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Shifting the focus: Implications of increasing ESG compensation on firm performance

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Abstract

ESG-linked objective metrics in executive compensation contracts are increasingly being adopted as a tool to harmonize and align the interests of stakeholders and incentivize decision-makers to consider ESG issues alongside conventional financial targets. While previous research has investigated the firm outcomes of engagement in the practice of ESG compensation, the findings regarding the impact on firm performance and value creation have been contradictory.

In our thesis, we study how changes in the weighting of ESG-linked metrics within executive compensation schemes influence firm performance. Diverging from earlier studies that primarily employ a binary variable to indicate firm engagement in ESG compensation to any extent, we introduce a novel and refined variable, measuring the year-to-year changes in the relative share of compensation metrics tied to ESG objectives. We assess the implications on firm ESG performance, operative financial performance, and investor sentiment through fixed-effects OLS regressions.

Our study spans 13,331 firm-year observations of North American publicly traded companies from 2010 to 2021. We find statistically and economically significant evidence on the association between the proportion of ESG-linked compensation metrics and developments in ESG ratings, especially those driven by environmental and holistic ESG objectives covering multiple of ESG areas. Contradicting the recent concerns of investors related to "fluffy" ESG targets shifting executives' focus away from growth and profitability, we find no significant relation between increases in the share of ESG-linked metrics and subsequent developments in relative sales growth and gross profit margins. Additionally, our research identifies a significant positive impact on short-term stock returns for institutionally owned firms following the announcements of ESG-favorable changes in executive compensation schemes. Firms that increase their focus on emissions reduction through compensation contracting experience higher returns also on a year-to-year basis, regardless of the level of institutional ownership.

Comparing the results of our refined ESG compensation variable with the binary variable, our findings indicate that assessing the relative change in the weight of ESG-linked compensation metrics provides a more informative perspective on firm outcomes resulting from changes in executive compensation than merely determining whether a firm practices ESG compensation or not.

Keywords ESG, compensation contracting, agency theory, managerial decision-making, non-financial targets, firm performance

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Abstrakti

Yritysjohdon palkitsemisjärjestelmissä käytetään yhä useammin ESG-sidonnaisia mittareita välineenä yhteensovittamaan eri sidosryhmien etuja sekä kannustamaan yritysten päätöksentekijöitä ottamaan huomioon ESG-teemat perinteisten taloudellisten tavoitteiden lisäksi. Aiemmat tutkimukset ovat tutkineet ESG-palkitsemisen harjoittamisen vaikutuksia yritystoiminnan tuloksiin, mutta tutkimustulokset yrityksen suorituskyvyn ja arvonluonnin osalta ovat olleet ristiriitaisia.

Tutkielmassamme tarkastelemme, miten muutokset ESG-sidonnaisten mittareiden painotuksessa johdon palkitsemisjärjestelmissä vaikuttavat yrityksen suorituskykyyn. Poiketen aiemmista tutkimuksista, joissa käytetään pääasiassa binääristä muuttujaa indikoimaan yrityksen ESG-palkitsemisen harjoittamista, esitämme uudenlaisen ja tarkemman muuttujan, joka mittaa ESG-sidonnaisten palkitsemismittareiden suhteellisen osuuden muutosta vuodesta toiseen. Käyttäen kiinteät vaikutukset huomioonottavia OLS-regressioita, tutkimme muutoksien vaikutuksia yrityksen ESG-pisteytyksiin, operatiiviseen taloudelliseen suorituskykyyn, sekä sijoittajien reaktioihin ja suhtautumiseen.

Tutkimuksemme kattaa 13,331 yritysvuosihavaintoa koostuen pohjoisamerikkalaisista julkisesti noteeratuista yrityksistä vuosina 2010–2021. Löydämme tilastollisesti sekä taloudellisesti merkitseviä tuloksia ESG-sidonnaisten palkitsemismittareiden osuuksien sekä ESG-pisteiden muutosten välillä, erityisesti ympäristöön sekä holistisiin ESG-teemoihin kattavien mittareiden osalta. Vastoin sijoittajien viimeaikaisia huolia siitä, että ”pehmeät” ESG-tavoitteet ajaisivat yritysjohdon huomion pois kasvusta ja kannattavuudesta, emme löydä merkittävää yhteyttä ESG-sidonnaisten mittareiden osuuden kasvun sekä liikevaihdon tai bruttokateprosenttien muutosten välillä. Tämän lisäksi tunnistamme tilastollisesti merkitsevän positiivisen vaikutuksen lyhyen aikavälin osaketuottoihin institutionaalisesti omistetuissa yrityksissä sen jälkeen, kun tieto ESG-positiivisista muutoksista palkitsemisjärjestelmissä on julkaistu. Yritykset, jotka lisäävät painotusta päästöjen vähentämiseen johdon palkitsemisessa, kokevat korkeampia osaketuottoja myös vuositasolla, riippumatta institutionaalisen omistuksen määrästä.

Tulosten vertailu kehittämällämme tarkemmalla ESG-palkitsemismuuttujalla ja binäärimuuttujalla osoittaa, että ESG-sidonnaisten palkkioiden suhteellisten osuuksien muutosten arviointi tarjoaa informatiivisemman kuvan ESG-palkitsemisen vaikutuksista yrityksen suorituskykyyn, verrattuna pelkästään siihen, toteuttaako yritys ESG-palkitsemista vai ei.

Avainsanat ESG, palkitsemissopimukset, agenttiteoria, johdon päätöksenteko, ei-taloudelliset tavoitteet, yrityksen suorituskyky

Table of Contents

List of Tables

List of Figures

List of Appendices

1. Introduction

1.1. Background and motivation

Over the past few decades, the focus on environmental, social, and governance (ESG) issues in corporate investments has significantly increased. This shift contrasts with the traditional agency-theoretic framework (Friedman, 1970), which advocates firms to maximize economic profits and shareholder welfare and aligns more with Freeman's (1984) Stakeholder Theory, arguing that firms should create value for all stakeholders, not just shareholders. A fundamental question arises: do firms' engagements in ESG activities generate value, and if so, for whom?

Motivated by this paradigm shift, existing research has found mixed results regarding ESG's value creation capabilities. Some argue ESG being an agency cost enjoyed by managers at shareholders' expense (e.g., Temple-West and Xiao, 2023; Bebchuck and Tallarita, 2022), while others consider ESG as an integral aspect of firm operations, lowering the impact of nonfinancial risks and enhancing economic results and stakeholders' welfare (e.g., Cohen et al., 2023). For instance, offering sustainable products can meet the demands of environmentally conscious consumers but the transparency of the ultimate emissions related to these products may not be evident or even available for consumers.

Further studies, like Jensen and Meckling (1976), emphasize the need for incentivizing managers to meet set targets effectively. In recent years, many firms across industries have been increasingly linking executive compensation to metrics related to sustainability targets rather than merely to financial or business-related objectives. For example, in the 10-year span from 2011 to 2021, Omnicom Group increased the relative share of ESG-linked metrics in executive compensation contracts from 17% to 44%, Duke Energy from 16% to 20%, and Apple from 0% to 25% (ISS Incentive Lab). Although the trend of including ESG targets in executive compensation is clearly significant, whether they are in harmony or in conflict with shareholders' interests remains an open question. Hence, the variety of views and the current trend drive us to assess the real-world effects of adopting ESG criteria and to examine their impact through established theories, e.g., stakeholder engagement and incentive contracting.

Reflecting on behavioral finance and managerial decision-making theories, many influential investors advocate integrating ESG initiatives into executive compensation. Leaders in this movement, like Allianz Global Investors (Bradford, 2022) and Cevian Capital (2021), require large European firms to incorporate ESG goals into executive pay structures. Blackrock (2023)

also emphasizes the importance of clarity in measuring sustainability-linked criteria and its alignment with strategic priorities. PwC's Global Investor Survey (2022) found that 41% of investors support including ESG objectives in executive compensation, even if these do not align with financial returns, while 42% oppose it. This result aligns with the findings of Hartzmark and Sussman (2019) that shareholders increasingly favor ESG initiatives, even if it means forfeiting financial returns.

In response to this pressure, a growing number of companies have been implementing financial targets into executive compensation contracts to complement financial targets, as documented by recent literature (e.g., Cohen et al., 2023; Qin and Yang, 2022; Bebchuk and Tallarita, 2022; Tsang et al., 2021). Investors are not the only stakeholders who are pressuring firms to incorporate ESG compensation. Credit rating agencies are also recognizing the importance of ESG, awarding higher ratings to firms with strong performance in these areas, especially in social aspects like community relations and diversity (Attig et al., 2013). Thus, sustainability-linked compensation is not only a commitment to ESG efforts but also beneficial from a business perspective.

However, Edmans (2023) notes that ESG-linked compensation agreements often primarily address environmental (E) and social (S) objectives, not fully encompassing all ESG aspects. This selective approach underscores a broader concern regarding ESG-based compensation practices. Additionally, Bebchuk and Tallarita (2022) document that ESG metrics inherently seem to focus on a limited number of welfare dimensions, impacting only a certain group of stakeholders while the intention is to deliver value to “all stakeholders”. Given the broad spectrum of stakeholders and the multiple ways corporate decisions can affect their interests, prior findings indicate that companies tend to focus on specific stakeholder groups over others. Reflecting this evidence, there has been a growing concern among some investors as well as academics about the use of ESG-linked compensation. They argue that it could serve as a way to disguise excessive, performance-insensitive compensation, potentially leading to greenwashing and shifting executives’ focus away from core business objectives (e.g., Temple-West and Xiao, 2023; Gosling and O’Connor, 2021).

As the concept of incorporating sustainability into managerial compensation has evolved, it is also referred to as CSR (corporate social responsibility) contracting. However, this term can sometimes lead to ambiguity, especially in distinguishing whether it only encompasses social and environmental performance or also governance aspects, such as ethical compliance. To

avoid this ambiguity in our study, we adopt the term "ESG compensation" to comprehensively cover all three dimensions of corporate sustainability: environmental, social, and governance.

1.2. Research questions and contribution

In our thesis, we study how increases in the relative share of ESG-linked metrics in executive compensation contracts affect firm performance. Specifically, we examine the implications on ESG performance, operative financial performance, and investor sentiment. We assess the impacts of both overall changes in ESG-linked metrics, as well as changes in ten subcategory constituents for metrics considered to be tied to ESG.

Our primary contribution lies in our novel approach, which measures the inclusion of ESG compensation by analyzing the change in the relative share of executive compensation metrics tied to ESG. The existing literature relies on a binary indicator variable to determine whether a firm engages in the practice of ESG compensation to any extent or not, which we find insufficient for the purpose of our analyses. Our granular approach allows us to gauge the shifting priorities the board of directors assigns to executives with the aim to provide fresh insights and a more detailed perspective into the implications of increasing the weight of ESG-linked compensation.

Furthermore, our study extends the scope of firm outcomes analyzed in the context of ESG compensation literature. Not only do we compare our results with the refined variable to those derived from the indicator variable used in previous research, but we also explore new dimensions. Responding to recent critiques of ESG compensation metrics (e.g., Temple-West and Xiao, 2023), we investigate their impact on changes in firm relative sales growth and gross profit margins – dimensions that have not previously been explored in the context of ESG-linked compensation. Additionally, we reevaluate outcomes that have been the focus of prior ESG compensation studies, such as ESG ratings, stock returns, ROA, and Tobin's Q.

Lastly, we adjust the timing for each dependent variable in our models, based on the expected time lead in the impact of changes in ESG compensation on the respective firm outcomes. This approach contrasts with previous studies that have typically applied a uniform year-to-year analysis window for all outcomes. We tailor our measurement of the dependent variable to align with the timing of compensation structuring changes, examining the effects in the same year, the following year, the subsequent quarter, or over two, three, or four years, depending on the specific nature of the dependent variable. This nuanced and comprehensive method allows for

a more in-depth analysis of the temporal and longer-term effects of ESG compensation changes on firm performance.

1.3. Structure of the thesis

The rest of this thesis is structured as follows. In Section 2, we review the relevant literature around ESG-oriented management practices and incentive contracting, as well as present our hypotheses based on the findings of previous research. In Section 3, we go through our data sources, sample selection procedure, and our empirical approach to study the research questions. In Section 4, we present the results of our main analyses for the implications of increasing the relative share of ESG-linked compensation on firm performance. In Section 5, we discuss the results of robustness tests and additional analyses. In Section 6, we delve into a detailed discussion on our findings and their implications. Finally, Section 7 concludes with a research summary and discussion on the limitations of our study and possible avenues for future research.

2. Literature review and hypotheses development

2.1. ESG contribution to firms' value creation

The rationale behind including ESG-linked metrics in executive compensation, such as targets related to CO_2 emissions, employee satisfaction and safety, and compliance with ethical standards, is tied to both ESG and financial performance of companies. ESG-linked metrics often relate to specific stakeholders, as they tend to have a significant impact on firm's operations and performance (Flammer, 2015a, 2015b). For instance, prioritizing employee well-being and development not only fosters greater employee engagement but also drives innovative productivity (Flammer and Kacperczyk, 2016). Furthermore, by improving environmental footprint and cherishing communities, companies can bolster their public image and appeal more effectively to clients and consumers (Bansal and Roth, 2000; Shrivastava and Hart, 1995). These are just a few examples of how ESG-linked initiatives can be efficient in signaling a firm's commitment to non-opportunistic behavior, leading to beneficial firm outcomes and ultimately, higher firm performance (Elfenbein et al., 2012; Du et al., 2011; Luo and Bhattacharya, 2006).

In contrast with the traditional agency-theoretic framework, which suggests that shareholders prioritize financial performance above other factors (Friedman, 1970), studies have demonstrated that ESG-oriented companies outperform their peers also in overall value creation, on top of the superior ESG performance (Cohen et al., 2023; Flammer et al., 2019; Eccles et al., 2014). Studies by Kempf and Osthoff (2007), Statman and Glushkov (2009), and Eccles et al. (2014) find a long-short investment strategy of buying high SRI rated or ESG score firms and selling low SRI rated or ESG score firms yields high abnormal returns. Conversely, there is some evidence questioning this relation by showing that the outperformance of high ESG score firms disappears after the initial sampling periods (Borgers et al., 2013). In the context of short-term returns, Krüger (2015) even shows that markets react strongly negatively to negative firm CSR news, but also weakly negatively on positive CSR events, which could result from agency problems. However, the study finds that investors do value "offsetting CSR", that is positive CSR news for firms that have a history of poor stakeholder relations.

Other various relations documented between ESG and financial parameters include, e.g., increase in firm value (Flammer et al., 2019; Albuquerque et al., 2019; Fatemi et al., 2015), decrease in systematic risk (Albuquerque et al., 2019), and decrease in cost of equity (El Ghoul et al., 2011). In addition, Cohen et al. (2023) find that ESG compensation is associated with engagement, shareholder voting, and trading activities by institutional investors, consistent with the research documenting the role of institutional investors in the efforts to accomplish sustainability objectives (Azar et al., 2021; Dimson et al., 2015).

Overall, previous research has documented a positive and economically significant association between ESG factors and firm value, therefore suggesting that managerial incentives should be tied to firms' ESG performance. However, since evidence also suggests that this relationship is complex as it may not always result in improved financial performance (e.g., Dutordoir et al., 2018; Lys et al., 2015), we are compelled to explore the value creation abilities of ESG-linked compensation metrics.

2.2. Managerial decision-making and compensation contracts

As corporate governance dynamics evolve, the transition from the traditional emphasis on merely economic profits, as advocated by Friedman (1970), has accelerated towards a broader perspective that encompasses ESG factors and overall stakeholder welfare. This shift, underscored by Hart and Zingales (2017), urges corporations to integrate and focus on

multifaceted interests of all stakeholders. Furthermore, the increased ESG awareness and demand among capital suppliers puts pressure on firm executives to take action in line with the evolving priorities. In resolving the potential conflicts of interest between capital suppliers and managers, compensation contracts with financial incentives, discussed by Jensen and Meckling (1976), have been a widely used approach to align the interests of these stakeholders. By incorporating ESG objectives into these executive compensation schemes, companies would signal their commitment to not just shareholders, but a broader spectrum of stakeholders, emphasizing a balanced focus on both economic and ESG considerations.

The influence of ESG-linked metrics on financial performance is intertwined with the complex dynamics of managerial decision-making, particularly in the context of short-term versus long-term priorities. Executives often face significant short-term pressures, which adds another layer of complexity to managerial decision-making. As summarized by Flammer et al. (2019), career concerns (Gibbons and Murphy, 1992), the structure of short-term executive compensation (Stein, 1989), and the expectations to meet or exceed analysts' quarterly earnings forecasts (DeGeorge et al., 1999) create an environment where managers may prioritize investments that yield immediate returns over those with longer-term benefits (Flammer and Bansal, 2017; Graham et al., 2005; Holmstrom, 1999; Stein, 1988, 1989). This preference for short-term results becomes especially highlighted when managers face the risk of missing quarterly earnings expectations. Graham et al. (2005) find that a striking 78% of managers would sacrifice long-term value in order to smooth earnings. Consequently, executives tend to focus their resources and efforts towards stakeholder claims that support them to achieve their short-term earnings targets.

Building upon the dilemma of short-term versus long-term priorities in managerial decision-making, managers may act on their private benefit, also beyond monetary compensation. While company shareholders are mostly independent investors that are trying to maximize the value of their diversified portfolios, managers are incentivized by personal motives such as individual reputation or pay. Executives may grow the line of business they manage beyond the optimal size as top-line growth is associated with personal compensation and the extent of the manager’s power through the resources under their control (Jensen, 1986). Moreover, Edmans et al. (2023) find that intrinsic motivation and reputation are seen as even stronger motivators than incentive pay among CEOs.

In ESG context, managers with manipulative tendencies have proven to be associated with adverse firm outcomes. The findings of Jang et al. (2022) imply that executives who manage

earnings to increase their own monetary income may care less about ESG performance that is not strongly aligned to their compensation. Similarly, Breuer et. al (2021) show that powerful CEOs pursue excessive ESG strategies aiming at reputational gains for their private benefit, resulting in defective ESG overinvestment, ultimately decreasing firm value. However, Flammer et al. (2019) find that ESG compensation also incentivizes managers to adopt a longer time horizon and shift their focus towards stakeholders that are less salient but considerable in the long-term value creation of the firm. Correspondingly, the results of Khenissi et al. (2022) suggest that including ESG criteria into compensation contracts has a decreasing effect on earnings manipulation activities conducted by executives.

In short, the existing literature suggests that monetary incentives provide an effective mean to guide managerial decision-making and align shareholder preferences, and therefore, ESG compensation can be expected to lead to ESG improvement efforts. Moreover, managers often care about their individual reputation, which also induces them to adopt ESG-improving practices.

2.3. The interrelationships of ESG compensation and firm characteristics

While ESG compensation has become more prevalent across the board, adoption of the practice varies at industry, country, and firm level. ESG compensation is more common in industries with a higher environmental footprint (such as mining, oil, gas, and transportation) and in countries with heavier regulation and sensitivity towards ESG (Ikram et al., 2023; Cohen et al., 2023; Flammer et al., 2019). This also partially explains ESG compensation being more common within larger firms, combined with the higher likelihood of having more resources and thereby motivation to engage in ESG (Lee et al., 2023). Cohen et al. (2023) and Focke (2022) also document a positive association between ESG compensation and the share of institutional ownership. Maas (2018) shows that the use of ESG compensation is not linked to the prevailing level of ESG strength; both firms with weak and strong ESG results engage in ESG compensation. Le and Ngo (2022) find that firms with a higher board gender diversity are more likely to shape their executive compensation contracts to be more ESG-oriented, especially for environmental and social issues.

The use of ESG compensation reflects efficient contracting, as the practice seems to be shaped by the costs and benefits of ESG and to vary with firm attributes that justify the use of non-financial metrics for compensation contracting (Cohen et al., 2023). Moreover, firms with more

shareholder-friendly corporate governance and lower earnings and stock return volatility are more likely to provide executive compensation linked to firms' ESG outcomes (Hong et al., 2015; Ikram et al., 2023). Ikram et al. (2023) further find that well-governed firms are more likely to offer formula-based, objective ESG-contingent compensation, that is, the executive receiving the contract knows ex ante the weighing of the pre-specified ESG activities in the compensation contract, and therefore knows how much he or she can expect to earn from pursuing these activities.

Finally, the findings of Qin and Yang (2022) demonstrate a link between the use of ESG compensation and reduction in performance-induced CEO turnover. This is consistent with the conception that ESG compensation aids to signal long-term strategies and builds trust between a firm and its investors to whom ESG performance is an issue, thereby reducing the importance of short-term financial performance that is linked to CEO dismissal decisions.

2.4. Compensation structuring and firm outcomes

Traditional financial metrics are commonly seen as competent measures for assessing a firm's current operational management, but they often fall short in capturing the value generated by many longer-term strategic initiatives, like new market or product development initiatives (e.g., Bushman et al., 1996). In this light, ESG performance metrics are emerging as valuable indicators of a firm's future performance, challenging the conventional emphasis on economic factors. This shift reflects the rationale for incorporating other non-financial variables in managerial incentive contracts, such as customer satisfaction or product quality (Dutta and Reichelstein, 2003), service quality (Campbell, 2008), market share (Ittner et al., 1997), and employee satisfaction (Gan et al., 2020). Based on agency theory, integrating non-financial objectives into executive compensation contracts can be highly effective, if the non-financial objectives contain additional insights into a manager's incentives and efforts that are not reflected in financial measures (Holmstrom, 1979).

However, the association between ESG-linked metrics and financial performance presents a nuanced picture that is dependent on the context and circumstances (Derrien et al. 2021; Gillan et al., 2021). In situations where environmental risks may present a long-term threat to a firm's operations, like climate change, aligning managerial incentives to mitigate these risks can improve long-term financial performance. Given the myriad of factors that can complicate long-term financial results, there is a tendency to concentrate on short-term financial outcomes.

Committing to ESG objectives can lead to higher initial expenses and decreased profit margins in the short term, which may reduce shareholder wealth if the balance between long-term sustainability and short-term operations is not well-maintained (Homroy et al., 2023).

Executives have been demonstrated to respond to compensation incentives in the intended manner, but compensation structuring still comes with some disadvantages and costs when considering firm outcomes. For example, Bennett et al. (2017) find that an unevenly large number of firms exceed their performance goals by a small margin compared to the number that fail to meet the goal by a similar margin, suggesting that executives do not bother to push for performance after their compensation threshold goal is met.

The evidence for the effectiveness of compensation structuring is mainly available for the use of financial targets leading to financial performance (e.g., Devers et al., 2007). Executive compensation tied to non-financial performance measures has been studied to a lesser extent. O'Connell and O'Sullivan (2014) find that linking CEO compensation to customer satisfaction has a positive influence on growth in future shareholder value. Complementing these findings, Karim et al. (2018) demonstrate that a higher proportion of equity-based compensation, as opposed to cash-based, is associated with improved ESG performance.

The positive impact of the use of ESG-linked compensation on ESG performance has been studied in recent literature, with ESG performance being measured by ESG ratings, emission reductions, green innovations, and social and environmental initiatives (Cohen et al., 2023; Tsang et al., 2021; Flammer et al., 2019; Hong et al., 2015). Maas (2018) identifies that "hard targets" with a clear-cut underlying quantification (e.g., "increasing the percentage of women in leadership positions from 10 to 25 percent by 2025") in ESG compensation are typically implemented for managerial purposes, leading to improved ESG results. Conversely, "soft targets", which are characterized by vague objectives (e.g., "increasing female leadership") tend to serve more as symbolic gestures rather than for creating an impact on actual ESG performance improvement.

2.5. The controversy of ESG performance metrics in executive compensation

In recent years, compensation metrics linked to profitability, growth, and other business issues have declined, while factors tied to ESG have surged. However, some of these environmental and social determinants in executive compensation are facing hard criticism from asset managers. Unlike for financial metrics, it is very difficult for outsiders to tell how some of the

ESG compensation determinants are measured, and whether they are used to fill executives' pockets with performance-insensitive pay (Temple-West and Xiao, 2023). Additionally, there are associated concerns related to ESG objectives being often vaguely worded, which makes them ambiguous, more attainable and sensitive to lead to increased compensation between executives.

Bebchuk and Tallarita (2022), Gosling and O'Connor (2021), and Gosling et al. (2023) find that ESG compensation may be a mean to disguise excessive executive compensation, as ESG performance results are difficult to measure and audit for outsiders. Such concerns are also consistent with the literature suggesting ESG initiatives are being used to advance managers' own personal interests. Moreover, in the sample of S&P 100 companies, Bebchuk and Tallarita (2022) find that over 73% of firms do not disclose the weight of ESG metrics for overall ESG compensation. Gosling et al. (2021) documents that a significant portion (50%) of ESG targets within FTSE 350 firms would not be perceived as substantially relevant to the company. This suggests that ESG goals in managerial compensation contracts increase agency problems, resulting in "more pay and not more ESG". However, the findings of Cohen et al. (2023) reveal that ESG compensation does not seem to be related to abnormal levels of CEO compensation, when taking firm size and industry peers' CEO compensation levels into consideration.

In addition to the worries about managers gaming ESG-flavored compensation schemes, ESG compensation is also linked to greenwashing concerns. Unfounded positive communication about environmental performance is increasingly used by firms to mislead consumers and shareholders to create a distorted view on transparency and accountability (Delmas and Burbano, 2011; Marquis et al., 2016). This evidence suggests that it is possible that some firms aim to adopt ESG compensation only "nominally" to realize the benefits of being deemed as ESG conscious while avoiding costly ESG-linked efforts (Cohen et al., 2023). In the granular hand-collected sample of Swedish firms, Homroy et al. (2023) find a negative correlation between CEOs meeting ESG and financial targets, indicating that ESG goals may compete with financial goals. Consequently, the study further uncovers that generalists CEOs with a wide skill set have more ESG-linked metrics in their compensation contracts.

2.6. Hypothesis development

Our first hypothesis seeks to clarify the intricate relationship between ESG components in executive compensation and overall ESG performance, as indicated in studies by Cohen et al.

(2023), Flammer et al. (2019), Maas (2018), and Hong et al. (2015). These studies highlight a trend where firms with more shareholder-friendly governance structures are inclined to incentivize their executives to engage in ESG and Corporate Social Responsibility (CSR) initiatives. This is further supported by findings that firms offering compensation linked to ESG and CSR demonstrate higher levels of social performance, aligning with the idea that incentivizing CSR leads to increased CSR activities.

However, these studies also observe mixed results, depending on the employed ESG ratings and types of ESG-linked objectives. In light of this, we examine this relationship more closely by implementing a refined version of the variable previously used in research to measure ESG compensation. Our aim is to untangle the complexities of how ESG-focused incentives in executive pay might influence a firm's ESG achievements and provide further robustness on the prior findings.

Hypothesis 1: Increasing the relative share of ESG compensation leads to improved ESG performance

Previous research has found that compensation structuring effectively leads to the intended firm outcomes (Devers et al., 2017; Derrien et al., 2021; Gillan et al., 2021). Additionally, there is ample evidence suggesting that executives encounter various short-term pressures, which significantly impact their decision-making regarding long-term commitments (e.g., Flammer and Bansal, 2017; DeGeorge et al., 1999, Gibbons and Murphy, 1992; Stein, 1989).

However, the research by Flammer et al. (2019) demonstrates that ESG compensation influences managers to concentrate on a longer-term horizon. Building on this, our second hypothesis aims to explore how ESG-linked compensation might redirect executives' short-term priorities from financial objectives, like growth and profitability, towards ESG objectives, along with related initiatives and investments. The hypothesis seeks to find out whether recent concerns raised by asset managers, related to executives' focus being shifted from operative performance towards "intangible" ESG goals, are valid (Temple-West and Xiao, 2023).

Hypothesis 2: Increasing the relative share of ESG compensation decreases short-term operative financial performance of the firm

Despite our hypothesis that increasing the relative share of ESG compensation may initially lead to deteriorated growth and profitability figures, we anticipate that shareholders will appreciate the enhanced focus on ESG for its potential to improve long-term environmental and

financial performance. This perspective aligns with findings that institutional investors favor ESG-oriented management practices (e.g., Dimson et al., 2015; Azar et al., 2017), although literature on to which extent investors see the practice of ESG compensation to be value-enhancing is limited. Based on the findings of previous research, we hypothesize that firms experience higher stock returns following an increase in the share of ESG compensation, and the effect to be stronger for firms predominantly owned by institutional shareholders.

Hypothesis 3a: Increasing the relative share of ESG compensation leads to higher stock returns

Hypothesis 3b: Increasing the relative share of ESG compensation leads to higher stock returns for firms owned by institutional investors compared to all firms

3. Data and methods

3.1. Data sources

Our main sample comprises North American public firms covered by Institutional Shareholder Services' (ISS) database Incentive Lab from 2010 to 2021. Incentive Lab was founded in 2009 and it provides comparable data on compensation structuring, including performance metrics and targets as well as payout structures with grant data collected from proxy statements of firms from the US, Canada, UK, Europe, and Australia. Various research papers like Cohen et. al (2023), Ma et al. (2019), and Bennett et al. (2017) use ISS's data on executive compensation. Our Incentive Lab data sample ends in 2021, as our analyses require data on firm outcomes for the subsequent year ($t+1$), and 2022 is the latest year with available data at the time of this thesis.

We employ distinct data sources for ESG ratings, firm-level accounting and market variables, and institutional ownership. Specifically, commercial ESG ratings are sourced from Refinitiv and MSCI. Data on firm institutional ownership ratios are obtained from Thomson Reuters. Finally, our firm-level controls and dependent variables for financial performance and stock returns are constructed with data from Compustat and Center for Research in Security Prices (CRSP).

3.2. Sample selection

Our initial dataset from Incentive Lab consists of 505,066 firm-grant observations, corresponding to 1,692 unique firms. Each firm-grant observation denotes a specific compensation metric tied to an individual executive's pay for a specified period within a particular firm within a year. For instance, an executive's compensation could be linked to the company's EPS performance for Q1 of 2010. If this performance metric (in this case EPS) is updated quarterly, it would lead to four distinct firm-grant observations in our data. This is because there would be four separate entries for this same metric for the same executive within a year. Naturally, a firm has multiple executives and most often executives' compensation is tied to multiple performance metrics within a given period, contributing to the high number of total firm-grant observations in our sample.

To refine our sample for studying ESG-linked compensation, we first exclude firm-grant observations where the time period within a year is more than one. This is because we discover from our data that for every observation with a grant time period exceeding one (within a year), there is a corresponding observation with a time period of one, with grant receiver, firm, and metric being the same. As our objective is to examine the proportion of ESG-linked metrics in executives' compensation in comparison to all utilized compensation metrics, we aim to uniformly weigh all metric types tied to an executive's *annual* compensation, regardless of whether the performance target undergoes periodic updates within the year. By omitting firm-grant observations where the time period is more than one, our sample comprises 406,984 firm-grant observations.

To construct each firm-year observation through analyzing the intra-firm development of ESG criteria used in compensation schemes, we first filter the data based on the primary categories of the metrics. This step rules out metrics explicitly related to financial performance. For the remaining 16,509 unique metrics with descriptions either indicating ESG linkage (e.g., *Environmental Protection*) or ambiguous relation (e.g., *Other*), we manually assign a binary value of 1 if we consider the metric being related to ESG and 0 otherwise. Metrics assigned a value of 1 are further classified into categories: Environmental, Social, or Governance, and eventually allocated to their subcategories. Our subcategorization primarily follows the criteria established by Cohen et al. (2023) with Environmental including *Carbon emissions* and *Other environmental*, Social including *Safety & health*, *Diversity & inclusion*, *Employee engagement & development* and *Community contribution*, Governance including *Corporate culture*,

Compliance & ethics and *Governance*, and Other including *Other ESG.* We provide examples of the grant metrics for each ESG compensation subcategory in Appendix 2.

Next, we calculate the total number of compensation metrics and the number of ESG-linked metrics for each executive within a firm to quantify the extent of ESG linkage in executive compensation. The ratio of ESG-linked metrics to the total metrics is then used as a proxy for the proportion of executive compensation associated with ESG targets. This approach is adopted because the Incentive Lab dataset predominantly lacks specific monetary values or percentage shares assigned for each metric. We end up with 14,594 firm-year observations across 1,692 unique firms. We graphically present the trend of ESG metric adoption in executive compensation over the study period in Figure 1 and 2.

The initial firm-year observations in our ESG compensation dataset are reduced to 13,331, as our analysis requires consecutive annual ESG compensation data for each firm. Further refinement is done by removing observations with incomplete control variable data. Consequently, the number of observations in our regression models ranges from 1,454 to 12,526, depending on the availability of data for the dependent variables.

Table 1 shows the ESG compensation sample by year. Panel A of Table 1 outlines the number of unique firms per year, and the firms that have included ESG metrics in compensation to any extent. This reflects the samples that are used previously in the research of ESG compensation. Although the number of firms with ESG compensation fluctuates across the years, the most recent years in the sample exhibit a more consistent upward trend in the adoption of ESG compensation. This observation aligns with findings in recent literature, which also document an increasing trend (Cohen et al., 2023; Bebchuk and Tallarita, 2022). The most significant increase occurs in the last year of our sample, when the share of firms with ESG compensation surges from 23% to 33%. According to Panel A, *Safety & health* emerges as the most prevalent ESG grant type among firms employing ESG metrics throughout the sample period. Notably, the most substantial increase in the relative share of firms adopting the respective ESG grant type is for *Other ESG*. This suggests that, in addition to the increasing number of firms incorporating ESG grants, many of the new grants encompass holistic ESG objectives. Conversely, the largest decrease in the relative share is observed for *Compliance & ethics*.

Panel B of Table 1 shows the sample out of which we derive the year-on-year changes used in our analysis, the total number of firm-grant observations per year (with time period of one within a year), and the distribution of the ESG-linked firm-year grants per ESG metric type.

The firm-grant data follows a similar pattern as in Panel A, with the share of total ESG-linked grants from all grants increasing most substantially in 2021 to 11% from 8% in 2020. Over the sample period, metrics related to *Safety & health* have been most widely used among firms. At the same time, the share of metrics related to *Diversity & inclusion* experiences the most significant increase in its relative share, aligning with the trend within the metric type in Panel A. Interestingly, the relative share of *Other ESG* grant remains unchanged in Panel B, contrasting with the substantial increase observed in Panel A.

Figure 1. Firms with ESG compensation metrics

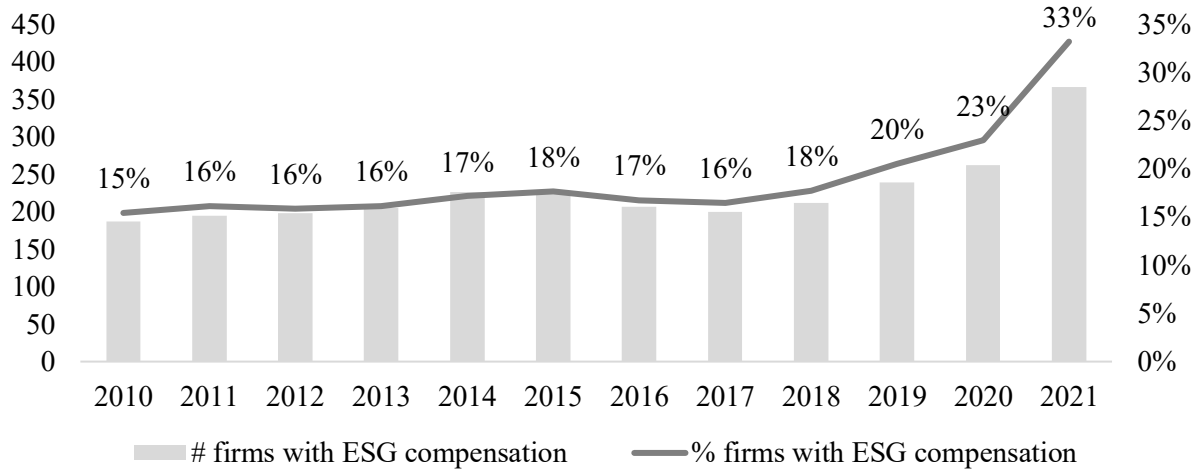
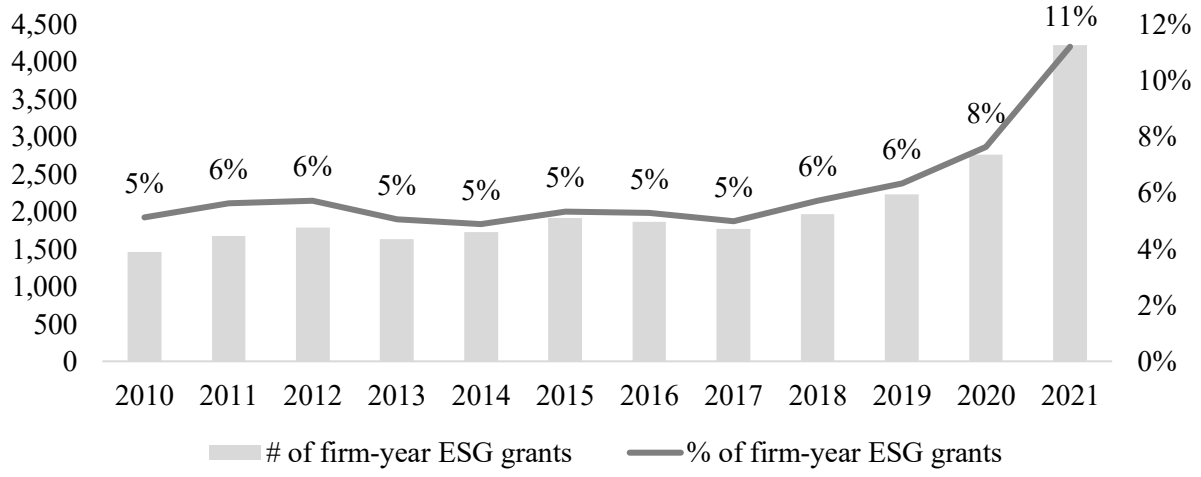


Figure 2. ESG-linked firm-year grants



Figures 1 and 2 present the evolution of the adoption of ESG metrics in executive compensation contracts over our sample period. The data include all firms covered by ISS Incentive Lab from 2010 to 2021 (1,692 firms). In Figure 1, the columns (LHS y-axis) represent the number of firms that include ESG performance metrics (to any extent) in their executive compensation contracts in a given sample year, and the line (RHS y-axis) represents the respective relative share of firms with ESG performance metrics. Figure 2 illustrates the data we employ in our regression analyses. In Figure 2, the columns (LHS y-axis) represent the number of ESG-linked grants (i.e., compensation metrics) unique for each executive in a given sample year. The line (RHS y-axis) of Figure 2 represents the share of compensation grants unique for each executive that are linked to ESG in a given sample year.

Table 1. ESG compensation sample composition by year

Panel A. Sample distribution by firm and year

Year	# Firms	# Firms with ESG Comp	# Firms by ESG grant type									
			Carbon emissions	Other environmental	Safety & health	Diversity & inclusion	Employee engagement & development	Community contribution	Corporate culture	Compliance & ethics	Governance	Other ESG
2010	1,212	187	6 (3%)	24 (13%)	99 (53%)	15 (8%)	79 (42%)	6 (3%)	14 (7%)	34 (18%)	9 (5%)	4 (2%)
2011	1,208	195	7 (4%)	25 (13%)	102 (52%)	18 (9%)	85 (44%)	5 (3%)	9 (5%)	28 (14%)	10 (5)	5 (3%)
2012	1,250	198	2 (1%)	29 (15%)	105 (53%)	16 (8%)	73 (37%)	5 (3%)	10 (5%)	31 (16%)	11 (6%)	5 (3%)
2013	1,269	205	3 (1%)	33 (16%)	115 (56%)	17 (8%)	70 (34%)	6 (3%)	11 (5%)	30 (15%)	10 (5%)	3 (1%)
2014	1,316	226	4 (2%)	33 (15%)	129 (57%)	13 (6%)	79 (35%)	4 (2%)	13 (6%)	31 (14%)	9 (4%)	5 (2%)
2015	1,284	227	4 (2%)	36 (16%)	142 (63%)	15 (7%)	74 (33%)	5 (2%)	10 (4%)	25 (11%)	5 (2%)	6 (3%)
2016	1,235	207	6 (3%)	32 (15%)	130 (63%)	15 (7%)	63 (30%)	4 (2%)	14 (7%)	26 (13%)	7 (3%)	5 (2%)
2017	1,214	200	7 (4%)	35 (18%)	121 (61%)	13 (7%)	57 (29%)	4 (2%)	14 (7%)	22 (11%)	3 (2%)	4 (2%)
2018	1,197	212	3 (1%)	39 (18%)	123 (58%)	17 (8%)	61 (29%)	2 (1%)	16 (8%)	25 (12%)	3 (1%)	13 (6%)
2019	1,166	239	6 (3%)	50 (21%)	127 (53%)	24 (10%)	73 (31%)	7 (3%)	21 (9%)	27 (11%)	7 (3%)	18 (8%)
2020	1,141	262	17 (6%)	55 (21%)	143 (55%)	49 (19%)	70 (27%)	7 (3%)	18 (7%)	28 (11%)	10 (4%)	34 (13%)
2021	1,102	366	35 (10%)	73 (20%)	154 (42%)	131 (36%)	98 (27%)	8 (2%)	18 (5%)	29 (8%)	10 (3%)	100 (27%)

(Continued)

Table 1 presents descriptive statistics for the sample used in our regression analyses. Panel A reports summary statistics by firm and year. The sample period is 2010 to 2021. Number of grants refers to the sum of unique compensation metrics allocated to each executive of a given firm in a given year. Each ESG grant type comprises both the absolute amount and the relative share (in parentheses) of firms adopting the respective ESG grant type for the corresponding year. Note that the sum of the relative share for the ESG grant types within the same year can exceed 100%, as firms often incorporate multiple ESG grant types.

Table 1. ESG compensation sample composition by year *(continued)*

Panel B. Sample distribution by firm-grant and year

			# Firms-grants by ESG grant type									
Year	# Firm-year grants	# Firm-year ESG grants	Carbon emissions	Other environmental	Safety & health	Diversity & inclusion	Employee engagement & development	Community contribution	Corporate culture	Compliance & ethics	Governance	Other ESG
2010	28,526	1,459	66 (5%)	111 (8%)	599 (41%)	98 (7%)	328 (22%)	42 (3%)	47 (3%)	134 (9%)	26 (2%)	8 (1%)
2011	29,780	1,675	42 (3%)	127 (8%)	739 (44%)	112 (7%)	405 (24%)	23 (1%)	35 (2%)	142 (8%)	35 (2%)	15 (1%)
2012	31,289	1,785	10 (1%)	159 (9%)	872 (49%)	100 (6%)	344 (19%)	26 (1%)	53 (3%)	173 (10%)	26 (1%)	22 (1%)
2013	32,192	1,626	15 (1%)	139 (9%)	797 (49%)	97 (6%)	319 (20%)	23 (1%)	51 (3%)	136 (8%)	33 (2%)	16 (1%)
2014	35,270	1,722	17 (1%)	155 (9%)	884 (51%)	73 (4%)	357 (21%)	18 (1%)	65 (4%)	114 (7%)	18 (1%)	21 (1%)
2015	35,884	1,913	22 (1%)	196 (10%)	1023 (53%)	78 (4%)	375 (20%)	24 (1%)	62 (3%)	102 (5%)	7 (0%)	24 (1%)
2016	35,322	1,864	35 (2%)	162 (9%)	984 (53%)	109 (6%)	325 (17%)	24 (1%)	81 (4%)	115 (6%)	9 (0%)	20 (1%)
2017	35,391	1,766	43 (2%)	168 (10%)	932 (53%)	92 (5%)	321 (18%)	17 (1%)	65 (4%)	104 (6%)	7 (0%)	17 (1%)
2018	34,275	1,962	28 (1%)	220 (11%)	947 (48%)	132 (7%)	335 (17%)	10 (1%)	94 (5%)	135 (7%)	7 (0%)	54 (1%)
2019	35,158	2,224	39 (2%)	287 (13%)	1,041 (47%)	143 (6%)	354 (16%)	33 (1%)	103 (5%)	128 (6%)	21 (1%)	75 (1%)
2020	36,176	2,757	107 (4%)	338 (12%)	1,234 (45%)	275 (10%)	351 (13%)	35 (1%)	91 (3%)	141 (5%)	40 (1%)	145 (1%)
2021	37,721	4,222	235 (6%)	499 (12%)	1,326 (31%)	859 (20%)	514 (12%)	54 (1%)	87 (2%)	143 (3%)	31 (1%)	474 (1%)

Panel B of Table 1 reports summary statistics by firm-grant observations and year. The sample period is 2010 to 2021. Number of grants refers to the sum of unique compensation metrics allocated to each executive of a given firm in a given year. Each ESG grant type comprises both the absolute amount and the relative share of total ESG grants (in parentheses) of the respective ESG grant type at the firm-grant level for the corresponding year.

Finally, Figure 3 illustrates the distribution of unique firms and firm-year observations in our analysis, categorized by industry according to the Global Industry Classification Standard (GICS). Notably, the most prevalent industries in our sample are Real Estate, Communication Services, Consumer Discretionary, and Consumer Staples, accounting for 57% of the firm-year observations. Despite this concentration, our sample is relatively balanced across industries, with representation from all 11 GICS sectors. This diverse industry coverage ensures an accurate portrayal of the adoption of ESG-linked metrics in executive compensation contracts among publicly traded firms in North America.

Figure 3. Sample distribution by industry

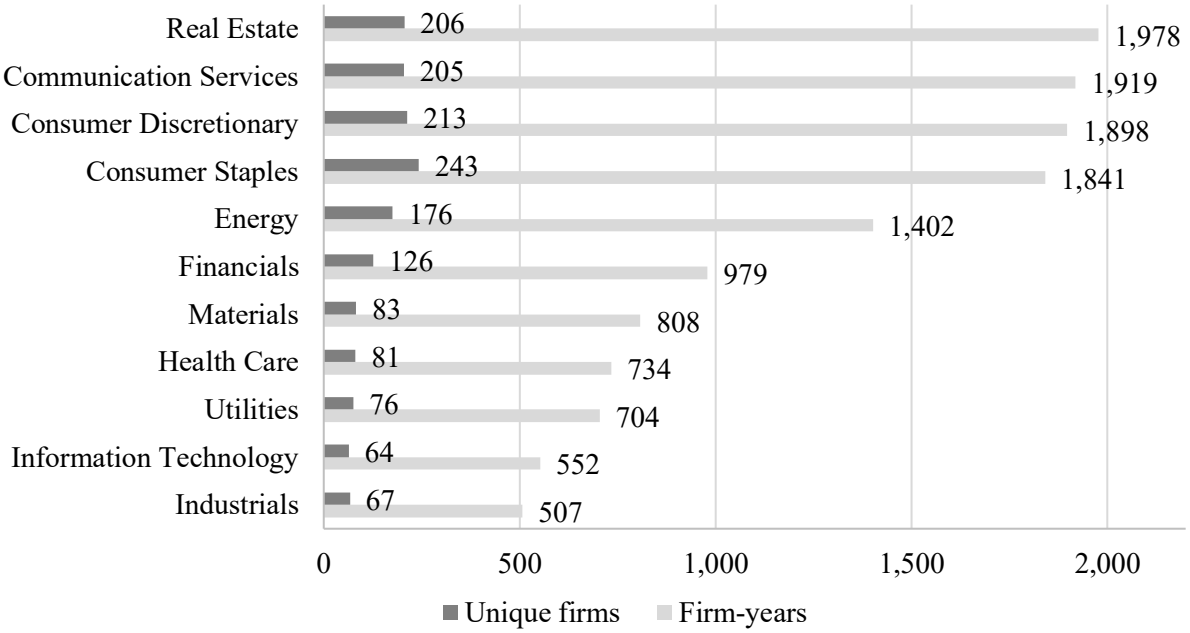


Figure 3 presents the frequency of the ESG compensation sample by industry. The sample period is 2010 to 2021, and the figure comprises of the unique firms and firm-year observations used in our regression analyses. The data is from ISS Incentive Lab and the industry classification follows the sectors of the Global Industry Classification (CIGS) system.

3.3. Dependent and ESG compensation variables

In our regression analyses we employ a group of dependent variables related to ESG ratings as well as firm accounting and stock performance. All of the variables are covered in more detail in their respective sections in Section 4 with their definitions also available in Appendix 1. Δ *MSCI* and Δ *Refinitiv* are the absolute change in the firm's MSCI or Refinitiv ESG score with respect to the previous year. *Relative sales growth* is the absolute change in firm annual sales growth percentage with respect to the previous year. *Gross profit margin* is the absolute change in the firm gross profit margin with respect to the previous year. *Returns Q1, Returns*

institutional Q1, and Returns non-institutional Q1 are the change in stock price from fiscal year end to the end of the first fiscal quarter for all firms, firms with an institutional ownership of over 70%, and firms with an institutional ownership of 70% or less, respectively. Similarly, *Returns*, *Returns institutional*, and *Returns non-institutional* exhibit the year-to-year change in stock price. It should be noted that *Returns* is also used as a control variable in our tests. Additionally, in addition to our main analyses we conduct complementary analyses in Section 5, in which we describe the dependent variables used in those tests.

Our independent variables of interest are related to the change in the relative share ESG compensation and its multivariate constituents. *ESG Comp* is the year-to-year absolute change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. *Carbon emissions, Other environmental, Safety & health, Diversity & inclusion, Employee engagement & development, Community contribution, Corporate culture, Compliance & ethics, Governance,* and *Other ESG* are derived from *ESG Comp* with the categorization outlined in Table 1. These subcategory variables measure the change in the share of the corresponding ESG metric type compared to all compensation metrics.

3.4. Control variables

Following prior literature on the outcomes of ESG compensation (e.g., Cohen et al., 2023; Flammer et al., 2019; Maas, 2018), we introduce firm-level controls to alleviate the possibility that our regression results are driven by omitted variables that reflect the firm fundamentals and financial attributes linked to the costs and benefits of engaging in ESG-oriented management practices (Cohen et al., 2023). As larger firms are faced with more scrutiny regarding their ESG practices, we include *Size* as the logarithm of total assets. As financial returns and growth potential are expected to impact firms' decisions on decreasing or increasing the weight of management's focus on ESG, we include *ROA* as net income divided by total assets and *Returns* as the stock price return over the year. We include *Leverage* as total debt (short-term and long-term) over the firm's total assets, as firm financial policies and indebtedness can affect the availability of funding for ESG initiatives. As tangible assets can be more easily collateralized, we include *Tangibility* as the ratio of property, plant, and equipment (PPE) over total assets. Finally, we include *Dividends* as total dividends divided by net income. Additionally, we include firm and year dummies to address potential unobserved heterogeneity in our data (Gormley and Matsa, 2014).

Table 2 presents the descriptive statistics for all the variables used in the main regression analyses. Within our sample, the distribution of the dependent variables exhibits a slight degree of right-skewness, evidenced by the median being relatively smaller than the corresponding mean.

In Tables 3 and 4 we present the results from correlation studies involving the variables used in our main analyses. In Table 3, the correlation analysis includes the regression variables where there is only one independent variable of interest, *ESG Comp*, that reflects the relative change in the total amount of ESG-linked compensation metrics out of all compensation metrics. Most correlation values for the variables in Table 3 are very low, falling between -0.1 and 0.1. Notably, the near-zero correlations between the two ESG ratings, Δ *MSCI* and Δ *Refinitiv,* are highly insightful findings for the interpretation of our analyses for ESG performance. This implies that using the different variables constructed from different ESG ratings likely yields differing results. As observed in prior literature (Berg et al., 2022), these discrepancies seem to arise from different computational methods and definitions, i.e., different attributes within subcategories, views on the relative importance of attributes and ways of computing the final ratings. Furthermore, Berg et al. (2022) demonstrate that these discrepancies manifest not only in divergent ratings across agencies, such as, MSCI, Refinitiv, KLD, Sustainalytics, and Moody's, but also in the pairwise Pearson correlations between these agencies, ranging from 0.38 to 0.71.

As expected, the correlations are relatively higher for dependent variables related specifically to stock returns, i.e., *Returns inst., Returns inst. Q1, Returns non-inst., Returns non-inst. Q1,* and *Returns*. Furthermore, the low correlations between control variables *Size*, *ROA*, *Leverage*, *Tangibility*, *Dividends*, and *Returns* suggest a low likelihood of multicollinearity in our regression models.

In Table 4, the correlation study reports the independent variables used in our main regression analyses. In line with the findings in Table 3, most of the correlation results in Table 4 range between -0.1 and 0.1. Logically, a stronger correlation exists between *ESG Comp* and its subcategory variables, while the correlations between the subcategory variables themselves remain much lower, again lowering the concern of multicollinearity.

Table 2. Summary statistics of variables in main analyses

	N	*St.Dev*	*Min*	*P25*	*Median*	*Mean*	*P75*	*Max*
Dependent variables:								
Δ *MSCI*	8,136	0.665	-3.900	0	0	0.081	0.200	4.900
Δ *Refinitiv*	10,799	6.633	-69.960	-1.608	1.560	2.356	5.546	76.815
Δ *Sales growth*	13,739	5.822	-277.116	-0.100	-0.007	-0.029	0.076	283.606
Δ *Gross profit margin*	13,828	12.133	-741.822	-0.014	0.001	0.036	0.016	745.823
Returns Q1	14,681	0.330	-0.943	-0.063	0.041	0.041	0.14	18.459
Returns institutional	6,390	1.174	-0.984	-0.121	0.089	0.142	0.301	83.635
Returns institutional Q1	7,269	0.215	-0.926	-0.072	0.036	0.025	0.133	3.758
Returns non-institutional	1,843	3.085	-0.993	-0.138	0.063	0.293	0.277	116.750
Returns non-institutional Q1	2,062	0.560	-0.856	-0.074	0.030	0.056	0.131	16.837
ESG compensation variables:								
ESG Comp	13,331	0.071	-0.750	0	0	-0.002	0	1
Carbon emissions	13,331	0.011	-0.400	0	0	0	0	0.400
Other environmental	13,331	0.020	-0.500	0	0	0	0	0.500
Safety & health	13,331	0.038	-0.424	0	0	-0.001	0	0.556
Diversity & inclusion	13,331	0.023	-0.500	0	0	0	0	0.500
Employee engagement & development	13,331	0.027	-0.333	0	0	0	0	0.333
Community contribution	13,331	0.006	-0.263	0	0	0	0	0.175
Corporate culture	13,331	0.012	-0.333	0	0	0	0	0.238
Compliance & ethics	13,331	0.013	-0.300	0	0	0	0	0.300
Governance	13,331	0.006	-0.250	0	0	0	0	0.167
Other ESG	13,331	0.021	-0.500	0	0	0	0	0.500
Control variables:								
Size	15,461	0.708	-0.322	3.425	3.845	3.873	4.309	6.634
ROA	15,461	0.152	-5.645	0.006	0.037	0.032	0.080	4
Leverage	15,461	0.257	0	0.060	0.249	0.277	0.416	3.892
Tangibility	15,461	0.252	0	0.042	0.129	0.233	0.352	0.999
Dividends	15,011	6.531	-189.667	0	0.151	0.399	0.458	583.750
Returns	13,227	1.654	-1	-0.113	0.093	0.182	0.308	116.750

Table 2 presents summary statistics for the variables used in our main regression analyses. The sample period is 2010 to 2021 and includes 1,843 to 15,461 firm-year observations depending on the variable. The variables are defined in Appendix 1.

Table 3. Correlation table of variables in single independent variable of interest analyses

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)
(1) Δ *MSCI*	1															
(2) Δ *Refinitiv*	-0.02	1														
(3) *Sales growth*	0.02	-0.01	1													
(4) *Gross profit margin*	-0.02	0	0.12	1												
(5) *Returns Q1*	0	-0.01	0	-0.01	1											
(6) *Returns inst.*	-0.01	-0.02	0	0	0.18	1										
(7) *Returns inst. Q1*	-0.02	-0.02	-0.03	-0.02	1	0.18	1									
(8) *Returns non-inst.*	0.06	-0.02	0.01	0.01	0.45	NA	NA	1								
(9) *Returns non-inst. Q1*	-0.03	0.01	-0.01	0	1	NA	NA	0.45	1							
(10) *ESG Comp*	0.02	0	0	-0.01	0	-0.01	0	0.02	0.01	1						
(11) *Size*	-0.02	-0.04	-0.01	-0.01	-0.07	-0.06	-0.12	-0.05	-0.08	-0.02	1					
(12) *ROA*	0.02	-0.01	-0.03	-0.05	-0.05	-0.06	0.01	-0.21	-0.08	-0.02	0.1	1				
(13) *Leverage*	-0.03	0.04	-0.01	0	-0.02	0	-0.03	0.09	0	0.01	-0.03	-0.07	1			
(14) *Tangibility*	0.03	-0.03	0	0	-0.01	-0.01	-0.03	0.01	-0.05	-0.02	0.05	-0.02	0.09	1		
(15) *Dividends*	-0.03	0.03	0	0	-0.01	0	0	-0.01	-0.02	-0.01	0.02	0.01	0.01	0	1	
(16) *Returns*	0	-0.01	0.03	0.01	0.31	1	0.18	1	0.45	-0.01	-0.05	-0.12	0.04	0.01	-0.01	1

Table 3 displays the results from the correlation study of the variables used in our single independent variable of interest regression analyses. Subcategory variables of *ESG Comp*, as presented in Table 4, are excluded. The sample period is 2010 to 2021. The variables are defined in Appendix 1.

Table 4. Correlation table of the independent variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)
(1) *ESG Comp*	1																
(2) *Carbon emissions*	0.25	1															
(3) *Other environmental*	0.38	0.06	1														
(4) *Safety & health*	0.62	0.08	0.12	1													
(5) *Diversity & inclusion*	0.46	0.11	0.07	0.06	1												
(6) *Employee engagement & development*	0.46	0.01	0.03	0.01	0.11	1											
(7) *Community contribution*	0.14	0.01	0.01	0.01	0.02	0.10	1										
(8) *Corporate culture*	0.17	0	0	0	0.03	0	-0.02	1									
(9) *Compliance & ethics*	0.23	-0.03	-0.02	0.02	0.02	0.05	0.01	-0.03	1								
(10) *Governance*	0.16	0.01	0.04	0.01	0.04	0.09	0.04	0.03	0	1							
(11) *Other ESG*	0.34	0	0	0.04	0.05	0.02	-0.02	0.02	0.04	0.02	1						
(12) *Size*	-0.02	-0.01	-0.01	-0.02	-0.01	-0.01	-0.01	0	-0.01	0	0	1					
(13) *ROA*	-0.02	-0.02	-0.02	-0.02	0.01	0	0	0	0	0	0	0.1	1				
(14) *Leverage*	0.01	0.01	0.01	0.01	0	0	0	0	0	0	0	-0.03	-0.07	1			
(15) *Tangibility*	-0.02	0	0	-0.03	-0.01	0	0	0	0	0	0	0.05	-0.02	0.09	1		
(16) *Dividends*	-0.01	0.01	-0.01	-0.02	0	0.01	0	0	0	0	0	0.02	0.01	0.01	0	1	
(17) *Returns*	-0.01	0.01	0.01	0	0	-0.02	0	0.01	0	0.01	-0.01	-0.05	-0.12	0.04	0.01	-0.01	1

Table 4 reports the results from the correlation study of the independent variables used in our regression analyses. Dependent variables are excluded. The sample period is 2010 to 2021. The variables are defined in Appendix 1.

3.5. Methodology

As widely employed in studies of ESG compensation and firm outcomes (e.g., Cohen et al., 2023; Qin and Yang, 2022; Maas, 2018; Hong et al., 2015), we use a fixed-effects ordinary least squares (OLS) specification for our panel data set to examine whether the development of the relative share of ESG payment metrics in relation to total compensation metrics affect our firm-level outcomes of interest. To test our hypotheses, we use the following regression as our baseline model:

$$y_{it+1} = \alpha + \beta * ESG\ Comp_{it} + \gamma * Controls_{it} + t_t + \delta_i + \varepsilon_{it}, \quad (1)$$

where *i* indexes firms and *t* indexes years; *y* is the dependent variable of interest reflecting the firm-level outcomes; β is the coefficient of interest and *ESG Comp* is the change in the percent of compensation metrics linked to ESG compared to the previous year *t-1*; *Controls* include *Size*, *ROA*, *Returns*, *Leverage*, *Tangibility* and *Dividends* as defined in Section 3.4. and in Appendix 1; *t* and *δ* refer to year and firm fixed effects, respectively, to account for time-invariant firm characteristics and economy-wide factors that may both affect firm-level outcomes and the adoption of ESG compensation; ε is the error term.

We modify the timing of Equation (1) in some of our tests depending on the time lead we expect changes in the relative share of ESG compensation to affect the dependent variable. We use Equation (1) in scenarios where we expect changes in the firm outcomes to materialize only after the publishment of the ESG-related changes in compensation structures. For example, whereas we measure annual changes in *ESG Comp* over the end-of-year *t-1* to the end-of-year *t*, we measure the consequent annual changes in ESG ratings from *t* to *t+1*, as we expect ESG ratings to be influenced only after the publishment of annual proxies stating the changes in compensation structuring. However, when we measure changes in operative financial performance, we consider the implications originating from managerial decision-making from the start of year *t* in the beginning of which executive compensation structures have been modified within the firm. In these cases, we modify Equation (1) so that controls are measured at the end of the year *t-1* as opposed to *t*, and the measurement of the dependent *y* begins also from the end of *t-1* as with *ESG Comp*. We alter the timing in our analyses also by measuring *y* over different time periods; we use quarterly, annual, and two-, three-, and four-year changes in firm outcomes depending on the nature of the dependent.

To study each hypothesis, we construct two variations of our primary regression model with respect to the coefficient of interest, *ESG Comp*. The first variation investigates the total ESG-linked compensation metrics, while the second breaks the variable down to its ESG-subcategories. This enables us to pinpoint which specific types of ESG metrics tied to compensation are driving our results. Recognizing that a fixed-effects OLS model assumes constant variance in residuals, we incorporate heteroskedasticity-robust standard errors in our regression analyses. Furthermore, considering the dynamic characteristics of our panel data, we cluster the standard errors at the firm level to account for within-firm correlations over time.

4. Hypothesis testing and empirical results

4.1. ESG compensation and ESG performance

The link between ESG compensation and improved subsequent ESG performance has been widely studied in the existing literature (e.g., Cohen et al., 2023; Flammer et al., 2019; Maas, 2018; Hong et al., 2015). As ESG ratings are based on firm policies and outcomes related to ESG, they are perceived as credible proxies for firms' efforts to improve their ESG performance. Prior literature provides nuanced evidence supporting the positive influence of ESG-linked executive compensation metrics on ESG ratings (performance). For instance, Cohen et al. (2023) found positive and significant results for MSCI and Sustainalytics ESG ratings but not for Refinitiv with Flammer et al. (2019) reporting significant results for MSCI. However, Maas (2018) concluded that only quantitative, hard ESG-linked objectives lead to improved ESG.

Nonetheless, the existing models capture ESG compensation with a binary variable, which indicates either a firm *introducing* ESG compensation for the first time or *employing* ESG compensation in the respective year, without specifying whether ESG compensation had been previously implemented or the extent of its application (Cohen et al., 2023; Abudy et al., 2022). We argue that such a high-level variable is not sufficient for analyzing the potential relationship between ESG compensation and performance. Consequently, given the nuanced nature of firm-level ESG performance, we advocate for a more granular approach.

Our study, to our understanding, is the first to examine the firm-level outcomes of ESG compensation by assessing the change in the relative share of ESG-linked compensation metrics

compared to all compensation metrics. With this refined independent variable of interest, our aim is to re-examine the findings of previous research with a more detailed lens.

We test our first hypothesis of ESG compensation improving ESG performance with the following model:

$$\Delta\ ESG\ Rating_{it+1} = \alpha + \beta * ESG\ Comp_{it} + \gamma * Controls_{it} + t_t + \delta_i + \varepsilon_{it,} \quad (2)$$

where Δ *ESG Rating* is the absolute change in the firm's ESG score with respect to the previous year. Following Homroy et al. (2023), our dependent variable *ESG Rating* takes a one-year lead (*t+1*) in relation to other variables for primarily two reasons. First, corporate information on executive compensation is released after the fiscal year end, leading to a delay in the ESG rating updates by third-party agencies. Second, prior literature and empirical evidence indicate that ESG objectives frequently align with firms signaling their long-term commitments, further justifying the lagged measurement approach. The firm-level ESG scores are obtained from MSCI (scale 0 to 10) and Refinitiv (scale 0 to 100). *ESG Comp* is the change in the percent of compensation metrics linked to ESG compared to the previous year *t*-1. All other variables are as defined in Section 3.4. and Appendix 1.

We also repeat the tests by replacing *ESG Comp* with its subcategory variables defined in Table 1: *Carbon emissions*, *Other environmental*, *Safety & health*, *Diversity & inclusion*, *Employee engagement & development*, *Community contribution*, *Corporate culture*, *Compliance & ethics*, *Governance*, and *Other ESG*. These variables measure the change in the relative share of the respective ESG metric subcategory compared to all compensation metrics. For both regressions, all variables must be available to be included in the firm-grant observations. We control for firm and year fixed effects and use heteroskedasticity-robust standard errors clustered at firm level. The total number of observations for Δ *MSCI* (Δ *Refinitiv*) amount to 7,296 (9,502). The results for Equation (2) are presented in Table 5.

In Table 5, Column (1) reveals that the coefficient of *ESG Comp* is positive and statistically significant at the 5% level. This finding indicates a positive correlation between the inclusion of ESG-linked metrics in executive compensation and MSCI ESG ratings. Specifically, a one-percentage-point increase in the share of ESG-linked metrics in executive compensation corresponds to a 0.26-point increase in the firm's MSCI ESG rating. Despite the novelty of our independent variable of interest, we find this result highly relevant, further providing robustness for prior research findings. As for the multivariate regression presented in Column (2), only the coefficients for *Other environmental* and *Other ESG* achieve statistical significance. This

implies that the positive relationship between *ESG Comp* and MSCI ratings primarily stems from metrics centered on environmental objectives and holistic ESG goals.

Upon reviewing Δ *Refinitiv* regressions in Column (3), we do not observe statistically significant results for *ESG Comp*, as in Column (1) with Δ *MSCI*. As prior research has found significant divergences across the ESG ratings from different agencies (Berg et al., 2022), we do not find the difference in overall results all too surprising. However, the multivariate regression analysis reveals a negative association between *Carbon emissions* and Refinitiv ratings, as well as a positive association between *Compliance & ethics* and Refinitiv ratings, both significant at the 10% level.

Given these observations, we confirm *Hypothesis 1*: *increases in the relative share of ESG compensation leads to higher ESG ratings* (performance). However, it is pivotal to highlight that the source (agency) of ESG ratings seem to significantly influence the outcomes of this analysis. Furthermore, the R^2 values for the Δ *MSCI* regressions surpass similar regressions related to Δ *ESG Rating* in Cohen et al. (2023), suggesting our model effectively captures the effect of *ESG Comp* on MSCI ratings from the sample data. Conversely, the R^2 in our Δ *Refinitiv* regressions mirror those found in previous studies.

In Table 10 of Section 5.3., we investigate the relation between the ESG grant (metric) types in Table 1 and the changes in the respective pillars of Refinitiv's ESG rating to provide further robustness to our main analysis. After employing these more granular variables, the analysis outcomes are in line with Column (4) of Table 5, where *Carbon emissions*, categorized under environmental metrics have a statistically significant but negative relation with Refinitiv's environmental pillar score. Furthermore, in Section 5.4., we analyze whether established firm characteristics, such as *Size*, *ROA*, *Leverage*, *Tangibility*, *Dividends*, and *Returns*, could signal the degree of change in the ratio of ESG-linked metrics, i.e., *ESG Comp*. We also include Refinitiv's ESG pillar scores to study previous findings of corporate governance (scores) on firm-level ESG performance, expanding existing literature. The analysis findings with our refined variable, *ESG Comp*, do not notably support findings of existing literature as the economic significance of the statistically significant coefficients is minimal.

Table 5. ESG ratings

	Δ *MSCI*		Δ *Refinitiv*	
Dependent variable	(1)	(2)	(3)	(4)
ESG Comp	0.260**		0.575	
	(2.213)		(0.475)	
Carbon emissions		0.316		-15.291*
		(0.627)		(-1.691)
Other environmental		1.050***		5.403
		(2.584)		(1.324)
Safety & health		-0.006		0.048
		(-0.033)		(0.023)
Diversity & inclusion		-0.146		-0.382
		(-0.287)		(-0.119)
Employee engagement & development		0.430		-1.090
		(1.532)		(-0.383)
Community contribution		0.430		-7.805
		(0.477)		(-0.601)
Corporate culture		0.296		8.221
		(0.651)		(1.467)
Compliance & ethics		0.514		8.710*
		(0.741)		(1.948)
Governance		0.514		-3.316
		(0.668)		(-0.438)
Other ESG		0.696**		2.638
		(2.415)		(0.522)
Size	-0.083	-0.082	0.151	0.140
	(-1.418)	(-1.405)	(0.261)	(0.241)
ROA	0.116	0.120	1.159	1.122
	(1.009)	(1.043)	(1.443)	(1.388)
Leverage	-0.015	-0.013	-0.523	-0.531
	(-0.192)	(-0.168)	(-0.772)	(-0.782)
Tangibility	-0.069	-0.072	1.527	1.547
	(-0.391)	(-0.407)	(0.969)	(0.977)
Dividends	-0.001**	-0.001***	0.024**	0.024**
	(-2.522)	(-2.673)	(2.528)	(2.538)
Returns	-0.003	-0.003	-0.064	-0.064
	(-0.504)	(-0.478)	(-1.243)	(-1.238)
Constant	2.368***	2.359***	-1.836	-1.763
	(7.743)	(7.701)	(-0.654)	(-0.629)
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.373	0.374	0.152	0.153
Observations	7,296	7,296	9,502	9,502

Table 5 presents the estimates from the analysis of the relation between ESG compensation and ESG ratings. The sample period is 2010 to 2021. In Columns (1) and (2), the dependent variable Δ *MSCI* is the absolute change in the firm year-to-year MSCI ESG rating. In Columns (3) and (4), the dependent variable Δ *Refinitiv* is the absolute change in the firm year-to-year Refinitiv ESG rating. The dependent variables are measured with a one-year lead

with respect to *ESG Comp,* from *t* to *t+1*. *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. In Columns (2) and (4), *ESG Comp* is replaced with its subcategory variables corresponding to the categorization in Table 1. The rest of the variables are as defined in Appendix 1. The control variables are measured at the end of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

4.2. ESG compensation and operative financial performance

Recent investor concerns about "fluffy" and easily gamed ESG metrics being used to determine bonuses for top executives, coupled with a decline in metrics tied to profitability and business matters (Temple-West and Xiao, 2023), have prompted us to scrutinize the relation between ESG compensation and firm operative financial performance. Our *Hypothesis 2*: *increasing the relative share of ESG compensation decreases short-term operative financial performance of the firm* assumes that an increasing share of a given executive's compensation metrics being tied to ESG goals shifts their focus on ESG matters. This perspective is not only in line with our findings in Section 4.1., but also supported by the results of positive ESG outcomes following the engagement in ESG compensation as documented by recent research (Cohen et al., 2023; Flammer et al., 2019; Maas, 2018; Hong et al., 2015).

The link between ESG compensation and company financials has been examined in recent literature, by utilizing methodologies that differ from ours in measuring the coefficient of interest (Homroy et al., 2023; Cohen et al., 2023; Flammer et al., 2019; Maas, 2018). However, the employed proxies for financial performance have focused on the bottom line (returns on assets), and investors' sentiment towards firm value and growth opportunities (Tobin's Q). In contrast, our research aims to assess the impact of ESG compensation on company business performance from a more operative perspective, and therefore focus on the short-term implications on growth and profitability with the following specifications:

$$\Delta\, Sales\ growth_{it(+1)} = \alpha + \beta * ESG\ Comp_{it} + \gamma * Controls_{it-1} + t_t + \delta_i + \varepsilon_{it}, \quad (3)$$

$$\Delta\, Gross\ profit\ margin_{it(+1)} = \alpha + \beta * ESG\ Comp_{it} + \gamma * Controls_{it-1} + t_t + \delta_i + \varepsilon_{it}, \quad (4)$$

Δ *Sales growth* is the absolute change in firm sales growth percentage with respect to the previous year. Instead of merely quantifying simple sales growth, our approach involves comparing the current year's growth rate with that of the previous year. This allows us to evaluate the impact of ESG compensation on growth in greater detail by taking into account the firm's historical growth trajectory. We measure changes in profitability with Δ *Gross profit margin* as the absolute change in the firm gross profit margin with respect to the previous year.

We use gross profit margin as our proxy for profitability due to the metric's comparability across industries, and because we believe that the short-term managerial decision-making on profitability matters is mostly reflected in direct costs rather than in, e.g., financing expenses.

We hypothesize that the effects of changes in ESG compensation on growth and profitability might be observable within year *t*, the same year that executive compensation structures are modified. This would suggest an immediate realignment of priorities. However, we also acknowledge that the implications could manifest over a longer period. This delay could be attributed to the fact that information regarding changes in compensation structures could become public almost one year later, through the publication of annual reviews. Consequently, executive commitment to performance targets might be influenced not only by monetary incentives but also by concerns over public image. Moreover, according to Khan et al. (2016), the effects of changes in corporate sustainability-linked issues appear on the income statement only after two years. Therefore, we repeat the regressions with measuring *y* over two years, from end-of-year *t-1* to *t+1*. For Δ *Sales growth*, we utilize a two-year CAGR in sales to attain a comparable figure for relative growth. In Section 5.4., we also explore further implications by measuring the dependents over three- and four-year periods.

The results for Equations (3) and (4) for annual and two-year changes, and for both single and multivariate specifications for ESG compensation are presented in Table 6. After controlling for firm and year fixed effects and using heteroskedasticity-robust standard errors with firm-level clustering, there appears to be no association between changes in the relative share of ESG compensation and the following operative financial performance during the same or the consequent year. In Columns (1), (3), (5), and (7), *ESG Comp* is statistically insignificant, and the positivity or negativity of the coefficient is not consistent for the regression variations. In multivariate regressions, there is a negative statistical association for increases in the relative share of compensation tied to *Corporate culture* metrics and firm relative sales growth during the same year compensation changes have been made. However, as the relation does not consistently appear in other specifications, and is based on a relatively small number of observations for changes in *Corporate culture* metrics, we conclude that the evidence of executives' increasing pay tied to corporate culture issues leading to decreased relative sales growth is not sufficiently convincing.

Based on the results on Table 6, we reject *Hypothesis 2: increasing the relative share of ESG compensation decreases short-term operative financial performance of the firm*, and therefore,

conclude that incentivizing executives to pursue ESG objectives does not come at the cost of short-term growth and profitability.

To complete the findings of previous research with our refined variable for *ESG Comp*, we repeat the profitability analysis with ROA (return on assets), commonly used in finance literature studying profitability, as the dependent variable in Section 5.5. (Table 12). Additionally, we measure simple sales growth instead of relative sales growth. While we do not find evidence that an increasing relative share of overall ESG compensation leads to changes in ROA, our findings do reveal a pattern consistent with prior research on ESG compensation using indicator variables (Cohen et al., 2023; Homroy et al., 2023). We observe that an increase in the relative share of compensation metrics tied to carbon emissions initially has a negative impact on ROA. However, this impact turns positive over the medium term, specifically over two and three years.

Table 6. Operative financial performance

	Δ *Sales growth, t*		Δ *Sales growth, t+1*		Δ *GP margin, t*		Δ *GP margin, t+1*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG Comp	-0.708		-1.228		0.463		0.053	
	(-0.816)		(-0.803)		(0.693)		(0.083)	
Carbon emissions		-0.639		-1.236		-1.018		0.068
		(-0.732)		(-0.812)		(-1.004)		(0.054)
Other environmental		0.257		0.062		-0.894		-0.452
		(0.608)		(0.105)		(-0.656)		(-0.615)
Safety & health		-0.294		0.082		-0.902		-0.619
		(-0.965)		(0.113)		(-1.410)		(-1.027)
Diversity & inclusion		0.293		-0.157		-0.434		0.319
		(0.720)		(-0.428)		(-0.469)		(1.078)
Employee engagement & development		-0.324		-1.672		-1.962		0.788
		(-0.107)		(-0.531)		(-1.067)		(1.018)
Community contribution		0.736		1.493		-2.328		-0.394
		(0.369)		(0.653)		(-0.614)		(-0.322)
Corporate culture		-3.985*		-3.267		-2.682		2.781
		(-1.682)		(-1.373)		(-0.267)		(0.241)
Compliance & ethics		-14.204		-1.530		1.703		-0.889
		(-1.128)		(-0.971)		(0.661)		(-0.753)
Governance		-0.243		0.055		79.605		0.289
		(-0.132)		(0.033)		(0.975)		(0.114)
Other ESG		0.387		-0.177		2.493		0.096
		(0.157)		(-0.265)		(0.895)		(0.115)
Size	-0.831	-0.834	-0.918	-0.920	-0.219	-0.216	1.499	1.501
	(-1.30)	(-1.299)	(-1.296)	(-1.292)	(-0.226)	(-0.224)	(0.786)	(0.784)

ROA	-5.470**	-5.439**	-3.095*	-3.818**	-10.700**	-10.722**	-7.165**	-7.177**
	(-1.200)	(-2.000)	(-1.655)	(-1.424)	(-2.146)	(-2.151)	(-1.988)	(-1.993)
Leverage	-1.499**	-1.515**	-1.035	-1.040	-0.838	-0.884	-1.523	-1.531
	(-2.134)	(-2.140)	(-1.631)	(-1.247)	(-0.746)	(-0.794)	(-1.437)	(-1.446)
Tangibility	-0.768	-0.774	-0.229	-0.318	-0.967	-0.943	-1.037	-1.026
	(-0.781)	(-0.783)	(-0.224)	(-1.263)	(-1.319)	(-0.368)	(-0.575)	(-0.571)
Dividends	-0.0005	-0.001*	-0.003	-0.002**	-0.0001	-0.0004	-0.000	-0.000
	(-0.059)	(-1.958)	(-0.711)	(-1.966)	(-0.165)	(-0.390)	(-0.529)	(-0.037)
Returns	-0.058	-0.057	-0.056	-0.063	-0.056	-0.061	-0.016	-0.016
	(-0.502)	(-0.500)	(-0.520)	(-0.531)	(-0.352)	(-0.384)	(-0.134)	(-0.136)
Constant	4.547	4.542	4.643	4.692	2.019	2.017	-6.060	-6.073
	(1.390)	(1.387)	(1.431)	(1.448)	(0.418)	(0.419)	(-0.693)	(-0.692)
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.126	0.127	0.232	0.233	0.143	0.144	0.305	0.305
Observations	11,468	11,468	10,295	10,295	12,340	12,340	11,145	11,145

Table 6 presents the estimates from the analysis of the relation between ESG compensation and firm operative financial performance. The sample period is 2010 to 2021. In Columns (1), (2), (3), and (4), the dependent variable Δ *Sales growth* is the absolute change in the firm sales growth percentages. Columns (1) and (2) describe the change over the year *t*, without a time lead with respect to *ESG Comp*, and columns (3) and (4) the change over two years from *t-1* to *t+1* using a two-year CAGR. In Columns (5), (6), (7), and (8), the dependent variable Δ *GP margin* is the absolute change in the firm gross profit margin In Columns (5) and (6) the dependent is measured over year *t*, and in Columns (7) and (8) over two years from *t-1* to *t+1*. *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. In Columns (2), (4), (6), and (8), *ESG Comp* is replaced with change variables for each of the types of metrics included in Table 1. The rest of the variables are defined in Appendix 1. The control variables are measured at the start of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

4.3. ESG compensation and investor sentiment

Research has proven investors to value ESG, but whether investors see ESG compensation as an effective tool for addressing ESG issues and creating value remains a less explored area. Cohen et al. (2023) found that firm engagement in ESG compensation does not lead to better year-to-year stock returns. Conversely, Flammer et al. (2019) found a positive association between ESG compensation and firm value on a year-to-year basis. We are motivated to reassess these relations of ESG compensation and investor sentiment with our refined variable, and to build upon prior research by not only limiting our focus to year-to-year stock returns. Instead, we extend the analysis to cover the period from year-end-to-Q1-end of the firm's fiscal year to more accurately capture investor sentiment in response to changes in the relative share of ESG compensation, as disclosed in the published annual proxies. Additionally, in light of recent evidence of institutional shareholders favoring ESG-oriented management practices and engagement in sustainability (Focke, 2022; Chen et al., 2020), we are motivated to study whether stock returns differ between firms that are institutionally and non-institutionally held.

In total, we conduct 12 specifications consisting of single and multivariate regressions with respect to *ESG Comp* for year-to-year and year-to-Q1 returns for total sample, institutionally held firms, and non-institutionally held firms. We set a 70% threshold for classifying firms as predominantly institutionally held based on the distribution of institutional ownership in our sample – even with the 70% threshold, approximately 74% of the firm-year observations in our sample, for which institutional ownership data is available, are categorized as institutionally held firms. It should be noted that within our total sample, data on the share of institutional ownership is available for only 64% and 65% of the observations for year-on-year and year-end-to-Q1-end stock returns, respectively.

The specifications for year-to-year and year-to-Q1 are as follows, with dependent variable Δ *Returns* referring to stock price returns, all other variables are as previously specified:

$$\Delta\, Returns_{it+1} = \alpha + \beta * ESG\ Comp_{it} + \gamma * Controls_{it} + t_t + \delta_i + \varepsilon_{it}, \quad (5)$$

$$\Delta\, Returns_{it+1/4} = \alpha + \beta * ESG\ Comp_{it} + \gamma * Controls_{it} + t_t + \delta_i + \varepsilon_{it}, \quad (6)$$

We employ the two equations above to evaluate the total sample, institutionally held firms and non-institutionally held firms, as well as single and multivariate regressions for *ESG Comp*. Results of the analyses are presented in Table 7.

For overall ESG compensation, the only statistically significant and positive relation appears with year-end-to-Q1-end stock returns for the sample comprising of institutionally held firms, indicating that institutional investors react positively to published information on firms increasing ESG-linked metrics in executives' compensation. Specifically, the coefficient indicates that firms increasing ESG-linked compensation by one percentage point experience 0.07% higher year-end-to-Q1-end stock returns compared to the sample median. For instance, if a firm increases the share of ESG-linked compensation from 10% to 30%, it will experience a 1.4% higher year-end-to-Q1-end return.

Both on a year-to-year and year-to-Q1 basis, especially institutional investors experience higher stock returns to compensation schemes being increasingly tied to reductions in carbon emissions. For firms with institutional ownership of 70% or less, there seems to be a strong negative association between increases in pay tied to *Community contribution* and quarterly stock returns. However, considering the smaller sample size of non-institutionally owned firms combined with the relatively small number of nonzero firm-year observations for *Community contribution*, we do not find this association robust enough to make definitive conclusions.

Based on the results of our analysis, we partially accept our *Hypotheses 3a* and *3b*, concluding that among firms held by institutional investors, stock prices increase following the publication of information regarding an increased weighting of ESG-linked metrics within executive compensation. However, the higher yearly stock returns persist only for observations tied to emissions reduction.

To assess longer-term investor sentiment and firm value, Tobin's Q is a commonly employed metric. It reflects the market value of a firm's assets relative to the replacement cost of those assets. Recent research (Homroy et al., 2023; Flammer et al., 2019) has examined the implications of ESG compensation on firm Tobin's Q, but a consensus regarding the positive association between the two remains elusive. To expand our research, in Section 5.6. we re-examine the association between ESG compensation and firm value. In Table 14, our findings do not reveal a significant relationship between increasing overall ESG compensation and firm value. Moreover, no distinction is observed between firms owned by institutional and non-institutional investors in this regard. These results align with the findings for stock returns in Table 7, suggesting that while institutional investors exhibit a positive sentiment towards ESG compensation, it does not necessarily convert into longer-term increases in shareholder or firm value. However, consistent with the findings in Table 7, Tobin's Q is positively influenced by increases in compensation targets related to emissions reductions.

Table 7. Stock returns

	Total, Y1		*Total, Q1*		*Institutional, Y1*		*Institutional, Q1*		*Non-Inst., Y1*		*Non-Inst., Q1*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ESG Comp	-0.020		0.019		-0.158		0.070**		0.770		-0.117	
	(-0.165)		(0.673)		(-1.290)		(1.986)		(1.148)		(-0.786)	
Carbon emissions		1.581***		0.730***		2.046***		0.670***		1.471*		0.281
		(2.915)		(3.442)		(3.216)		(2.627)		(1.739)		(0.938)
Other environmental		-0.458		-0.052		-0.664		-0.089		-0.066		-0.081
		(-1.508)		(-0.491)		(-0.646)		(-0.559)		(-0.108)		(-0.351)
Safety & health		-0.100		-0.023		-0.211		0.021		1.030		-0.120
		(-0.354)		(-0.472)		(-0.391)		(0.276)		(0.730)		(-0.718)
Diversity & inclusion		0.316		0.015		0.022		0.090		-1.196		-0.101
		(0.322)		(0.199)		(0.024)		(0.944)		(-0.820)		(-0.440)
Employee eng. & dev.		-0.659*		0.009		-0.086		0.037		-0.076		0.003
		(-1.957)		(0.148)		(-0.132)		(0.420)		(-0.119)		(0.017)
Com. contribution		0.464		0.010		0.960		-0.062		0.945		-0.732***
		(0.964)		(0.039)		(0.324)		(-0.107)		(0.981)		(-2.813)
Corporate culture		0.986		-0.026		-0.134		0.044		5.511		-0.069
		(1.023)		(-0.141)		(-0.083)		(0.124)		(1.252)		(-0.227)
Compliance & ethics		-0.144		-0.066		-0.189		-0.025		-3.853		-0.458
		(-0.313)		(-0.377)		(-0.161)		(-0.108)		(-1.274)		(-0.591)
Governance		4.518		0.561**		-1.530		0.531		56.630		-0.438
		(0.964)		(2.126)		(-0.495)		(1.680)		(1.109)		(-0.292)
Other ESG		0.127		-0.046		-0.704		0.126		0.704		-0.367
		(0.692)		(-0.496)		(-0.576)		(0.938)		(1.019)		(-1.130)
Constant	3.507***	3.503***	0.801***	0.800***	3.285***	3.247**	0.408***	0.410**	4.615***	5.047***	1.559**	1.559**
	(3.431)	(3.421)	(6.720)	(6.712)	(2.608)	(2.558)	(3.880)	(3.885)	(2.587)	(2.693)	(2.266)	(2.249)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.163	0.163	0.308	0.308	0.175	0.176	0.357	0.359	0.409	0.434	0.366	0.366
Observations	11,330	11,330	12,526	12,526	5,750	5,750	6,500	6,500	1,454	1,454	1,625	1,625

Table 7 presents the estimates from the analysis of the relation between ESG compensation and stock returns. The sample period is 2010 to 2021. In Columns (1), (2), (5), (6), (9), and (10) the dependent variable is the year-to-year change in stock price with a one-year lead with respect to *ESG Comp.* In Columns (3), (4), (7), (8) and (9) the dependent variable is the change in stock price from firm fiscal year end to Q1-end, measured with one-quarter lead with respect to *ESG comp*. In Columns (5)-(8), the analysis is computed only on firm-year observations in which the share of institutional ownership in the firm is >70%, and in Columns (9)-(12) for firms in which the share of institutional ownership is <=70%. *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. In Columns (2), (4), (6), (8), (10) and (12), *ESG Comp* is replaced with its subcategory variables corresponding to the categorization in Table 1. The rest of the variables are defined in Appendix 1. The control variables are measured at the end of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tails), respectively.

5. Robustness tests and additional analysis

5.1. Lagged dependent variables

As the panel structure of our data includes multiple observations per firm, we repeat the regressions of our main analysis in Section 4 by incorporating linear autoregressive dynamics with a lagged dependent variable as an additional control for each specification. This approach aims to mitigate potential omitted variable bias, which could otherwise suggest that changes in the dependent variable are influenced by firm-specific positive or inverse momentum effects.

The results are reported in Panels A, B, and C of Table 8. We repeat the analysis for all relevant regressions of our main analysis detailed in Section 4, focusing specifically on assessing the impact of the lagged dependent variable. As relative sales growth utilized in Section 4.2. inherently considers the growth trajectory of the previous year, we only perform the lagged variable analysis for gross profit. Similarly, we only assess the quarterly stock returns of Section 4.3., as our standard control variables in the main analyses of Section 4.3. already account for the yearly stock return of the previous year. The coefficients and t-statistics of the lagged dependent variables are reported in the tables, while other control variables are omitted for brevity.

For ESG ratings, shown in Panel A, our findings indicate a surprising relationship: an increase in a firm's ESG rating in one year is followed by a decrease in its ESG rating the subsequent year. Notably the positive coefficient for total *ESG Comp* in relation to Δ *MSCI* remains statistically significant, though the level of significance decreases from 5% in the main analysis in Section 4.1. to 10%. Moreover, the positive statistical significance for *Other environmental* in the multivariate regression holds from the main analysis.

For profitability, specifically Δ *GP margin,* the inclusion of a lagged dependent variable does not change the previously observed non-significant results for *ESG Comp* and its components. As for ESG ratings, an increase in gross profit margin predicts a decrease for the margin during the consequent year. For quarterly stock returns, the lagged dependent variable seems to hold its predictive power for only institutionally held companies. Similarly, for Δ *MSCI*, the statistical significance of overall *ESG Comp* for institutionally held firms persists, though the level of significance decreases from 5% to 10%. Moreover, the strong positive relationship of *Carbon emissions* in the multivariate regressions remains.

Table 8. Results with lagged dependent variables

	Panel A. ESG ratings				Panel B. Operative financial performance			
	Δ *MSCI*		Δ *Refinitiv*		Δ *GP margin, t*		Δ *GP margin, t+1*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG Comp	0.185*		1.149		-0.292		-0.067	
	(1.683)		(0.840)		(-0.643)		(-0.100)	
Carbon emissions		0.175		-18.468*		-1.587		-0.419
		(0.335)		(-1.917)		(-1.403)		(-0.368)
Other environmental		0.732**		3.893		-2.157		-0.415
		(1.998)		(0.800)		(-0.352)		(-0.601)
Safety & health		-0.035		1.366		-0.996		-0.859
		(-0.187)		(0.567)		(-1.492)		(-1.086)
Diversity & inclusion		-0.172		-0.932		-0.158		-0.135
		(-0.395)		(-0.268)		(-0.361)		(0.465)
Employee eng. & development		0.370		0.535		-0.370		0.255
		(1.244)		(0.179)		(-0.546)		(0.691)
Com. contribution		-0.118		-8.000		-0.053		0.085
		(-0.120)		(-0.538)		(-0.546)		(0.076)
Corporate culture		0.452		8.909		6.713		3.615
		(0.830)		(1.392)		(0.651)		(0.295)
Compliance & ethics		-0.185		6.686		-0.091		-1.220
		(-0.533)		(1.297)		(-0.940)		(-0.011)
Governance		0.998		-11.120		-1.092		-0.025
		(1.063)		(-1.076)		(-0.940)		(-0.019)
Other ESG		0.499		2.930		0.274		1.247
		(1.590)		(0.546)		(0.517)		(1.476)
Constant	0.614**	0.634***	-3.940	-3.767	-2.338	-2.361	-8.643	-8.660
	(2.527)	(2.593)	(-1.032)	(-0.984)	(-0.782)	(-0.787)	(-0.932)	(-0.932)
Lagged dependent	-0.213***	-0.213***	-0.202***	-0.202***	-0.465***	-0.465***	-0.498***	-0.498***
	(-12.334)	(-12.346)	(-13.338)	(-13.313)	(-54.658)	(-54.870)	(-86.029)	(-86.017)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.355	0.356	0.197	0.197	0.225	0.225	0.295	0.295
Observations	5,997	5,997	8,417	8,417	11,354	11,354	10,185	10,185

(Continued)

Table 8 presents the estimates from the analysis of the relation between changes in ESG compensation and firm ESG ratings (Panel A) and gross profit margins (Panel B) with the inclusion of lagged dependent variable as an independent variable. The sample period is 2010 to 2021. In Columns (1) and (2), the dependent variable Δ *MSCI* is the absolute change in the firm year-to-year MSCI ESG rating. In Columns (3) and (4), the dependent variable Δ *Refinitiv* is the absolute change in the firm year-to-year Refinitiv ESG rating. In Columns (5)-(8), the dependent variable Δ *GP margin* is the absolute change in the firm gross profit margin. In columns (1)-(4) the dependent is measured with a one-year lead with respect to *ESG Comp* from *t* to *t+1*, in Columns (5) and (6) over the year *t* (*t-1* to *t*) and in Columns (7) and (8) from *t-1* to *t+1*. In Columns (1)-(4) the controls are measured at the end of the year *t*, and in Columns (5)-(8) at the start of the year *t*. *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. In Columns (2), (4), (6), and (8), *ESG Comp* is replaced with change variables for each of the types of metrics included in Table 1. The rest of the variables are defined in Appendix 1. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

Table 8. Results with lagged dependent variables *(continued)*

	Panel C. Quarterly stock returns					
	Total		*Institutional*		*Non-Institutional*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
ESG Comp	0.016		0.068*		-0.120	
	(0.548)		(1.983)		(-0.703)	
Carbon emissions		0.729***		0.677**		0.268
		(3.228)		(2.418)		(0.788)
Other environmental		-0.063		-0.090		-0.088
		(-0.568)		(-0.519)		(-0.330)
Safety & health		-0.026		0.016		-0.121
		(-0.568)		(0.195)		(-0.632)
Diversity & inclusion		0.013		0.091		-0.095
		(0.166)		(0.873)		(-0.367)
Employee eng. & dev.		0.010		0.039		-0.008
		(0.166)		(0.408)		(-0.036)
Com. contribution		0.011		-0.055		-0.736**
		(0.038)		(-0.087)		(-2.496)
Corporate culture		-0.027		0.037		-0.056
		(-0.135)		(0.097)		(-0.159)
Compliance & ethics		-0.067		-0.031		-0.461
		(-0.361)		(-0.122)		(-0.525)
Governance		0.561**		0.530		-0.517
		(1.991)		(1.560)		(-0.286)
Other ESG		-0.047		0.117		-0.382
		(-0.471)		(0.792)		(-1.017)
Constant	0.806***	0.805***	0.418***	0.419***	1.585**	1.584**
	(6.725)	(6.718)	(3.949)	(3.953)	(2.297)	(2.279)
Lagged dependent	-0.002	-0.003	-0.045***	-0.046***	-0.064	-0.064
	(-0.164)	(-0.209)	(-2.604)	(-2.625)	(-0.925)	(-0.922)
Other controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.308	0.309	0.359	0.361	0.367	0.367
Observations	12,516	12,516	6,493	6,493	1,625	1,625

Panel C of Table 8 presents the estimates from the analysis of the relation between changes in ESG compensation and firm stock returns with the inclusion of lagged dependent variable as an independent variable. The sample period is 2010 to 2021. The dependent variable is the change in stock price from firm fiscal year end to the end of the first fiscal quarter, measured with one-quarter lead with respect to *ESG Comp*. In Columns (3) and (4), the analysis is computed only on firm-year observations in which the share of institutional ownership in the firm is >70%, and in Columns (5) and (6) for firms in which the share of institutional ownership is <=70%. *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. In Columns (2), (4), and (6), *ESG Comp* is replaced with its subcategory variables corresponding to the categorization in Table 1. The rest of the variables are defined in Appendix 1. The control variables are measured at the end of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

5.2. Indicator variables for ESG compensation

Our refined variable for ESG compensation measures the change in the proportion of ESG metrics in executive compensation, rather than merely assessing whether a firm engages with ESG compensation or not. To evaluate the effectiveness of this refined variable compared to the established binary variable of ESG compensation, we replicate the analyses from Section 4 using indicator variables for *ESG Comp* and its multivariate constituents. These indicator variables are constructed following the methodology from existing studies, such as Cohen et al., 2023; Ikram et al., 2023; Flammer et al., 2019; Hong et al., 2015; Maas, 2018. Specifically, we denote the indicator variable as 1 if the firm engages in ESG compensation to any extent in a given year, and as 0 if not. The results for the three main analyses are presented in Panels A, B, and C of Table 9.

For Panel A measuring the ESG ratings, in the Δ *MSCI* regressions within Columns (1) and (2), we observe statistically insignificant effects for the holistic variable *ESG Comp D*, in contrast to our earlier findings of statistical and economic significance in Table 5 with our version of the *ESG Comp* variable. This indicates that although firms merely *having* ESG-linked metrics in their compensation schemes do not experience increases in ESG ratings for the year during which changes in compensation incentives have been published, firms indicating their heightened focus on ESG through *increasing* the share of metrics being ESG-linked do expect increases in their ESG ratings. Among the multivariate constituents, both *Carbon emissions D* and *Compliance & ethics D* exhibit statistical significance at the 5% level. These results suggest that, on average, a firm incorporating ESG compensation incentives related to carbon emissions and compliance & ethics is expected to see an increase in its MSCI ESG rating by 0.131 and 0.141, respectively.

Turning to Δ *Refinitiv* regressions in Columns (3) and (4) of Panel A, we observe statistically insignificant estimates for the holistic variable *ESG Comp D*, mirroring our primary findings in Table 5. Notably, among the multivariate constituents, *Carbon emissions* and *Compliance & ethics* continue to exhibit strong statistical significance, consistent with our main test results. However, when incorporating the indicator variables, the estimate for *Carbon emissions* loses its statistical significance, while the estimate for *Compliance & ethics* remains significant at the 10% level with a positive coefficient. This suggests that, on average, a firm incorporating ESG compensation incentives related to compliance and ethics is expected to see an increase in its

Refinitiv ESG rating by 1.198. Lastly, R^2 for the regressions are relatively high for MSCI compared to Refinitiv, consistent with Section 4.1. main tests.

For operative financial performance in Panel B, the results are similar to those in Section 4.2., i.e., there appears to be no association between companies engaging in ESG compensation and the relative sales growth or change in gross profit margin during the same and the following year. In contrast to the multivariate regressions in Section 4.1., we observe some notable changes. The previously identified negative significance at the 10% level for relative sales growth and metrics tied to *Corporate culture* during year *t* disappears. Instead, the indicator analysis reveals a negative association between increases in compensation metrics related to *Safety & health* and both the two-year relative sales growth and the change in gross profit margin within the same year *t*. This pattern is similar to our interpretations for MSCI ESG ratings. Our results suggest that while firms engaging in culture-linked compensation practices do not necessarily see a decrease in growth and profitability, those *increasing* their focus on culture-linked matters through compensation contracts may experience a decline in operative performance, and vice versa for *Safety & health*. However, given that these negative coefficients only reach a 10% significance level, we refrain from drawing definitive conclusions. In six out of eight specifications for operative financial performance, the R^2 figures are higher in the main analysis (Table 6) compared to the indicator variable analysis, suggesting that our refined variable provides a higher explanatory power on the dependent variables compared to the binary variable utilized in prior literature.

For stock returns in Panel C, the strong positive association between increases in the relative share of carbon-emissions-related compensation metrics and subsequent stock returns in Section 4.3. remain. Most interestingly, our refined variable for *ESG Comp* again demonstrates its informative, added value. While our main analysis in Table 7 shows a positive association at 5% level for the overall *ESG Comp* and the consequent end-of-year-to-end-of-Q1 stock returns for institutional investors, this relation disappears when we use indicator variables. As institutional investors seem to respond positively to firms increasing their executives' focus on ESG issues, our analysis suggests that our refined variable does effectively captures the extent of investors' appreciation towards firms that increase emphasis on the use of compensation metrics tied to ESG. Additionally, the R^2 figures are lower in each specification of the indicator analysis compared to the main analysis in Section 4.3., consistent with the results for operative financial performance.

Table 9. Results with indicator variables for ESG compensation

	Panel A. ESG ratings with indicator variables for ESG compensation			
	Δ *MSCI*		Δ *Refinitiv*	
Dependent variable	(1)	(2)	(3)	(4)
ESG Comp D	-0.011		-0.214	
	(-0.356)		(-0.725)	
Carbon emissions D		0.131**		-1.694
		(2.394)		(-1.411)
Other environmental D		0.068		-0.130
		(1.075)		(-0.219)
Safety & health D		-0.027		-0.023
		(-0.556)		(-0.049)
Diversity & inclusion		-0.059		-0.154
		(-0.937)		(-0.230)
Employee engagement & development D		-0.048		-0.184
		(-1.133)		(-0.449)
Community contribution D		0.089		-2.022
		(1.001)		(-1.140)
Corporate culture D		0.048		-0.240
		(0.614)		(-0.299)
Compliance & ethics D		0.141**		1.198*
		(2.164)		(1.672)
Governance D		-0.007		-0.364
		(-0.056)		(-0.305)
Other ESG D		0.040		-0.236
		(0.626)		(-0.318)
Constant	2.428***	2.435***	-2.569	-2.490
	(3.856)	(3.864)	(-0.794)	(-0.768)
Controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
R^2	0.371	0.372	0.152	0.153
Observations	7,524	7,524	9,771	9,771

(Continued)

Panel A of Table 9 presents estimates from the analysis of the relation between ESG compensation indicator variables and ESG ratings. The sample period is 2010 to 2021. In Columns (1) and (2), the dependent variable Δ *MSCI* is the absolute change in the firm year-to-year MSCI ESG rating. In Columns (3) and (4), the dependent variable Δ *Refinitiv* is the absolute change in the firm year-to-year Refinitiv ESG rating. The dependent variables are measured with a one-year lead with respect to other variables. *ESG Comp D* is an indicator variable that equals 1 if the firm incorporates any ESG metrics in executive compensation for the respective year, and 0 otherwise. In Columns (2) and (4), *ESG Comp D* is replaced with its subcategory indicator variables, corresponding to the categorization outlined in Table 1. The rest of the variables are defined as in Appendix 1. The control variables are measured at the end of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

Table 9. Results with indicator variables for ESG compensation *(continued)*

	Panel B. Operative financial performance with indicator variables for ESG compensation							
	Δ *Sales growth, t*		Δ *Sales growth, t+1*		Δ *GP margin, t*		Δ *GP margin, t+1*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG Comp D	0.036		0.113		-0.058		-0.095	
	(0.460)		(0.591)		(-0.439)		(-0.213)	
Carbon emissions D		-0.203		-0.223		-0.283		-0.229
		(-1.368)		(-1.041)		(-1.040)		(-0.501)
Other environmental D		-0.075		-0.032		-0.065		-0.047
		(-0.663)		(-0.372)		(-0.463)		(-0.044)
Safety & health D		0.107		-0.150*		-0.299*		-0.347
		(0.600)		(-1.735)		(-1.786)		(-1.267)
Diversity & inclusion D		-0.008		-0.087		-0.169		2.245
		(-0.109)		(-0.880)		(-0.520)		(1.418)
Employee eng. & dev. D		0.503		0.296		-0.203		0.098
		(1.014)		(1.058)		(-0.721)		(0.519)
Community contribution D		-0.223		-0.293		-0.253		-0.117
		(-0.929)		(-1.072)		(-0.555)		(-0.400)
Corporate culture D		-0.299		-0.038		0.030		0.134
		(-0.982)		(-0.353)		(0.040)		(0.045)
Compliance & ethics D		-0.134		0.764		-0.092		0.082
		(-1.657)		(0.955)		(-0.561)		(0.419)
Governance D		-0.082		-0.051		8.470		0.069
		(-0.410)		(-0.484)		(1.003)		(0.206)
Other ESG D		-0.216		-0.126		-0.077		0.169
		(-1.400)		(-1.313)		(-0.379)		(1.037)
Constant	10.789	10.678	5.613	5.426	2.115	2.223	-9.411	-9.530
	(1.361)	(1.345)	(0.841)	(0.834)	(0.483)	(0.493)	(-1.154)	(-1.162)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.082	0.082	0.230	0.231	0.142	0.144	0.270	0.271
Observations	11,754	11,754	10,120	10,120	12,668	12,668	11,462	11,462

(Continued)

Panel B of Table 9 presents the estimates from the analysis of the relation between ESG compensation and firm operative financial performance. The sample period is 2010 to 2021. In Columns (1), (2), (3), and (4), the dependent variable Δ *Sales growth* is the absolute change in the firm sales growth percentages. Columns (1) and (2) describe the change over the year *t*, and Columns (3) and (4) the change over two years from *t-1* to *t+1* using a two-year CAGR. In Columns (5), (6), (7), and (8), the dependent variable Δ *GP margin* is the absolute change in the firm gross profit margin with respect to the previous year. *ESG Comp D* is an indicator variable that equals one if the firm incorporates any ESG metrics in executive compensation in the respective year, and zero otherwise. In Columns (2), (4), (6), and (8), *ESG Comp D* is replaced with its subcategory indicator variables. In Columns (1), (2), (5), and (6), the dependent variable is measured over the year *t*, and in Columns (3), (4), (7), and (8) over two years from *t-1* to *t+1*. The rest of the variables are defined in Appendix 1. The control variables are measured at the start of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

Table 9. Results with indicator variables for ESG compensation *(continued)*

	Panel C. Stock returns with indicator variables for ESG compensation											
	Total, Y1		*Total, Q1*		*Institutional, Y1*		*Institutional, Q1*		*Non-Inst., Y1*		*Non-Inst., Q1*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ESG Comp D	-0.009		-0.001		-0.029		0.000		0.025		-0.016	
	(-0.245)		(-0.153)		(-1.011)		(0.030)		(0.361)		(-0.585)	
Carbon emissions D		0.204**		0.167***		0.300***		0.235***		0.103		-0.016
		(2.256)		(3.488)		(2.889)		(3.365)		(0.572)		(-0.298)
Other environmental		-0.013		0.008		-0.122		-0.025		0.138		0.068*
		(-0.267)		(0.527)		(-1.524)		(-1.091)		(0.886)		(1.731)
Safety & health D		0.016		0.002		0.027		0.017		0.030		-0.024
		(0.323)		(0.189)		(0.574)		(1.063)		(0.291)		(-0.670)
Diversity & inclusion		0.040		0.020		0.051		0.013		-0.917		0.036
		(0.335)		(1.363)		(1.161)		(0.555)		(1.241)		(0.804)
Employee eng. & dev.		-0.108**		-0.014		-0.017		-0.012		-0.270		0.010
		(-2.127)		(-1.552)		(-0.489)		(-0.937)		(-1.322)		(0.313)
Com. Contribution D		-0.138		0.026		0.018		0.039		0.237		-0.079
		(-0.931)		(0.658)		(0.120)		(0.599)		(0.687)		(-0.913)
Corporate culture D		0.034		-0.014		-0.057		-0.030		1.195		-0.047
		(0.156)		(-0.559)		(-0.793)		(-0.753)		(1.224)		(-1.107)
Compliance & ethics		0.034		-0.005		-0.023		-0.004		0.400		0.015
		(0.502)		(-0.323)		(-0.427)		(-0.163)		(1.116		(0.219)
Governance D		0.395		0.006		-0.034		0.037		3.696		-0.048
		(0.903)		(0.280)		(-0.216)		(1.227)		(1.349)		(-0.687)
Other ESG D		-0.030		0.029		-0.108		0.013		0.314**		0.093
		(-0.545)		(1.378)		(-1.370)		(0.373)		(2.077)		(1.284)
Constant	3.316***	3.332***	0.753***	0.746***	3.246***	3.237***	0.399***	0.398***	3.613***	3.323*	1.293**	1.318**
	(3.453)	(3.455)	(7.249)	(7.177)	(2.776)	(2.774)	(3.632)	(3.331)	(2.264)	(1.919)	(2.204)	(2.229)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.155	0.156	0.238	0.240	0.173	0.173	0.346	0.351	0.401	0.430	0.276	0.276
Observations	11,674	11,674	12,887	12,887	5,891	5,891	6,646	6,646	1,526	1,526	1,702	1,702

Panel C of Table 9 presents the estimates from the analysis of the relation between ESG compensation and stock returns. The sample period is 2010 to 2021. In Columns (1), (2), (5), (6), (9), and (10) the dependent variable is the year-to-year change in stock price with one-year lead with respect to *ESG Comp D.* In Columns (3), (4), (7), (8) and (9) the dependent variable is the change in stock price from firm fiscal year end to the end of the first fiscal quarter, measured with one-quarter lead with respect to *ESG Comp D.* In Columns (5)-(8), the analysis is computed only on firm-year observations in which the share of institutional ownership in the firm is >70%, and in Columns (9)-(12) for firms in which the share of institutional ownership is 70% or less. *ESG Comp D* is an indicator variable that equals one if the firm incorporates any ESG metrics in executive compensation in the respective year, and zero otherwise. In Columns (2), (4), (6), (8), (10), and (12), *ESG Comp D* is replaced with its subcategory indicator variables according to Table 1. The rest of the variables are defined in Appendix 1. The control variables are measured at the start of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

5.3. ESG performance: ESG pillar scores

We repeat the analysis in Section 4.1. to investigate on a more granular level the relationship between ESG compensation and ESG ratings by employing ESG rating pillar scores and constructing independent variables from the corresponding ESG compensation subcategories. Our objective is to focus on the impact of ESG metric types on their respective ESG rating pillar scores, complementing our main tests in Section 4.1. that only incorporated holistic ESG ratings.

We obtain the pillar scores for Refinitiv's ESG ratings, where Δ *Ref E,* Δ *Ref S, and* Δ *Ref G* represent the absolute changes in the firm year-to-year ESG pillar scores for environmental, social, and governance aspects, respectively. Furthermore, we construct independent variables based on the categorization of *ESG Comp* as defined in Table 1. *Environmental* variable includes ESG metrics *Carbon emissions* and *Other environmental*, *Social* includes S*afety & health, Diversity & inclusion, Employee engagement & development,* and *Community contribution*, and, lastly, *Governance* includes *Corporate culture, Compliance & ethics*, and *Governance*. Similar to the *ESG Comp* variable in Section 4, these three independent variables represent the year-to-year changes in the proportion of the respective ESG metric types incorporated into executive compensation relative to all compensation metrics. It is worth noting that we do not allocate *Other ESG* metric to any of the three independent variables, as this metric encompasses holistic ESG goals, making it challenging to determine its specific subcategory placement.

The results are displayed in Table 10. Among the three regressions, only Column (1) featuring *Environmental* independent variable exhibits statistically significant results, achieving a 5% level of statistical significance. The significant but negative coefficient suggest that there is an inverse relation between environmental compensation incentives and the change in the environmental pillar score within Refinitiv ESG ratings. This finding is also consistent with the results in Section 4.1. from our primary analyses on ESG ratings. Additionally, the R^2 for the regressions reflect similar levels as in Section 4.1. main analyses.

Table 10. ESG pillar ratings

	Δ Ref E	Δ Ref S	Δ Ref G
Dependent variable	(1)	(2)	(3)
Environmental	-3.257**		
	(-2.396)		
Social		0.332	
		(0.227)	
Governance			4.754
			(0.712)
Constant	1.643	7.746**	3.488
	(0.376)	(2.056)	(0.565)
Controls	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
R^2	0.160	0.131	0.105
Observations	9,491	9,491	9,491

Table 10 presents estimates from the analysis of the relation between the subcategories of ESG compensation and ESG pillar scores by Refinitiv. The sample period is 2010 to 2021. The dependent variables Δ *Ref E,* Δ *Ref S*, and Δ *Ref G* measure the absolute change in the firm year-to-year respective Refinitiv ESG pillar score. The dependent variables are measured with a one-year lead with respect to *ESG Comp*. *Environmental*, *Social*, and *Governance* represent the year-to-year change in the share of the combination of the respective ESG metric subcategories outlined in Table 1. *Environmental* includes *Carbon emissions* and *Other environmental*, *Social* includes *Safety & health, Diversity & inclusion, Employee engagement & development,* and *Community contribution*, and *Governance* includes *Corporate culture, Compliance & ethics,* and *Governance*. The rest of the variables are defined in Appendix 1. The control variables are measured at the end of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

5.4. ESG compensation and firm characteristics

Following Cohen et al. (2023), we closely examine the influence and extent of established firm characteristics, such as *Size*, *ROA*, *Leverage*, *Tangibility*, *Dividends*, and *Returns*, on *ESG Comp*. To expand previous research, we also include ESG pillar scores (Refinitiv), i.e., *Ref E*, *Ref S*, and *Ref G* in the analysis. Our objective is to determine whether these characteristics indicate the degree of change in the proportion of ESG-linked compensation metrics, with a particular interest on the coefficients of ESG pillar scores.

Cohen et al. (2023) observe that firms with higher carbon emissions and greater volatility tend to ingrate ESG objectives into their executive compensation structures. They also highlight that larger companies are more likely to adopt ESG-linked pay schemes, often due to ESG activism or regulatory pressures. Previous literature (Hong et al. 2015; Shrivastava and Addas, 2014) has also found that environmental and holistic ESG or CSR scores are strongly influenced by

corporate governance scores, that is, firms with robust governance (high governance scores) generally perform better in sustainability and ESG compared to companies with weak governance. We aim to explore whether this link between governance and sustainability performance manifests in the relationship between governance and *ESG Comp*, with *ESG Comp* being more prevalent among companies with high *Ref G*. Our analysis employs a regression model similar to those used in our main analyses, with the following specification:

$$ESG\ Comp_{it+1} = \alpha + \beta * Firm\ charateristics_{it} + t_t + \delta_i + \varepsilon_{it}, \quad (7)$$

The results are presented in Table 11. While we find statistically significant coefficients for *ROA, Tangibility, and Returns*, their economic magnitude suggests that these firm characteristics do not notably influence how significantly firms adjust the proportion of ESG-linked compensation metrics within executive compensation schemes. The limited effect may be partly linked to the inconclusive findings from the Δ Refinitiv analysis detailed in Section 4.1., which did not yield definitive results. Additionally, the results from our analysis with the refined *ESG Comp* variable do not corroborate the findings of Cohen et al. (2023). Consequently, we conclude that firm characteristics, including ESG pillar scores (Refinitiv), do not serve as reliable indicators for estimating changes in ESG-linked compensation metrics.

Table 11. ESG Comp and firm characteristics

	ESG Comp
Dependent variable	(1)
Size	-0.003
	(-1.618)
ROA	-0.022***
	(-0.792)
Leverage	0.003
	(0.657)
Tangibility	-0.011***
	(-2.593)
Dividends	0
	(-1.398)
Returns	-0.001**
	(-2.082)
Ref E	0
	(0.206)

Ref S	0
	(0.547)
Ref G	0
	(-0.403)
Constant	-0.021
	(0.909)
Firm FE	Yes
Year FE	Yes
R^2	0.184
Observations	10,859

Table 11 presents estimates from the analysis of the relation between ESG compensation and firm characteristics including Refinitiv ESG pillar scores. The sample period is 2010 to 2021. The dependent variable *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. Firm characteristic variables, i.e., the control variables in other regression analyses are measured at the end of the year. *Ref E, Ref S*, and *Ref G* measure the absolute values for each corresponding Refinitiv ESG pillar score from 0 to 100. *ESG Comp* is measured in *t+1* while other variables are measured in *t.* Rest of the variables are defined in Appendix 1. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

5.5. Operative financial performance: alternative measures and time leads

As outlined in Section 4.2., we conduct an additional analysis for our financial performance study by employing year-to-year simple growth rates rather than absolute changes in year-to-year growth rates. For profitability, we conduct an additional analysis by utilizing the widely used ROA as our proxy for bottom line profitability and asset efficiency. We construct both dependent variables in the same manner as in the main analysis, i.e., measuring the change in the dependent variable during the same year as the relative change in the proportion of ESG compensation, as well as over a two-year period. This two-year measurement would account for the possibility that the effects of changes in ESG compensation may only manifest in the income statement after two years, as suggested by Khan et al. (2016).

Our results are presented in Table 12. Consistent with our observations in Section 4.2., our analysis reveals no significant overall relationship between simple sales growth and changes in ESG compensation. In the multivariate regressions focusing on simple sales growth, there is a noticeable negative association between sales growth and increases in compensation metrics related to *Carbon emissions* and *Safety & health* within the same year. However, this specification does not account for the firm's growth trajectory. Therefore, we prioritize the use of the relative sales growth variable in our main analysis to capture this aspect more accurately.

In line with the recent findings of Cohen et al. (2023) and Homroy et al. (2023), there appears to be no association between changes in the relative share of overall ESG compensation and ROA. However, in the multivariate regressions, we observe a strong negative relationship with a 0.1% significance level between increases in the relative share of *Carbon emissions* and the change in ROA during the year of compensation structure alteration. Interestingly, this relationship turns positive, with a similar magnitude of coefficient, when measured over a two-year span, maintaining the same level of significance. Cohen et al. (2023), using indicator variables, also discovered a negative association between the use of emission-related metrics and change in ROA during the same year of ESG compensation engagement. However, the relation is significant at 10% level, and they do not discuss or explore further implications. Our more significant t-statistics for the relative change variable in ESG compensation, coupled with the consideration of time lead, provide new, informative insights. We explore the implications of these findings in greater detail in Section 6.

To enforce the robustness of the main results for operative financial performance, we repeat the regressions with two additional time leads for the dependent variables. Specifically, we measure the dependent over three years, denoted by *t+2* (from *t-1*), and over four years, denoted by *t+3*. As we found statistically significant results for ROA related to metrics tied to emissions reduction, we include ROA in the analysis for other time leads to enforce the robustness of the findings.

The results for the extended years regarding operative financial performance are presented in Table 13. The results for changes in relative sales growth and gross profit margin remain unchanged, meaning there seems to be no relation between increases in the relative share of ESG-linked compensation metrics and the consequent development in top-line growth and profitability. However, our findings enforce the perception of positive association between increases in targets related to emissions reduction and ROA. The positive coefficient remains statistically significant for *t+2*. This, combined with the findings in Table 12, suggests that although increasing executive incentives to reduce emissions may initially impact ROA negatively, there is a positive effect on bottom-line profitability and asset efficiency in the medium term. Specifically, this positive impact is observed two and three years after increasing emissions-related compensation incentives.

Table 12. Simple sales growth and ROA

	Sales growth, t		*Sales growth, t+1*		*Δ ROA, t*		*Δ ROA, t+1*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ESG Comp	-0.079		-0.050		-0.021		-0.001	
	(-0.518)		(-0.769)		(-1.293)		(-0.470)	
Carbon emissions		-0.851*		0.471		-0.255***		0.280***
		(-1.753)		(1.025)		(-4.108)		(3.497)
Other environmental		-0.463		0.009		-0.004		-0.029
		(-1.335)		(0.053)		(-0.040)		(-0.218)
Safety & health		-0.508**		-0.026		-0.067*		-0.025
		(-1.986)		(-0.359)		(1.774)		(-0.458)
Diversity & inclusion		-0.192		-0.223		0.041*		-0.045
		(-0.903)		(-1.375)		(1.665)		(-1.542)
Employee eng. & dev.		0.284		-0.124		0.003		0.022
		(0.553)		(-1.316)		(0.143)		(0.855)
Com. contribution		-0.827		0.120		-0.028		0.062
		(-1.063)		(0.397)		(-0.542)		(0.874)
Corporate culture		-3.258		-0.392		0.040		0.191
		(-1.085)		(-0.468)		(0.852)		(1.566)
Compliance & ethics		-0.538		0.062		0.075		-0.181
		(-0.467)		(0.149)		(1.276)		(-0.893)
Governance		14.675		0.033		-0.107		-0.019
		0.959		(0.059)		(-0.966)		(-0.195)
Other ESG		0.828		0.245		0.016		-0.037
		(0.661)		(0.571)		(0.474)		(-0.566)
Constant	0.221***	0.220***	1.227***	1.227***	0.343***	0.341***	0.403**	0.402***
	(2.674)	(2.667)	(2.974)	(2.973)	(4.735)	(4.716)	(3.790)	(3.775)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.202	0.202	0.366	0.367	0.463	0.463	0.530	0.530
Observations	12,345	12,345	9,830	9,830	12,372	12,372	11,177	11,177

Table 12 presents the estimates from the analysis of the relation between ESG compensation and firm operative financial performance. The sample period is 2010 to 2021. In Columns (1) to (4), the dependent variable *Sales growth* is the percentage change in the firm year-to-year sales. In Columns (5) to (6), the dependent variable Δ *ROA* is the absolute change in net income scaled by total assets. *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. In Columns (2), (4), (6), and (8), *ESG Comp* is replaced with change variables for each of the types of metrics included in Table 1. In Columns (1), (3), (5), and (7) the dependent is measured over year *t*, without a time lead with respect to *ESG Comp*, and in Columns (2), (4), (6), and (8) over two years from *t-1* to *t+1*. The rest of the variables are defined in Appendix 1. The control variables are measured at the start of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

Table 13. Further time leads for operative financial performance

	Δ *Sales growth*				Δ *GP margin*				Δ *ROA*			
	t+2		*t+3*		*t+2*		*t+3*		*t+2*		*t+3*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
ESG Comp	-3.175		-0.102		0.773		-0.849		0.016		0.023	
	(-0.977)		(-0.393)		(0.819)		(-0.900)		(0.831)		(1.219)	
Carbon emissions		-2.127		-1.047		1.050		1.175		0.383**		0.193
		(-1.382)		(-1.215)		(0.576)		(0.256)		(2.522)		(0.912)
Other environmental		0.308		0.313		-1.559		0.213		-0.045		0.022
		(0.699)		(0.902)		(-0.890)		(0.159)		(-0.468)		(0.340)
Safety & health		-0.244		-0.163		-0.891		-2.047		0.002		0.059*
		(-0.644)		(-0.790)		(-1.350)		(-0.949)		(0.061)		(1.882)
Diversity & inclusion		0.585		0.022		-1.690		1.745		0.099		-0.041
		(0.763)		(0.073)		(-1.075)		(1.249)		(1.359)		(-0.714)
Employee eng. & dev.		-5.459		0.485		1.896		-3.644		-0.041		-0.013
		(-0.891)		(1.333)		(0.603)		(-1.114)		(-1.151)		(-0.313)
Com. contribution		3.902		-1.221		0.858		0.010		-0.009		-0.017
		(0.847)		(-1.449)		(0.349)		(0.005)		(-0.246)		(-0.506)
Corporate culture		-3.867		-2.494		11.807		10.556		-0.003		0.073
		(-1.193)		(-0.887)		(0.546)		(1.042)		(-0.015)		(0.901)
Compliance & ethics		-28.946		-0.173		1.091		1.047		0.214		-0.119*
		(-0.958)		(-0.115)		(0.516)		(0.405)		(1.077)		(-1.754)
Governance		0.534		1.778		-1.373		2.829		0.165**		0.209
		(0.236)		(0.923)		(-0.544)		(0.714)		(2.189)		(1.180)
Other ESG		-0.767		-0.870		4.624		3.294		0.004		0.031
		(-0.695)		(-0.615)		(0.715)		(1.128)		(0.041)		(0.782)
Constant	5.709	6.006	7.405	7.398	-19.925	-20.059	-28.691	-28.685	0.244***	0.243***	0.261***	0.264***
	(1.479)	(1.536)	(1.279)	(1.275)	(-0.829)	(-0.834)	(-1.194)	(-1.018)	(2.811)	(2.799)	(2.962)	(3.002)
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.277	0.283	0.468	0.468	0.066	0.066	0.025	0.025	0.490	0.491	0.544	0.544
Observations	9,001	9,001	7,756	7,756	9,825	9,825	8,565	8,565	9,854	9,854	8,588	8,588

Table 13 presents the estimates from the analysis of the relation between ESG compensation and firm operative financial performance. The sample period is 2010 to 2021. In Columns (1)-(4) the dependent variable Δ *Sales growth* is the absolute change in the firm sales growth percentages, in Columns (5)-(8) Δ *GP margin* is the absolute change in the firm gross profit margin, and in Columns (9)-(12) Δ *ROA* is the absolute change in net income scaled by total assets. In Columns (1), (3), (5), (7), (9) and (11) the dependent is measured over three years from *t-1* to *t+2*, and in Columns (2), (4), (6), (8), (10) and (12) over four years from *t-1* to *t+3*. *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. In Columns (2), (4), (6), (8), (10) and (12), *ESG Comp* is replaced with change variables for each of the types of metrics included in Table 1. The rest of the variables are defined in Appendix 1. The control variables are measured at the start of the year *t*. Standard errors are heteroskedasticity-robust and clustered at the firm level. *t-statistics* are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

5.6. Investor sentiment: Tobin's Q

Previous research has studied the relation between ESG compensation and firm value measured by Tobin's Q but has yet to reach consensus on the existence of the positive association (Homroy et al., 2023; Flammer et al., 2019). We follow Flammer et al. (2019) and construct Tobin's Q as the ratio of market value of firm total assets to the book value of total assets, obtained as described in Appendix 1, with data retrieved from Compustat.

In Table 14, we present the results of the relation between the increasing relative share of ESG compensation and changes in the longer-term market sentiment on firm valuation and investment efficiency. Upon repeating the regression analysis for the entire sample, including subgroups of institutionally and non-institutionally owned firms as detailed in Section 4.3., we find no significant correlation between relative changes in total ESG-linked compensation metrics and shifts in Tobin's Q for any of the sample groups. Nevertheless, consistent with our findings with stock returns, *Carbon emissions* in the multivariable tests exhibit a positive association. Moreover, increases in metrics linked to *Diversity & inclusion* seem to lead to an increased Tobin's Q in the subsequent year for firms owned by institutional investors.

Table 14. Tobin's Q

	Total		*Institutional*		*Non-Institutional*	
Dependent variable	(1)	(2)	(3)	(4)	(5)	(6)
ESG Comp	0.102		-0.179		0.217	
	(0.467)		(-0.487)		(0.671)	
Carbon emissions		1.587***		1.826**		1.299**
		(3.366)		(2.332)		(2.005)
Other environmental		-0.958		-2.365		0.201
		(-0.891)		(-1.179)		(0.311)
Safety & health		-0.094		-0.397		-0.430
		(-0.506)		(-1.131)		(-0.999)
Diversity & inclusion		0.080		1.256***		0.932
		(0.175)		(3.074)		(1.550)
Employee eng. & dev.		0.399		1.277		0.023
		(0.646)		(0.016)		(0.040)
Com. contribution		2.202		4.689		-0.344
		(0.702)		(0.738)		(-0.509)

Corporate culture		-0.307		-1.984		3.026
		(-0.189)		(-0.481)		(0.924)
Compliance & ethics		-1.052		-1.359		-0.512
		(-1.320)		(-1.195)		(-0.454)
Governance		1.163		-0.071		1.477
		(1.215)		(-0.040)		(0.424)
Other ESG		1.421***		0.926		0.003
		(3.279)		(1.406)		(0.003)
Constant	0.978**	0.946*	1.255	1.150	1.127	1.229
	(1.992)	(1.928)	(1.481)	(1.358)	(0.462)	(0.500)
Controls	Yes	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.160	0.161	0.224	0.228	0.427	0.429
Observations	11,329	11,329	5,750	5,750	1,454	1,454

Table 14 presents the estimates from the analysis of the relation between ESG compensation and firm value. The sample period is 2010 to 2021. The dependent variable *Tobin's Q* is the year-to-year change in the ratio of the market value of total assets to the book value of total assets, as defined in Appendix 1. The dependent variable is measured with a one-year lead with respect to *ESG Comp,* from *t* to *t+1.* In Columns (1) and (2), Tobin's Q is measured for the total sample, in Columns (3) and (4) for firms that have an institutional ownership of >70%, and in Columns (5) and (6) for firms with institutional ownership of <=70%. *ESG Comp* measures the year-to-year change in the share of ESG metrics used in firm executive compensation compared to all compensation metrics used. In Columns (2), (4), and (6), *ESG Comp* is replaced with change variables for each of the types of metrics included in Table 1. The rest of the variables are defined in Appendix 1. The control variables are measured at the end of the year *t*. Standard errors are clustered at the firm level. t-statistics are in parentheses. *, **, and *** denote significance at the 10%, 5%, and 1% levels (two-tail), respectively.

6. Discussion

6.1. Implications on ESG performance

Motivated by the contradicting and nuanced findings of prior literature, we first revisited the analysis for ESG compensation and ESG performance (ESG ratings). This study, to the best of our knowledge, is the first to refine the binary variable utilized in prior research to capture the impact of ESG compensation more effectively at a granular level. Our variable, *ESG Comp* measures the change in the relative share of ESG-linked executive compensation metrics compared to all executive compensation metrics. We find a statistically and economically significant positive relationship between the increase in the relative share of ESG compensation and a firm's ESG ratings. Consequently, we confirm that including ESG metrics and objectives

within managerial compensation is an effective measure to steer executives' focus towards ESG topics, resulting in improved performance in ESG criteria.

The significant coefficients in both the single and multivariate regressions reinforce the prior findings from the binary variable measuring ESG compensation (Cohen et al., 2023; Flammer et al., 2019; Maas, 2018; Hong et al., 2015). Notably, our study finds a positive and significant effect for MSCI ESG ratings in the single-variable regression to be prominent with the novel and more granular independent factor, *ESG Comp*. For instance, Cohen et al. (2023) also find similar findings for MSCI ESG ratings but with substantially smaller sample size of 1,351 observations compared to our 7,296. However, as Cohen et al. (2023), we also want to note that this relationship between *ESG Comp* and ESG performance can vary depending on the choice of rating agency's ESG scores.

These results reinforce the perceived benefits and the growing trend in the financial world of a more holistic approach. Companies are urged to not only focus on financial outcomes but also to integrate non-financial attributes into executives' decision-making processes. As discussed by Cohen et al. (2023), the increasing criteria stemming from the growing spectrum of stakeholders and the complexity of their interests are key drivers for firms to think outside the "financial box". Companies are increasingly prompted to take responsibility for their impact extending beyond business operations to encompass societal and ecological aspects. Considering the growing trend of sustainable themes in business (PwC Global Investor Survey, 2022; Blackrock, 2023; Cevian Capital, 2021; Figure 1 and 2) and our analysis results, it is evident that the trend of executive and firm focus on sustainability and ESG will persist. While ESG-related criteria in managerial pay are relatively new compared to traditional criteria and in need of refinement (Temple-West and Xiao, 2023), we firmly anticipate that ESG compensation will soon evolve into an established form, guided by regulation as well as public pressure for transparency and accountability in corporate practices.

6.2. Implications on operative financial performance

We find no significant effect of increasing the relative share of ESG compensation on top-line growth and profitability. Despite our initial hypothesis of a negative association, based on literature affirming the effectiveness of compensation structuring in achieving intended outcomes (Devers et al., 2017; Derrien et al., 2021; Gillan et al., 2021) and suggesting ESG compensation encourages executives to adapt a longer-time horizon (Flammer et al., 2019), our primary interest was to study this potential relationship in response to recent criticism from

institutional investors against “fluffy” ESG targets in executive compensation (Temple-West and Xiao, 2023). While we do not address the broader issues surrounding the potential intangibility of ESG compensation metrics, our findings suggest that the concerns expressed by these investors about a potential trade-off between prioritizing ESG and top-line financial targets lack significant empirical support. Our analysis reveals no evidence that an increased emphasis on ESG objectives in executive compensation leads to a decline in relative sales growth or gross profit margins.

Therefore, the increasing adoption of ESG targets in executive compensation contracts does not appear to create conflicts among the diverse stakeholders of a firm. For instance, the interests of stakeholders who primarily focus on financial returns, such as shareholders and creditors, do not seem to clash with those stakeholders who have a stronger focus on ESG-linked issues, like customers or regulators concerned with emissions reduction or diversity. Indeed, there is a possibility that customers might favor companies that integrate ESG commitments into their compensation structures, which could offset the potential impacts from shift in executive focus. Additionally, promoting diversity within the workforce and enhancing employee engagement through sustainable culture could lead to increased productivity, further contributing to business performance (Alshammari, 2015; Delmas and Peković; 2012). Moreover, improvements in a firm’s ESG practices, or signals of such commitment through compensation contracts, might positively transform its supply chain dynamics. This could involve, for instance, partnering with suppliers who are equally dedicated to sustainable practices, thereby fostering mutual growth and collaboration. This lack of a significant link between the rise in ESG-linked compensation and operational performance observed in our study raises questions: is this a zero-sum situation, or is there genuinely no relationship between ESG compensation, executive focus trade-offs, and stakeholder behavior impacting growth and profitability? This area presents an opportunity for future research.

Our primary focus was on examining changes in relative sales growth and gross profit margins to assess operative financial performance. Additionally, we expanded upon previous studies by incorporating changes in ROA alongside our refined measure of ESG compensation. Consistent with prior literature (Cohen et al., 2023; Homroy et al., 2023), our findings did not reveal significant overall results. However, we noted that metrics linked to *Carbon emissions* resulted in a significant decrease in ROA during the initial year following the compensation structuring changes, but this trend shifted to a significant increase over two- and three-year periods. This short-term outcome aligns with Cohen et al. (2023), but the long-term trajectory had not been

previously explored in research. These results might suggest that while an initial increase in executives' focus on ESG issues could temporarily diminish profitability and asset efficiency, over the following years and after changes in compensation structures become public knowledge, firms might achieve higher net income from their assets. This improvement could stem from various factors such as cost reductions from lower energy consumption, operational efficiencies, heightened innovation, or easier access to financing for environmentally friendly projects. Our findings imply that the extended time horizon adopted by executives in response to ESG-oriented compensation, as identified by Flammer et al. (2019), does yield financial benefits, but these tend to manifest over a longer period.

6.3. Implications on investor sentiment

We find that an increase in the relative share of ESG compensation leads to higher stock returns. Interestingly, this positive impact is primarily observed in the fiscal year-end-to-Q1-end returns of firms largely held by institutions. The discovery is noteworthy, as it diverges from previous research, like that of Cohen et al. (2023), which does not establish a positive link between ESG compensation and stock returns. Our results suggest that institutional shareholders tend to respond positively to announcements regarding changes in executive compensation structures that emphasize ESG objectives. This is particularly intriguing when contrasted with Krüger's (2015) findings, where investors (not specifically institutional investors) showed a slightly negative reaction to positive ESG events in the short term. Krüger (2015) attributes this to potential agency problems, leading us to infer that institutional investors might view increases in ESG-linked compensation as less prone to such agency issues compared to other forms of ESG effort indications by firms. However, our results for stock returns and Tobin's Q indicate that this initial positive reaction from investors may not translate into sustained long-term shareholder value.

Despite the absence of evidence for sustained long-term stock return increases, the short-term rise in stock prices driven by enhanced ESG focus, as indicated through compensation structuring, may offer numerous advantages for a firm. A positive market response to a firm's heightened commitment to ESG issues can attract favorable media coverage and bolster the firm's image among investors and customers. Additionally, a spike in stock prices in the short term could facilitate easier access to capital, reinforce employee morale and retention, and create opportunities for advantageous M&A or partnerships. Therefore, while the effect on

long-term stock returns might be limited, the adoption of incentive contracts that underscore a firm's dedication to ESG objectives can yield multiple positive indirect impacts.

In our comprehensive multivariate regressions, considering both year-on-year and quarterly returns, we found that increases in the proportion of compensation metrics linked to *Carbon emissions* significantly correlate with higher stock returns compared to the sample medians. While these emissions-related objectives represent just one of the ten variables comprising the overall ESG compensation, they are often more visibly associated with a firm's broader ESG initiatives in the eyes of investors, perhaps more so than targets related to aspects like corporate culture or employee satisfaction. These findings raise a compelling question related to how investors value environmental incentives compared to those focused on social or governance issues. Investors could either place a higher value on environmental commitments over social or governance counterparts, or they believe that executives' influential power is stronger in actions related to emissions reduction, as opposed to other dimensions of ESG.

6.4. Relative change variables vs. indicator variables for ESG compensation

In this paper, we introduced a novel approach for measuring the utilization of ESG compensation. While existing papers typically employ a binary variable to indicate whether a firm practices ESG compensation or not, our method quantifies the change in the relative weight of ESG-linked compensation metrics within all compensation metrics. By applying our main analyses using both the relative change variable and traditional dummy variables, we gained valuable insights between the implications of these different variables.

In our primary analysis utilizing the relative change variable, we identified a significantly positive relationship between the comprehensive *ESG Comp* variable and subsequent shifts in a firm's MSCI ESG rating. Contrastingly, when we applied the binary *ESG Comp D* indicator, this significant correlation was not observed. This implies that while an increase in the relative portion of ESG compensation is linked to higher ESG ratings, merely participating in ESG compensation practices does not guarantee similar improvements. This outcome is logical considering that the binary indicator fails to capture the development within ESG compensation practices on a year-on-year basis, unless there is a transition from non-engagement (0) to engagement (1), or previously implemented ESG compensation metrics are completely discontinued. Additionally, we noted that the overall positive correlation between *ESG Comp* and year-end-to-Q1-end returns for institutional investors disappears when using *ESG Comp D*.

Furthermore, across all three of our main analyses, the significance varied among the multiple elements comprising the *ESG Comp*.

All in all, our study demonstrates that our novel approach to measuring ESG compensation yields significant explanatory power. We find that stakeholders, including rating agencies and investors, respond differently to information about firms adjusting the degree of ESG focus on executive incentives, compared to mere participation in ESG compensation practices. The relative change in ESG compensation is particularly informative, offering insights into the evolving priorities of a company's board of directors and the shifting incentives that guide executive decision-making. Consequently, while alterations in the metrics tied to executive compensation might seem like minor details in annual proxy statements, they can, in fact, reveal substantial information about a firm's long-term strategic objectives and the potential impact on its performance. This understanding underscores the importance of closely examining these compensation changes, as they provide valuable indicators of a firm's future direction and priorities.

Supporting the view of our change variable providing significantly higher informative value over the binary variables used in prior research, we observed that the R^2 values in our main analyses are consistently higher than those in the analyses employing the indicator variable. This suggests that our approach offers a more accurate model for explaining variations in firm outcomes. Considering that databases such as ISS's Incentive Lab and Executive Compensation Analytics have been accessible for years and have been utilized in earlier studies, a question raises: why has previous literature predominantly relied on simpler indicator variables, despite the availability of these resources that enable a more granular analysis of ESG compensation practices? Our study suggests this more detailed approach could yield more insightful and impactful findings on the empirical outcomes of ESG-linked compensation metrics.

6.5. Final thoughts on ESG compensation metrics

ESG-linked objectives, whether implemented to genuinely incentivize firms to commit to long-term ESG improvement targets or utilized for more symbolic signaling purposes, have become a staple in executive compensation schemes. The rationale behind adopting ESG commitments is twofold: external pressures from customers, investors, and regulators advocating for a more sustainable future, and intrinsic business motivations. Positioning as an ESG-committed firm is not only a response to societal demands but also a strategic business decision. It helps in attracting talent, as prospective employees increasingly prioritize sustainability in their

employment choices. Moreover, customer loyalty is increasingly influenced by a firm's sustainable practices, with customers willing to change their allegiance if they are dissatisfied with how a business operates in environmental and social realms.

We find supporting evidence for that compensation metrics linked to ESG encourage executives to adopt a longer-term perspective (Flammer et al., 2019). This shift in focus is perhaps the most significant distinction between conventional financial compensation metrics, such as earnings targets, and non-financial metrics like ESG compensation. By increasing the proportion of ESG metrics in incentive schemes, a firm can meaningfully pivot towards long-term sustainability. This approach not only fosters the well-being of employees, society, and the planet but also lays the groundwork for sustainable business success in the long run.

A persistent issue with ESG-linked compensation metrics lies in their perceived intangibility and the ensuing concerns about greenwashing. To enhance the credibility of the metrics and gain trust among skeptics, it is crucial for boards of directors to develop easily measurable, quantifiable metrics. Furthermore, firms should endeavor to communicate the achievement of these ESG goals with as much transparency as is typically applied to financial targets. Concurrently, executives and employees, working alongside the board, must commit time to developing clear initiatives and programs that enable the realization of these ESG targets. While financial targets are undeniably essential for all firms, boards also face the critical task of finding an optimal balance between financial metrics and those related to ESG and other non-financial variables.

7. Conclusions

7.1. Research summary

In this thesis, we examined the implications of increasing the relative share of ESG-linked metrics in executive compensation schemes on firm performance. Specifically, we studied the impact on ESG performance, financial performance, and investor sentiment. Our setup was motivated by prior research using an indicator variable of ESG compensation and measuring partially different outcomes than the ones we focused on. Prior literature has found contradicting results on the implications of the use of ESG compensation on ESG and financial performance.

We constructed our ESG compensation sample of 13,331 firm-year observations of North American firms from the Incentive Lab database by ISS. For each analysis, we studied the total compensation metrics tied to ESG as well as the ten subcategory constituents for ESG-linked metrics. We also incorporated data on ESG ratings, financial performance, and institutional ownership from Refinitiv, MSCI, Compustat, CRSP and Thomson Reuters. We used fixed-effects OLS regressions with heteroskedasticity-robust and firm-clustered standard errors for our panel data to study our hypotheses with different time leads for the dependent variables.

We found that increases in the relative share of ESG compensation leads to increases in overall ESG ratings, measured with MSCI data. Multivariate regressions revealed that relative increases in environmental and holistic ESG targets are the main drivers behind increases in ratings. We found no association between increases in relative ESG compensation and the consequent changes in relative sales growth or gross profit margins, mitigating the recent concerns of investors related to executives' focus being shifted away from growth and profitability. However, firms seem to benefit from increasing ESG-linked compensation when considering bottom-line returns on assets in the medium term. Lastly, we found that after the publishment of annual statements that state executives' compensation is increasingly tied to ESG, firms with high institutional ownership experience higher stock returns on a short-term basis, with information on compensation being increasingly tied to emissions reduction leads to higher returns also on a year-to-year basis. We found our results robust to testing for autoregressive effects as well as to additional analyses using different proxies for the outcome variables. Additionally, we found that measuring relative change in the weight of ESG-linked compensation metrics provides informative value over merely measuring ESG compensation as an indicator variable as has been the practice in prior research.

7.2. Limitations of the study

Our results are subject to certain caveats and limitations. To begin with, our ESG compensation data from Incentive Lab includes firm-grant level information categorized under various subcategories. These comprise ambiguous categories such as "Other" and "Individual". For a large portion of the firm-grant entries within these indistinct categories, no detailed specifications are provided. This lack of clarity raises the concern that several ESG-linked metrics may not be recognized in our analysis. Our firm-grant data has also another limitation: due to constraints in data availability, we use the ratio of ESG metrics to total compensation

metrics as a proxy for the proportion of ESG-linked compensation. It's important to note that using the actual share of pay for each metric might yield different results.

As the data sample consists of North American firms, it naturally raises questions about the broader applicability of our findings. Notably, European countries have demonstrated a heightened sensitivity to ESG factors (Gibson et al., 2022). This distinction is further exemplified by the more frequent implementation of ESG compensation measures in Europe than in the United States (Cohen et al., 2023). These regional variations suggest that the applicability of our findings may be limited outside of North America.

We also recognize the limited number of nonzero observations in our ESG compensation sample when examining the multivariable regressions of the ESG compensation subcategories. For the total relative change in ESG compensation metrics (*ESG Comp*) in the sample, 5,384 of the 13,331 observations (~40%) are nonzero, i.e., the relative share of ESG compensation metrics has either increased or decreased. For the *ESG Comp* subcategories, the average number of nonzero observations is 3,135 (~24%). This prevalence of zero values in our data could potentially skew the results of our analyses, limiting us to detect subtle but significant trends within the *ESG Comp* subcategories. The relatively high proportion of zero values suggest that many firms may not actively update their *ESG Comp* metrics, reflecting the varied importance firms place on ESG issues.

Finally, as observed in Sections 4.1., 5.1., and 5.2., we acknowledge that the ESG ratings provided by various established agencies can significantly influence the outcomes of analyses. Indeed, prior research has revealed considerable disparities among ESG ratings from reputable agencies, such as MSCI, Refinitiv, KLD, Sustainalytics, and Moody's, which poses challenges for empirical research and introduces uncertainty in drawing conclusions as well as decision-making guided by such ratings (Berg et al., 2022; Chatterji et al., 2016). For instance, Berg et al. (2022) identify three primary sources of divergence that contribute to significant discrepancies in ESG ratings: (1) "scope divergence", occurring when rating agencies base their ratings on different sets of factors, resulting in divergence – for example, one agency may consider parental leave, while another might not; (2) "measurement divergence", emerging when rating agencies evaluate an attribute, like work safety, using different factors – such as the number of reported incidents versus the number of equipment breakdowns; and (3) "weight divergence", occurring when rating agencies assign varying weights and importance to different attributes due to differing views on the importance – for instance, environmental attributes receive a greater weight in the final rating than work safety. The complex, multivariate structure

of these ratings, influenced by scope, measurement, and weight divergence, complicates both the interpretation of ESG performance and the comparability of ratings across different agencies.

7.3. Suggestions for future research

Our results generate various interesting avenues for future research. First, expanding the sample used in our thesis can provide more universal insights on the implications of increasing the relative share of ESG compensation. Conducting the analyses for an international sample can provide more understanding on the geographical differences in firm outcomes, especially considering that US firms are behind many other countries in ESG sensitiveness. Additionally, our sample consists of large public firms – implications of ESG compensation on smaller businesses, where executives can hold more decision-making power due to lower levels of regulation and stakeholder scrutiny, could be a possible topic for future research.

There are also unanswered questions that could be studied by expanding the analysis with the sample used in our thesis. For example, conducting an industry analysis on the sample could reveal interesting insights on the cross-industry differences in firm performance when increasing executives' focus on ESG through compensation contracting. Similarly, it could be fruitful to assess the results by prevailing level of ESG compensation, e.g., by firm quintiles based on the extent by which of the current compensation metrics are tied to ESG.

We did not find evidence of a relation between increases in relative ESG compensation and firm operative financial performance. As discussed in Section 6, it could be interesting to further break down whether there truly is no trade-off between incentivizing executives to focus increasingly more on ESG over growth and top-line profitability and the respective financial development, or whether the insignificant results are a combination of the negative effects of executives' shifted focus and stakeholders' positive reaction towards indications on firm commitment to ESG.

Lastly, a potential topic could lie in the optimal balance between weights on the more traditional, financial parameters in compensation metrics, and ESG-linked compensation metrics or other non-financial targets. It could be interesting to study what kind of balance between these metrics produces the highest overall firm performance financially and non-financially, and the well-being and wealth of the stakeholders such as employees and investors.

Appendix

Appendix 1. Variable definitions

Carbon emissions	Year-to-year change in the share of firm executive compensation metrics being linked to carbon emissions
Carbon emissions D	Indicator variable that equals one if the firm incorporates any carbon emissions criterion in executive compensation that year, and zero otherwise
Diversity & inclusion	Year-to-year change in the share of firm executive compensation metrics being linked to gender, ethnic, or other diversity in the workplace
Diversity & inclusion D	Indicator variable that equals one if the firm incorporates any gender, ethnic, or other diversity criterion in executive compensation that year, and zero otherwise
Dividends	Total amount of dividends scaled by net income
Community contribution	Year-to-year change in the share of firm executive compensation metrics being linked to community-linked or societal impact initiatives
Community contribution D	Indicator variable that equals one if the firm incorporates any community-linked or societal impact initiatives related criterion in executive compensation that year, and zero otherwise
Compliance & ethics	Year-to-year change in the share of firm executive compensation metrics being linked to corporate compliance and ethics
Compliance & ethics D	Indicator variable that equals one if the firm incorporates any corporate compliance and ethics criterion in executive compensation that year, and zero otherwise
Corporate culture	Year-to-year change in the share of firm executive compensation metrics being linked to corporate culture, mission or values
Corporate culture D	Indicator variable that equals one if the firm incorporates any corporate culture, mission or values related criterion in executive compensation that year, and zero otherwise
Employee engagement & development	Year-to-year change in the share of firm executive compensation metrics being linked to employee satisfaction and training
Employee engagement & development D	Indicator variable that equals one if the firm incorporates any employee satisfaction and training criterion in executive compensation that year, and zero otherwise
ESG Comp	Year-to-year change in the share of firm executive compensation metrics being linked to ESG
ESG Comp D	Indicator variable that equals one if the firm incorporates any ESG criterion in executive compensation that year, and zero otherwise
Governance	Year-to-year change in the share of firm executive compensation metrics being linked to corporate governance

Governance D	Indicator variable that equals one if the firm incorporates any corporate governance criterion in executive compensation that year, and zero otherwise
Δ *GP margin*	Year-to-year change in gross profit margins (gross profit/sales)
Institutional	Firms with an institutional ownership of over 70%
Leverage	Total debt (sum of long-term debt and the debt in current liabilities) scaled by total assets
Δ *MSCI*	Year-to-year absolute change in the firm MSCI ESG rating. Values range from 0 to 10. A higher score indicates better ESG performance.
Non-Institutional	Firms with an institutional ownership of 70% or under
Other environmental	Year-to-year change in the share of firm executive compensation metrics being linked to environmental metrics that is not specific to carbon emissions
Other environmental D	Indicator variable that equals one if the firm incorporates any environmental criterion in executive compensation that is not specific to carbon emissions that year, and zero otherwise
Other ESG	Year-to-year change in the share of firm executive compensation metrics being linked to holistic/overall ESG, or uncategorized ESG metrics
Other ESG D	Indicator variable that equals one if the firm incorporates any holistic/overall/uncategorized ESG-related criterion in executive compensation that year, and zero otherwise
Δ *Refinitiv*	Year-to-year absolute change in the firm Refinitiv ESG rating. Values range from 0 to 100. A higher score indicates better ESG performance.
Δ *Ref E*	Year-to-year absolute change in the firm Refinitiv Environmental pillar score. Values range from 0 to 100. A higher score indicates better environmental performance.
Δ *Ref S*	Year-to-year absolute change in the firm Refinitiv Social pillar score. Values range from 0 to 100. A higher score indicates better social performance.
Δ *Ref G*	Year-to-year absolute change in the firm Refinitiv Governance pillar score. Values range from 0 to 100. A higher score indicates better governance performance.
Ref E	Absolute value of firm Refinitiv Environmental pillar score. Values range from 0 to 100. A higher score indicates better environmental performance.
Ref S	Absolute value of firm Refinitiv Social pillar score. Values range from 0 to 100. A higher score indicates better social performance.
Ref G	Absolute value of firm Refinitiv Governance pillar score. Values range from 0 to 100. A higher score indicates better governance performance.
Return	Stock return of the firm compounded over the year

ROA	Net income scaled by total assets
Δ *ROA*	Year-to-year absolute change in net income scaled by total assets
Safety & health	Year-to-year change in the share of firm executive compensation metrics being linked to employee safety, health, or security
Safety & health D	Indicator variable that equals one if the firm incorporates any employee safety, health, or security criterion in executive compensation that year, and zero otherwise
Δ *Sales growth*	Year-to-year change in sales growth rates
Sales growth	Year-to-year sales growth rate
Size	Logarithm of the firm's total assets (expressed as millions of USD)
Tangibility	Property, plant, and equipment scaled by total assets
Δ *Tobin's Q*	Year-to-year change in the market value of total assets (book value of total assets + market value of common stock – (book value of common stock + balance sheet deferred taxes)) scaled by book value of total assets

Appendix 2. Examples of ESG compensation metrics

This table provides examples of the ESG compensation metrics under each subcategory as outlined in Table 1. The metrics are from ISS Incentive Lab database, the categorization ("Type of ESG metric") is done by the authors.

Type of ESG metric	**Examples**	**Company (year)**
Carbon emissions	Environmental emissions improvement	United States Steel Corporation (2012)
	Progress toward GHG emissions intensity targets by 2030	ConocoPhillips (2020)
Other environmental	Clean World Initiative	Covanta Holding Corporation (2011)
	Non-revenue water reduction	Xylem (2021)
Safety & health	Total recordable incident rate	Transocean (2013)
	Collective radiation exposure	Pinnacle West Capital Corporation (2017)
Diversity & inclusion	Diversity targets (within the company and for suppliers)	The Clorox Company (2012)
	Achieve women at Terex targets at leader level	Terex Corporation (2018)
Employee engagement & development	Improvements in associate engagement	Kroger Company (2016)

	Provide training and leadership development to the system	Planet Fitness (2021)
Community contribution	Sustain our involvement in civic affairs and non-profit organizations	Constellation Energy Group (2011)
	Increasing the company's community service hours	Wynn Resorts (2019)
Corporate culture	Institutionalize a culture of corporate giving	Activision Blizzard (2010)
	Live our values and champion our culture	Capital One Financial Corporation (2017)
Compliance & ethics	Key global ethics and compliance objectives	Colgate Palmolive (2010)
	Zero anti-corruption violations	Kosmos Energy (2014)
Governance	Coordinating governance and board activities	Post Properties (2014)
	Sound management and governance practices	Brookfield Renewable Corporation (2019)
Other ESG	ESG efforts	The Carlyle Group (2020)
	Build a sustainable company	Biogen (2012)

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