021. They also featured a 14-point increase in a single year. Its CEO, Mark Kowlzan, increased his pay by \$4.8 million during the same 10-year period. PKG was able to increase its ESG scores substantially, and Mark Kowlzan was very successful at increasing his compensation.

Figure 4: ESG Disclosure Score and PKG



## 7.2 Average Executive Compensation Discussion

Equation 6 find that, for the median industry, a one point increase in a firm’s ESG disclosure score is associated with a 0.37% decrease in the firm’s average executive compensation and is statistically significant at the 10% level. The interaction term between ESG disclosure score and NAICS code reveals which industries reward their entire executive suite with an increase in compensation. Firms that belong to the NAICS code 515210, or cable and other subscription programming<sup>17</sup>, have the largest impact on average executive compensation, where a one point increase in a firm’s ESG disclosure score is associated with a 5.53% increase in average executive compensation, ceteris paribus. The interaction term has a t-statistic of 24.12, which is statistically significant at the 1% level. Firms within the data set that belong to this NAICS code include

<sup>17</sup> “515210.” *NAICS*. <https://www.naics.com/naics-code-description/?code=515210>

the Dish Network and Charter Communications Inc (who operates as Spectrum). In contrast, firms belonging to the NAICS code 333611, or turbine and turbine generator set units manufacturing<sup>18</sup>, have the largest negative impact on average executive compensation, where a one point increase in a firm's ESG disclosure score is associated with a 10.26% decrease in average executive compensation, *ceteris paribus*. The interaction term has a t-statistic of -4.19, which is statistically significant at the 1% level. Firms within the data set that belong to this industry include the General Electric Company which operates across a wide array of business activities, including the production of electricity. In comparison to a firm like Dish or Spectrum, General Electric would have significantly higher barriers when it comes to disclosing ESG data. Overall, the relationship between ESG disclosure scores and compensation is industry dependent.

### 7.3 Limitations

It is important to discuss the limitations faced in this paper. As discussed previously, the main limitation is that the index used to compile firms was static at the time of pulling data. Therefore, the firms utilized in this paper are the S&P 500 as of January 2022. Firms that are within the S&P 500 during this paper's time horizon but removed before 2022 are therefore not featured in the data set. Likewise, firms that were added to the S&P 500 in January 2022 are used in the data set. I am concerned with the effect ESG disclosure scores have on CEO compensation, and so the primary negative effect that the static index has is lowering the amount of observations for firms that do not have historical data back to 2011. Bloomberg Terminals have quite a few data limitations. Additional CEO specific characteristics would have been preferred,

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<sup>18</sup>“333611.” *NAICS*. <https://www.naics.com/naics-code-description/?code=333611>

including factors such as education or previous CEO experience. Bloomberg did not have historical data on any other executive’s pay besides the CEO, consequently why I used average executive pay in this paper. Likewise, it failed to have executive specific characteristics such as gender or education, which the average executive compensation comparison lacks.

## 8 CONCLUSION

The primary goal of this paper is to empirically test whether S&P 500 firms deploy incentives to attain the benefits of a higher ESG rated firm. Without including industry interaction terms, I find that an increase in a firm’s ESG disclosure score is associated with an increase in CEO compensation. However, after including interaction terms between ESG disclosure scores and NAICS codes, my findings suggests that, for the median industry, a one point increase in a firm’s ESG disclosure score leads to a 0.22% decrease in CEO compensation, *ceteris paribus*. Although some industries may reward reward CEOs with an increase in compensation, the median industry has a decrease of 0.22%. When compared to alternative executive compensation packages, I find that the magnitude and statistical significance is higher for the average executive. Overall, the results are industry dependent.

There is still much to do in the ESG field. Further research should attempt to account for firms entering and leaving the S&P 500. It is also currently difficult to account for firms that are green washing (overstating the extent of the firms sustainability practices<sup>19</sup>) rather than actually making changes in relation to ESG factors. An optimal future paper would account for S&P 500 changes, extend the time horizon, and account for green washing. Addi-

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<sup>19</sup>“Greenwashing.” *SEC*. <https://www.investor.gov/introduction-investing/investing-basics/glossary/greenwashing>

tional research can be conducted to compare historical ESG scores from rating agencies, rather than disclosure scores to see if the same effects hold.

## 9 REFERENCES

- [1] Deloitte. What is ESG. <https://www2.deloitte.com/hu/en/pages/energy-and-resources/articles/esg-explained-1-what-is-esg.html>, Nov 2021.
- [2] Gunnar Gutsche and Andreas Ziegler. Which Private Investors Are Willing to Pay For Sustainable Investments? Empirical Evidence from Stated Choice Experiments. *Journal of Banking & Finance*, 102:193–214, 2019.
- [3] Robert G. Eccles, Ioannis Ioannou, and George Serafeim. The Impact of Corporate Sustainability on Organizational Processes and Performance. *Management Science*, 60(11):2835–2857, 2014.
- [4] Beiting Cheng, Ioannis Ioannou, and George Serafeim. Corporate Social Responsibility and Access to Finance. *Strategic Management Journal*, 35(1):1–23, 2014.
- [5] Milton Friedman. A Friedman Doctrine— The Social Responsibility of Business Is to Increase Its Profits. *The New York Times*, Sep 1970.
- [6] Howard Rothmann Bowen. *Social Responsibilities of the Businessman*. Harper & Brothers, 1953.
- [7] Gordon J. Alexander and Rogene A. Buchholz. Corporate Social Responsibility and Stock Market Performance. *The Academy of Management Journal*, 21(3):479–486, Sep 1978.

- [8] Philip L. Cochran and Robert A. Wood. Corporate Social Responsibility and Financial Performance. *The Academy of Management Journal*, 27(1):42–56, Mar 1984.
- [9] United Nations. Who Cares Wins: Connecting Financial Markets to a Changing World, 2004.
- [10] United Nations. Secretary-General Launches ‘Principles for Responsible Investment’ Backed by World’s Largest Investors. *United Nations*, Apr 2006.
- [11] PRI. About the PRI. <https://www.unpri.org/about-us/about-the-pri>, Dec 2022.
- [12] Edward P. Lazear. Performance Pay and Productivity. *American Economic Review*, 90(5):1346–1361, 2000.
- [13] Rick Lord, Steven Bullock, and Murray Birt. Understanding Climate Risk at the Asset Level: The Interplay of Transition and Physical Risks, 2021.
- [14] David F. Larcker, Lukasz Pomorski, Edward M. Watts, and Brian Tayan. ESG Ratings: A Compass without Direction. *Stanford Closer Look Series*, Aug 2022.
- [15] Florian Berg, Julian F Kölbl, and Roberto Rigobon. Aggregate Confusion: The Divergence of ESG Ratings. *Review of Finance*, 26(6):1315–1344, 2022.
- [16] R. Boffo and R. Patalano. ESG Investing: Practices, Progress, and Challenges, 2020.

- [17] PwC. PwC's Global Investor Survey 2022. <https://www.pwc.com/gx/en/issues/esg/global-investor-survey-2022.html>, Dec 2022.
- [18] Carola Frydman and Dirk Jenter. CEO Compensation. *Annu. Rev. Financ. Econ.*, 2(1):75–102, 2010.
- [19] Sara L Rynes, Barry Gerhart, and Laura Parks. Personnel Psychology: Performance Evaluation and Pay For Performance. *Annu. Rev. Psychol.*, 56:571–600, 2005.
- [20] Edwin A. Locke, Karyll N. Shaw, Lise M. Saari, and Gary P. Latham. Goal Setting and Task Performance: 1969–1980. *Psychological Bulletin*, 90(1):125–152, 1981.
- [21] O. Bandiera, I. Barankay, and I. Rasul. Incentives for Managers and Inequality among Workers: Evidence from a Firm-Level Experiment. *The Quarterly Journal of Economics*, 122(2):729–773, 2007.
- [22] Karen Maas. Do Corporate Social Performance Targets in Executive Compensation Contribute to Corporate Social Performance? *Journal of Business Ethics*, 148:573–585, 2018.
- [23] Elisa Baraibar-Diez, María D. Odriozola, and José Luis Fernández Sánchez. Sustainable Compensation Policies and Its Effect on Environmental, Social, and Governance Scores. *Corporate Social Responsibility and Environmental Management*, Mar 2019.
- [24] Shira Cohen, Igor Kadach, Gaizka Ormazabal, and Stefan Reichelstein. Executive Compensation Tied to ESG Performance: International Evidence. *SSRN Electronic Journal*, Apr 2022.



- [25] Robert A Ritz et al. *Climate Targets, Executive Compensation, and Corporate Strategy*. JSTOR, 2020.
- [26] Hoje Jo and Maretno A. Harjoto. Corporate Governance and Firm Value: The Impact of Corporate Social Responsibility. *Journal of Business Ethics*, 103(3):351–383, 2011.
- [27] Dan S. Dhaliwal, Oliver Zhen Li, Albert Tsang, and Yong George Yang. Voluntary Nonfinancial Disclosure and the Cost of Equity Capital: The Initiation of Corporate Social Responsibility Reporting. *The Accounting Review*, 86(1):59–100, 2011.
- [28] Mozaffar Khan, George Serafeim, and Aaron Yoon. Corporate Sustainability: First Evidence on Materiality. *The accounting review*, 91(6):1697–1724, 2016.
- [29] Marina Brogi and Valentina Lagasio. Environmental, Social, and Governance and Company Profitability: Are Financial Intermediaries Different? *Corporate Social Responsibility and Environmental Management*, 26(3):576–587, Oct 2018.
- [30] Marcel C Minutolo, Werner D Kristjanpoller, and John Stakeley. Exploring Environmental, Social, and Governance Disclosure Effects on the S&P 500 Financial Performance. *Business Strategy and the Environment*, 28(6):1083–1095, 2019.
- [31] Paul Gompers, Joy Ishii, and Andrew Metrick. Corporate governance and equity prices. *The quarterly journal of economics*, 118(1):107–156, 2003.
- [32] Ki-Hoon Lee, Beom Cheol Cin, and Eui Young Lee. Environmental Responsibility and Firm Performance: The Application of an

- Environmental, Social and Governance Model. *Business Strategy and the Environment*, 25(1):40–53, 2016.
- [33] Paul C Godfrey, Craig B Merrill, and Jared M Hansen. The Relationship between Corporate Social Responsibility and Shareholder Value: An Empirical Test of the Risk Management Hypothesis. *Strategic management journal*, 30(4):425–445, 2009.
- [34] Maretno Harjoto and Indrarini Laksmana. The Impact of Corporate Social Responsibility on Risk Taking and Firm Value. *Journal of Business Ethics*, 151:353–373, 2018.
- [35] Roger CY Chen and Chen-Hsun Lee. The Influence of CSR on Firm Value: An Application of Panel Smooth Transition Regression on Taiwan. *Applied Economics*, 49(34):3422–3434, 2017.
- [36] Edward R. Freeman, Jeffrey S. Harrison, Andrew C. Wicks, Bidhan L. Parmar, and Simone De Colle. *Stakeholder Theory: The State of the Art*. Cambridge University Press, 2010.
- [37] Michael E. Porter and Mark R. Kramer. Creating Shared Value. *Harvard Business Review*, Feb 2011.
- [38] Lee Bohl. Short Selling: The Risks and Rewards.  
<https://www.schwab.com/learn/story/ins-and-outs-short-selling>, Aug 2022.
- [39] Archana Jain, Pankaj K Jain, and Zabihollah Rezaee. Value-Relevance of Corporate Social Responsibility: Evidence from Short Selling. *Journal of Management Accounting Research*, 28(2):29–52, 2016.

- [40] Gunnar Friede, Timo Busch, and Alexander Bassen. ESG and Financial Performance: Aggregated Evidence from More than 2000 Empirical Studies. *Journal of sustainable finance & investment*, 5(4):210–233, 2015.
- [41] Tensie Whelan, Ulrich Atz, Tracy Van Holt, and Casey Clark. ESG and Financial Performance. *Uncovering the Relationship by Aggregating Evidence from*, 1:2015–2020, 2021.
- [42] John Nofsinger and Abhishek Varma. Socially Responsible Funds and Market Crises. *Journal of Banking & Finance*, 48:180–193, 2014.
- [43] Jon Hale. Sustainable Funds Weather the First Quarter Better Than Conventional Funds. <https://www.morningstar.com/articles/976361/sustainable-funds-weather-the-first-quarter-better-than-conventional-funds>, Apr 2020.
- [44] Nils Engelhardt, Jens Ekkenga, and Peter Posch. ESG Ratings and Stock Performance during the COVID-19 Crisis. *Sustainability*, 13(13):7133, 2021.
- [45] David C. Broadstock, Kalok Chan, Louis T.W. Cheng, and Xiaowei Wang. The Role of ESG Performance during Times of Financial Crisis: Evidence from COVID-19 in China. *Finance Research Letters*, 38, 2021.
- [46] Karl V Lins, Henri Servaes, and Ane Tamayo. Social Capital, Trust, and Firm Performance: The Value of Corporate Social Responsibility During the Financial Crisis. *the Journal of Finance*, 72(4):1785–1824, 2017.
- [47] Marcia Millon Cornett, Otgontsetseg Erhemjamts, and Hassan Tehranian. Greed or Good Deeds: An Examination of the Relation Between Corporate Social Responsibility and the Financial Performance

of Us Commercial Banks Around the Financial Crisis. *Journal of Banking & Finance*, 70:137–159, 2016.

- [48] Kais Bouslah, Lawrence Kryzanowski, and Bouchra M’Zali. Social Performance and Firm Risk: Impact of the Financial Crisis. *Journal of Business Ethics*, 149:643–669, 2018.
- [49] John Hua Fan and Lachlan Michalski. Sustainable Factor Investing: Where Doing Well Meets Doing Good. *International Review of Economics & Finance*, 70:230–256, 2020.
- [50] Lars Kaiser. ESG Integration: Value, Growth and Momentum. *Journal of Asset Management*, 21(1):32–51, 2020.
- [51] Samuel Dremptic, Christian Klein, and Bernhard Zwergel. The Influence of Firm Size on the ESG Score: Corporate Sustainability Ratings Under Review. *Journal of Business Ethics*, pages 1–28, 04 2019.
- [52] Shane A. Johnson, Theodore C. Moorman, and Sorin Sorescu. A Reexamination of Corporate Governance and Equity Prices. *The Review of Financial Studies*, 22(11):4753–4786, 04 2009.

## A ESG SCORES AND ESG DISCLOSURE SCORES

This paper opts to utilize Bloomberg ESG disclosure scores rather than a traditional ESG score. Bloomberg’s traditional ESG score rates the firm across the three pillars with a range of 0 to 10 using a proprietary method. Although not the same, a higher ESG disclosure score means the firm is disclosing more quantitative and qualitative data related to ESG issues and that management is more prepared for contingencies and less likely to lose financial value in the future. Therefore, we would expect ESG disclosure scores to be a good predictor of a firm’s ESG score. The correlation between the two variables is 0.6, suggesting a strong positive relationship. Table 4 shows the results from regressing Bloomberg ESG scores on Bloomberg ESG disclosure scores. A one point increase in a firm’s ESG disclosure score is associated with a .06 increase in a firm’s ESG disclosure score, which is statistically significant at the 1% level. It is important to compare the 0.06 increase relative to the potential size of the variable, where Bloomberg ESG scores range from just 0 to 10. Therefore, I suggest that ESG disclosure scores are a good predictor of a firm’s ESG score.

Table 4: Average Executive Compensation Results

	(1) Bloomberg ESG Score
Bloomberg ESG Disclosure Score	0.0698172*** (14.56)
Observations	383

*t* statistics in parentheses

\*  $p < 0.10$ , \*\*  $p < 0.05$ , \*\*\*  $p < 0.01$