Master Thesis U.S.E.

The Impact of the European Shareholders Rights Directive II on the Adoption and Effectiveness of ESG-Linked Executive Compensation

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Table of contents

1. Introduction

Over the past decade, environmental, social, and governance (ESG) factors have become central to corporate strategy and investor decision-making. As firms face growing societal and regulatory pressures to operate sustainably, executive compensation structures have increasingly incorporated ESG-related performance metrics. Cohen et al. (2023) show that the percentage of firms linking executive pay to ESG metrics grew from just 1% in 2011 to 38% by 2021.

The rationale behind this shift can be partially understood through the lens of agency theory. Executives (agents) do not always act in accordance with the long-term interests of shareholders (principals), particularly when these interests involve ESG-related outcomes. Linking executive compensation to ESG targets may therefore serve as a mechanism to better align managerial incentives with shareholder objectives. ESG investing is often associated with increased financial performance and risk mitigation, both of which are increasingly relevant to shareholders. From this perspective, ESG-linked executives may serve as a tool to bridge the gap between corporate leaders and investor priorities, potentially reducing agency problems (Jensen & Meckling, 1976).

At the same time, the rise of ESG-linked pay cannot be attributed to agency dynamics alone, because traditional pay-performance incentives have proven to not always be sufficient in addressing the conflict of interest between shareholders and executives. Regulatory reforms, especially those empowering shareholders to influence remuneration practices combined with stricter remuneration disclosure regulation, have likely played a key role. One such influential reform is the European Union's revised Shareholder Rights Directive (SRD II), which came into effect in 2019 and built upon the original Shareholder Rights Directive introduced in 2007. The purpose of this directive was to strengthen the position of shareholders in EU-listed companies and encourage long-term shareholder management. The current study will focus on several key attributes of this regulatory framework, including the new EU "Say on Pay" legislation, requiring binding or advisory shareholder votes on executive compensation for all EU-listed firms. Moreover, SRD II mandates firms to disclose in detail how their remuneration policies align with long-term value creation, including non-financial elements like ESG performance (European Parliament and Council, 2017).

These regulatory changes introduced a new dynamic in how ESG-linked pay is governed and perceived across the EU. Where it once was a voluntary and relatively discrete practice, it has now become far more visible and, in some cases, almost expected. On top of the rules that were imposed on EU firms, the directive also introduced new transparency demands for institutional investors, representing about 36% of total EU shareholders, which now face their own ESG disclosure obligations (EY, 2024). This may have even further increased pressure on firms to adopt ESG-focused practices, as it may have increased investor demand for firms's ESG practices. From a neo-institutional theory perspective, the combination of these increased remuneration transparency requirements suggests that legitimacy concerns, peer imitation, and normative pressures may also be driving the adoption of ESG pay practices, independent of pure agency considerations (DiMaggio & Powell, 1983).

Given this dual theoretical grounding, agency alignment, and institutional pressure, this study investigates both the adoption and the effectiveness of ESG-linked executive compensation in light of the implementation of SRD II in order to get a better understanding of how the regulations mandated by the SRD II have influenced ESG-linked pay practices and effectiveness. This study revolves around the following research question:

Has the EU Shareholders Rights Directive II influenced the adoption and effectiveness of ESG-linked executive pay among publicly listed EU firms since its 2019 implementation?

To answer this question, the study treats the implementation of SRD II as a quasi-natural experiment and examines whether firms subject to its rules, and specifically its combined "Say on Pay," remuneration transparency, and institutional investor disclosure legislation, have caused an increase in the adoption of ESG-linked pay and whether it has shifted the ESG-linked pay-ESG performance relationship. By focusing not only on the European Union, the study adds to a growing but still inconclusive body of literature on the real-world impact of ESG compensation mechanisms and, more importantly, the way Say on Pay, and remuneration disclosure legislation impact this relationship.

The results of this study indicate no strong evidence that SRD II has had a statistically significant positive effect on the adoption of ESG-linked executive pay. However, results about changes in the effectiveness of ESG pay in improving ESG performance (measured by ESG scores) yield mixed outcomes. While there is some evidence that firms adopting ESG-linked pay post-SRD II implementation still experienced improvements in ESG performance, these positive effects are not universally strong or consistent across all ESG dimensions or firm types and were significantly smaller than the positive coefficient in the before period and for the environmental pillar when tested in an isolated European sample. However, when extending the analysis to a control group, no significant results were found. This indicates that there may be broader trends towards decreasing ESG-linked pay effectiveness; however, due to model and sample limitations, further study is necessary in order to get a deffinitve answer on whether SRDII caused this decline or whether there were indeed broader trends. This result offers valuable implications for a range of stakeholders, which will be discussed I more detail in the discussion section of this study.

These findings contribute to the ongoing debate on whether regulatory nudges can effectively enhance corporate sustainability behavior or whether deeper structural and cultural shifts are needed to translate policy intentions into meaningful results.

2. Literature Review

2.1 Defining ESG

ESG scores offer a framework for evaluating corporate performance beyond traditional financial metrics and build upon the earlier concept of corporate social responsibility (CSR), which traditionally focused on a company's voluntary initiatives to manage its social and environmental impacts (Gillan et al., 2021). The overall ESG score is a weighted average of firms' sustainability performance across three distinct dimensions: environmental (E), social (S), and governance (G). Specifically, the environmental pillar measures a firm's ecological footprint (e.g., greenhouse-gas emissions, resource intensity, waste), the social pillar gauges its stakeholder relations (e.g., labor conditions, workplace safety, human-rights and product-responsibility policies), and the governance pillar evaluates oversight quality (e.g., board composition, executive pay, shareholder rights, reporting integrity) (Friede et al., 2015; Clark et al., 2015; Eccles et al., 2012). However, because evaluation frameworks differ among rating agencies, ESG scores assigned to the same firm can vary widely between them, decreasing their power to serve stakeholders in drawing conclusions about corporate sustainability performance (Chatterji et al., 2016; Cheng et al., 2025).

2.1.1 ESG, long-term value and risk

Empirical research increasingly highlights the importance of environmental, social, and governance (ESG) performance for firms' long-term value creation and risk management. Meta-analytic evidence shows that companies with stronger ESG practices generally outperform their peers financially (Friede et al., 2015). More recent studies offer evidence to better understand the mechanisms behind this relationship. For example, Wang et al. (2023) found that higher ESG performance is associated with reduced stock price fragility, as ESG-committed investors demonstrate greater patience and are less sensitive to short-term market fluctuations, resulting in more stable equity valuations. Moreover, environmental factors such as carbon emissions are increasingly being priced into financial markets. Documented by Bolton and Kacperczyk (2021), who find a positive carbon-risk premium in U.S. stock markets, this indicates that firms with higher direct emissions must compensate investors for their exposure to transition risk, a premium that has intensified since the Paris Agreement, signaling that superior sustainability performance increasingly materializes in financial terms. Furthermore, although Oikonomou et al. (2012) do not explicitly examine ESG factors, their research reveals that firms with higher levels of corporate social responsibility (CSR) are associated with significantly lower systematic and idiosyncratic risk, particularly during periods of heightened market volatility, which suggests that robust CSR practices, and by extension, strong ESG performance, can function as a stabilizing force in times of financial market stress, valuable for shareholders. These findings provide investors with an economic motive to support the integration of ESG considerations into long-term corporate strategy. However, while the relationship between ESG performance, long-term value creation, and thus shareholders interests seem clear, shareholders' incentives do not always translate to actual business practices. This can occur in situations in which the interests of shareholders do not (fully) align with those of executives, creating agency conflicts in which short-term market pressures, information asymmetries, and managerial career concerns can undermine shareholders' best interests (Stein, 1989; Graham et al., 2005). Building on these agency concerns, Jensen and Meckling (1976) formally defined principal-agent conflicts and proposed incentive structures to align managers' interests with those of shareholders. These problems are most prevalent in environments characterized by dispersed ownership and limited direct oversight, such as large publicly listed firms (Eisenhardt, 1989; McColgan, 2001).

2.1.2 Traditional Executive Pay Mechanisms

To reduce agency problems, executive compensation contracts in listed firms generally comprise a combination of a fixed base salary and a variable pay component that ties compensation to firm performance. This variable component often represents a substantial portion of total pay, sometimes exceeding half, particularly in larger firms and competitive labor markets (Hu, 2024). Variable pay is typically divided into short-term incentives (STIs), such as annual cash bonuses, and long-term incentives (LTIs), which frequently include equity-based awards like shares or stock options. Performance metrics used to align executive pay with firm performance often include financial indicators such as earnings per share, return on equity, and total shareholder return, along with relative performance measures that compare the firm to its industry peers (Bell et al., 2021).

While performance-based pay mechanisms, such as earnings per share (EPS), return on equity (ROE), and total shareholder return (TSR), are designed to align managerial incentives with shareholder interests, they suffer from several limitations. First, executive pay is typically more sensitive to favorable than to unfavorable outcomes, potentially rewarding managers for luck rather than skill, especially when governance controls are weak (Bell et al., 2021). Second, highly detailed performance targets can prompt executives to focus on narrow metrics at the expense of broader, long-term value creation (Oehmichen et al., 2020). Within the broader mix of variable pay, equity-based incentives often promote excessive risk-taking and short-termism if poorly calibrated (Pandher, 2021). Relative performance contracts and non-financial targets offer partial remedies for these problems, although their effectiveness depends heavily on the firms' governance quality and the independence of compensation consultants (Bachmann et al., 2024). Accounting-based measures can also help remedy a manager's short-term focus by tying rewards to outcomes that extend beyond a chief executive's tenure (Hiemann, 2023). In sum, although performance-based pay can help align managers with shareholders, its ultimate effectiveness depends on robust governance, thoughtful metric design, and monitoring against unintended behavioral distortions (Bell et al., 2021; Oehmichen et al., 2020).

2.1.3 Traditional Executive Pay Mechanisms and ESG Performance

While traditional executive pay incentives link compensation to financial performance, and ESG investment has been shown to enhance financial outcomes, a reasonable question arises: if ESG scores improve long-term financial performance and executive pay is tied to financial results, shouldn't this alignment resolve the agency problem? The answer is that the relationship is more nuanced. Incentive pay based solely on financial targets does not necessarily lead to business practices that support ESG outcomes or improved ESG scores. This disconnects stems from several underlying structural and behavioral issues. Bonuses focused purely on short-term financial results often overlook sustainability goals, mainly because the benefits of ESG efforts take more time to materialize financially (Velte, 2024). On top of that, when executive contracts emphasize easily measurable indicators like earnings, managers are more likely to prioritize those rather than investing time and effort into ESG areas that are harder to track (Velte, 2024). Further building on these agency tensions, a large body of evidence shows that managers systematically over-weight near-term earnings signals and under-invest in projects whose pay-offs fall outside their tenure, a short-sightedness bias that additionally weakens the presumed link between financial targets and long-run ESG value (Stein, 1989). Which suggests the need for alternative incentive pay designs in addressing the agency problem, omitting limitations of traditional performance-based pay mechanisms and linking pay directly to ESG outcomes.

2.2 Empirical evidence on ESG-pay

A growing body of empirical research investigates the relationship between executive compensation linked to environmental, social, and governance (ESG) targets and subsequent ESG performance. Cohen et al. (2023) conduct a comprehensive global analysis covering more than 9,000 publicly listed firms between 2011 and 2020. Their findings indicate a generally positive, albeit sometimes modest, association between ESG-linked compensation and firm-level ESG outcomes. Notably, the strength of this relationship varies across ESG rating providers, underscoring the importance of measurement frameworks and contextual differences. Complementing this global evidence, Homroy et al. (2023) analyze Swedish firms and find that ESG-linked CEO compensation is positively associated with ESG performance, particularly in settings characterized by strong internal governance and diverse executive career backgrounds. Almici (2023) similarly reports that among Italian FTSE MIB-listed companies, sustainability-oriented pay structures are linked to improved outcomes in both environmental and social dimensions. These findings suggest that the effectiveness of ESG incentives is shaped by national governance structures and institutional norms. By contrast, Adu et al. (2022) offer a more critical perspective, distinguishing between symbolic and substantive sustainability practices in a sample of UK FTSE 350 firms. They find that ESG-linked compensation more often motivates symbolic actions, such as participation in procedural environmental initiatives, rather than substantive improvements, aligning with the neo-institutional theory notion of ceremonial adoption. Maas (2018) further emphasizes this concern, showing that "hard" quantitative ESG targets tend to produce measurable improvements in ESG performance, whereas "soft" qualitative objectives do not. Together, these studies highlight a generally positive, yet context-sensitive, relationship between ESG-linked pay and ESG outcomes.

2.3 Regulatory developments influencing executive pay

The recent surge in ESG-linked incentives has developed within the context of increasingly robust regulatory frameworks governing executive remuneration. While many of these frameworks, such as “say on pay” regulations, were initially designed to enhance shareholder influence over pay structures, they have since evolved to encompass broader transparency and accountability requirements. The initial wave of say-on-pay regulations emerged in the early 2000s in countries such as the United Kingdom (2002 Directors’ Remuneration Report Regulations), Australia (2004 Corporations Amendment), and later in other European countries, as well as the United States (2010 Dodd-Frank Act). These regulations generally provided shareholders with a non-binding advisory vote on executive pay packages. Research examining the staggered implementation of say-on-pay (SoP) laws across 36 jurisdictions between 2002 and 2019 demonstrates that the adoption of ESG and other non-financial targets in executive compensation tends to increase significantly following the introduction of SoP regulation, particularly when the vote is binding and local investors strongly prefer sustainability (Carter et al., 2023). This suggests shareholders value ESG performance and use SoP regulations to incentivize managerial ESG improvements, reinforcing the link between ESG performance and long-term shareholder value.

Building upon these earlier regulations, the introduction of the European Union’s Shareholder Rights Directive II (SRD II) represents the first generalised European regulation mandating a say-on-pay requirement for all European listed companies. SRD II introduced Articles 9a and 9b, requiring companies to submit their remuneration policies to a shareholder vote at least every four years and to publish detailed annual remuneration reports explicitly linking executive pay to company performance, including non-financial criteria such as sustainability (European Parliament and Council, 2017). This enhanced transparency empowers shareholders to more effectively monitor, and influence executive pay decisions.

Additionally, SRD II extends a “comply-or-explain” disclosure framework to institutional investors and asset managers under Articles 3g to 3i, requiring them to publish engagement policies or justify their absence, specifically addressing their monitoring of ESG impacts and corporate governance (European Parliament and Council, 2017). This dual regulatory approach targeting both investors and corporations may create reciprocal pressures, increasing institutional investor demands for ESG-linked remuneration practices, prompting firms to integrate sustainability metrics into executive compensation to meet these expectations.

However, the extent to which SRD II has accelerated ESG-linked pay adoption remains an empirical question examined in Hypothesis 1 of this study. Theoretically, agency theory suggests institutional investors may leverage enhanced say-on-pay rights to integrate ESG criteria into executive remuneration as a mechanism to mitigate agency costs and align managerial actions with long-term shareholder interests. Nevertheless, agency theory may not fully capture the nature of ESG pay adoption in response to regulatory developments.

Neo-institutional theory (NIT) provides an alternative perspective, proposing organizations may adopt ESG-linked compensation primarily to gain legitimacy by conforming to societal norms rather than due to genuine sustainability commitment (DiMaggio & Powell, 1983; Meyer & Rowan, 1977). Empirical evidence supports this legitimacy-seeking behavior among institutional investors themselves. The 2024 EY Global Corporate Reporting and Institutional Investor Survey found that while 88% of institutional investors reported increased ESG information use, 92% believed near-term financial risks outweighed ESG benefits, indicating potential ceremonial ESG adoption driven by regulatory compliance rather than substantive change (EY, 2024).

Further supporting the relevance of regulatory influences, Carter et al. (2023) found that say-on-pay enactment significantly increased firms' probability of adopting ESG-linked compensation, resulting in notable improvements in ESG scores. However, Edmans (2023) highlights potential drawbacks, warning that ESG-linked pay structures may encourage symbolic adherence to easily measurable ESG targets rather than meaningful sustainability progress.

Additionally, the EU adopted the Corporate Sustainability Reporting Directive (CSRD 2022/2464) in December 2022, significantly broadening non-financial reporting requirements beyond SRD II, requiring standardized sustainability reports and third-party assurance (European Parliament & Council, 2022). This may further influence ESG pay structures by enhancing the transparency and comparability of ESG information.

These regulatory developments collectively suggest complex interactions between regulatory frameworks, investor expectations, and ESG-linked executive pay adoption, potentially shaping whether ESG pay serves substantive sustainability goals or primarily ceremonial compliance objectives.

3. Theoretical Framework

3.1 Agency Theory

Agency theory conceptualizes executive compensation as a tool for resolving the principal–agent problem by aligning managers' incentives with those of residual claimants (Eisenhardt, 1989). Extending this logic to sustainability, Homroy et al. (2023) argue that indexing CEO pay to ESG targets can synchronize managerial behavior with both shareholder and stakeholder priorities. Europe's revised Shareholder Rights Directive (SRD II) further reinforces this alignment by mandating enhanced pay-plan disclosures and granting investors binding votes on remuneration (European Commission, n.d.).

3.2 Neo-Institutional Theory (NIT)

Neo-Institutional Theory (Meyer & Rowan, 1977) offers critical insights into the potential ceremonial adoption of ESG-linked pay structures in Europe. According to NIT, organizations often implement formal structures, such as ESG pay mechanisms, not necessarily to improve efficiency but to align with societal norms and gain legitimacy (DiMaggio & Powell, 1983). These structures can become decoupled from actual organizational practices, serving more to signal conformity to external expectations than to produce substantive change.

In the context of SRD II, coercive isomorphism may arise from regulatory requirements compelling firms to incorporate ESG performance into executive pay. Mimetic isomorphism may lead firms to imitate their peers, especially in times of uncertainty, while normative isomorphism can be driven by professional standards and investor expectations. Thus, while ESG-linked pay may appear to align managerial incentives with sustainability goals, it may also be adopted ceremonially, particularly following the introduction of SRD II, potentially resulting in weaker actual effects on ESG outcomes.

3.3 Research gaps and hypotheses

While the existing literature provides valuable insights into the relationship between ESG-linked executive compensation and ESG performance and the effect of Say on Pay regulation on this relationship, no studies have examined whether the introduction of SRD II has altered this relationship in Europe yet. Specifically, it remains unclear whether the regulatory push for ESG pay structures has led to more substantive ESG improvements or whether it has instead incentivized ceremonial adoption to meet regulatory or stakeholder expectations.

This study addresses this gap by examining European listed firms over the period from fiscal years 2015 to 2023, encompassing both the pre- and post-SRD II periods. By focusing on Europe as a whole, the research captures the broader effects of SRD II implementation across diverse regulatory and cultural contexts within the European Union. Drawing on neo-institutional theory, the study investigates whether the effectiveness of ESG-linked compensation in enhancing ESG performance has diminished due to its ceremonial adoption following SRD II. This research contributes to the literature by integrating neo-institutional theory insights and assessing whether regulatory interventions may unintentionally undermine the substantive impact of ESG-linked pay structures. While prior studies (e.g., Carter et al., 2023; Cohen et al., 2023) have examined ESG pay adoption, its effectiveness, and the influence of national regulations, little is known about how comprehensive EU-wide mandates such as SRD II, which extend beyond standard say-on-pay regulation, affect the link between adoption and effectiveness in practice.Based on the literature reviewed the following hypotheses are formulized:

H1: The EU Shareholder Rights Directive II (SRD II) caused an increase in the implementation of ESG-linked executive compensation among publicly listed EU firms.

H2: H2: SRD II implementation weakened the positive effect of ESG-linked compensation on ESG performance among EU-listed firms.

4. Empirical Strategy

4.1 Data Collection and Description

This study is based on firm-level panel data of companies listed on stock exchanges within the European Union (EU), covering the fiscal years 2015 to 2023, excluding 2019. All firm-level data, including ESG scores, ESG-linked executive compensation, and financial and governance variables, were sourced from Refinitiv Eikon. This data provider was chosen because it uses the broadest range of indicators for their ESG score calculation among competing ESG rating agencies, and their ESG scores are frequently used by professionals in sustainable finance, further supporting its appropriateness for the present study (Berg et al., 2022).

In constructing the sample, non-EU European countries (e.g., the UK, Norway, Switzerland, and Russia) were excluded to isolate the treatment region affected by SRD II; however, Switzerland re-enters later as part of the control group in the analysis. Furthermore, while the data collected initially included the year 2024, this year was excluded from the final panel due to incompleteness in most variables. Additionally, since SRD II was mandated for implementation on 10 June 2019, that year is considered a transition period and is excluded from the research model to establish clear pre- and post-treatment periods (Phan & Meyer, 2025).

Given this study's focus on ESG outcomes, all observations missing either ESG scores or ESG-linked executive data were removed. Importantly, only three additional cases were excluded due to missing data on ESG-linked executive compensation after all observations lacking ESG data were dropped, indicating that the availability of these variables overlaps almost perfectly. Following these cleaning steps, missingness in the remaining sample is minimal: seven of the eight control variables had below 0.25% missing data, with only Average Board Tenure missing for 1.6% of observations. Given these low missingness rates, the few remaining incomplete observations were dropped.

Moreover, firms with only pre- or post-policy period observations were also removed from the sample because of the inability to compare the before-and-after period for these firms in the analysis. The final cleaned EU sample contains 7,313 firm-year observations from 1,166 unique firms, representing 14.3% of the original raw dataset.

To assess the representativeness of the post-cleaning sample, the share of total book assets retained was calculated, which showed that the final cleaned sample still represented 91.9% of total assets from the original unfiltered dataset, meaning that the final sample still represents EU firms in terms of asset coverage and that the deletion has especially filtered out smaller firms.

Variable Definitions

All variables are constructed at the firm-year level. The dependent variable for Hypothesis 1 is a binary indicator for ESG-pay adoption, defined as one if the firm had linked executive compensation to ESG targets in a given year and zero otherwise. The dependent variable for hypotheses 2 and 3 is ESG Score, measured by Refinitiv's overall ESG score, which ranges from 0 to 100 and is a weighted score of firms sustainability performance on the environmental (E), social (S), and governance (G) dimensions, which individually are also measured on a 0 to 100 scale. E, S, and G scores can differ in weights when calculating the overall ESG score, and this weighting is industry-specific. On top of that, the weights of the underlying indicators used for calculating the individual E and S pillar scores also vary depending on sector characteristics; the indicator measuring a firm's emission reduction is for example, more heavily weighted for energy-intensive, high-polluting sectors compared to the financial services sector (Ehlers et al. 2024).

For the model used for hypothesis 1, the explanatory variables include a post-policy indicator equal to one for the post-SRD II implementation period (2020–2023) and zero for the pre-SRD II implementation period (2015–2019), and a treatment group indicator equal to one for EU-based firms and zero for control group firms, which will later be introduced.

Building on earlier studies on ESG-linked executive remuneration, several firm- and board-level control variables are included to limit omitted-variable bias. Firm-level controls comprise the natural logarithm of total assets (a proxy for firm size), financial leverage (total debt-to-assets ratio), and return on assets (ROA) (Carter et al., 2023; Cohen et al., 2023). Board-level controls consist of board size, the percentage of independent directors, and the percentage of female directors (Cohen et al., 2023). Prior research reports correlations between these variables and both ESG-linked executive pay and overall ESG performance; accordingly, the same set of controls is used when estimating each model (Almici, 2023; Carter et al., 2023). While Pareek and Sahu (2023) examine general executive compensation rather than ESG-linked pay, their findings also confirm correlations between these firm- and board-level characteristics and ESG performance. For the models used to test the second hypothesis, the list of control variables is extended to include average board tenure (in years), as earlier research shows that the length of board tenure is associated with a firm's ESG performance (Kim & Kim, 2023; Patro et al., 2018). All variables used in the analysis are summarized in Table 1 below.

Table 1. Variable Summary

VARIABLE NAME	DEFINITION	SOURCE	REGRESSION LABEL
ESG Score	Overall ESG score (0-100)	Refinitiv Eikon	ESGscore
E Score	Environmental pillar score (0-100)	Refinitiv Eikon	E_score
S Score	Social pillar score (0-100)	Refinitiv Eikon	S_score
G Score	Governance pillar score (0-100)	Refinitiv Eikon	G_score
ESG-Linked Compensation	Dummy variable: 1 if executive compensation includes ESG or sustainability-related metrics; 0 otherwise.	Refinitiv Eikon	ESG_ExecComp
Total Assets	Book value of total assets (current + non-current).	Refinitiv Eikon	log_TotalAssets
Financial Leverage	Total Liabilities ÷ Total Assets (proxy for capital structure).	Constructed by author *	Fin_Leverage
Return on Assets (ROA)	Net Income after Minority Interest ÷ Total Assets (profitability relative to assets).	Constructed by author*	ROA
Board Size	Number of board members at fiscal year-end.	Refinitiv Eikon	Board_Size
Independent Board Members (%)	Percentage of board members classified as independent.	Refinitiv Eikon	Indep_BoardMembers
Female on Board (%)	Percentage of board members who are female.	Refinitiv Eikon	FoB
Average Board Tenure	Average tenure of board members, in years.	Refinitiv Eikon	Avg_BoardTenure
Post-SRD II	Dummy variable: 1 if fiscal year is 2020 or later (post-SRD II), 0 otherwise.	Constructed by author	postSRD
EU-Exchange	Dummy variable: 1 if the firm is listed on a stock exchange subject to EU legislation, 0 otherwise.	Constructed by author	treatEU

* *Constructed by the author using Refinitiv Eikon financial data*

4.2 Data Analysis

To test Hypothesis 1 (H1), this study uses a difference-in-differences (DiD) research design to estimate the causal effect of the Shareholder Rights Directive II (SRD II) on the adoption of ESG-linked executive compensation and on firms' ESG performance. This approach is similar to the approach used by Phan and Meyer (2025), who use a DiD model to assess the impact of SRD II on CEO pay by comparing treated firms in Germany and Austria with a control group in Switzerland, thereby controlling for unobserved time-invariant firm characteristics and economy-wide shocks. For Hypothesis 3 (H3), the analysis extends to a triple-difference (DiDiD) model to examine whether the strength of the relationship between ESG-linked compensation and ESG-performance changes following the implementation of SRD II. Specifically, the model tests whether the association between ESG-linked pay and ESG outcomes weakens post-SRD II. This modeling strategy is conceptually aligned with the approach of Carter et al. (2023), who use interaction terms in a staggered DiD framework to assess how the introduction of Say-on-Pay laws influences the effectiveness of ESG contracting. By incorporating a triple interaction between ESG-linked pay, the post-SRD II period, and treatment status, this study isolates whether SRD II moderates the efficacy of ESG-linked compensation mechanisms in enhancing ESG-performance while accounting for DiD effects and firm-level heterogeneity.

Switzerland and Singapore, both high-income countries outside the scope of SRD II, are used to form the control group. Switzerland offers a strong point of comparison due to its institutional similarity to EU-member states and its exposure to shared regional economic conditions, while its Say-on-Pay (SOP) legislation remained unchanged during the study period (Swiss Federal Council, 2022; Carter et al., 2023). Singapore, in turn, helps control for country-specific shocks in Switzerland. It is also regarded as a leading global financial center, comparable in scale and integration to key financial hubs within the EU (IMF, 2019). Its SOP framework remained stable throughout the research period, as Singapore had not adopted Say-on-Pay at the time of Goh's analysis (Goh, 2014), and no evidence was found to suggest this has changed since.

Model equations

The empirical design tests three hypotheses introduced at the end of the literature review. H1 concerns ESG_Comp adoption, estimated with Equation (1); H2 and H3 relate to the ESG-pay–performance slope, estimated with Equation (2). All three regressions will also be ran seperately for each pillar score seperately for additional depth, but the models presented below are the model equations that are central to this study

$$ESG\_Comp_{it} = \alpha_i + \lambda_t + \beta_1(PostSRD_t \times TreatEU_i) + X_{it}\gamma + \varepsilon_{it}.$$

Equation (1) estimates whether the slope of the adoption of ESG_Comp changes after SRDII relative to the control group. Here, α_i are firm fixed effects, λ_t year fixed effects, $PostSRD_t$ = 1 for years ≥ 2020, $TreatEU_i$ = 1 if EU firm and X_{it} is the vector of controls.

$$ESGscore_{it} = \alpha_i + \lambda_t + \delta_1 ESG\_Comp_{it} + \beta_2(ESG\_Comp_{it} \times PostSRD_t) + X_{it} + \varepsilon_{it}.$$

Equation (2) is run on the EU-sample only, it estimates whether the slope of the ESG_Comp–ESG-performance relationship is positive in the pre-SRDII as as in the post SRDII period and it whether the slope changes after SRDII implementation. Here, α_i are firm fixed effects, λ_t year fixed effects, $PostSRD_t$ = 1 for years ≥ 2020, and X_{it} is the vector of controls.

$$\begin{aligned} ESGscore_{it} = {} & \alpha_i + \lambda_t + \delta_1 ESG\_Comp_{it} + \delta_2(ESG\_Comp_{it} \times PostSRD_t) \\ & + \delta_3(ESG\_Comp_{it} \times TreatEU_i) + \delta_4(PostSRD_t \times TreatEU_i) \\ & + \beta_3(ESG\_Comp_{it} \times PostSRD_t \times TreatEU_i) + X_{it}\gamma + \varepsilon_{it}. \end{aligned}$$

Equation (3) adds the interaction with the EU-treatment dummy to capture any additional change in the ESG-pay–performance slope for EU firms post-SRD II.

Each of these models is also estimated separately using the environmental (E), social (S), and governance (G) pillar scores as dependent variables to explore whether the observed effects differ across ESG dimensions. All models are estimated using a two-way fixed-effects setup, which controls for both firm-specific and year-specific fixed effects (FE) (Carter et al. 2023; Cohen et al. 2023). Firm FE soaks up all firm characteristics that are inherent to the firm and are constant across the sample, such as, for example, company culture, but also a firm's initial ESG performance, so that these firm-specific characteristics that do not change over time will not bias the estimates produced by the model. Year FE absorbs all economy-wide shocks that hit all firms in the sample so that this is also biasing the estimates. With both of these fixed effects indicators in place, all coefficients are identified only on changes within the same firm over time, which aligns with the focus of this study. Because observations for a given firm are typically serially correlated across years, standard errors are clustered at the firm level to prevent the test statistics from being overstated (Cohen et al. 2023; Phan & Meyer, 2025).

The main model is estimated using contemporaneous (t) observations of ESG-linked executive compensation and ESG performance, measured both by the overall ESG score and the individual E, S, and G pillars. Applying a one-year lead (t + 1) would exclude the entire calendar year 2023 because of insufficient ESG data availability. On top of that, since the dataset used is unbalanced, all firm-year observations for which next year's ESG score data is missing in the sample will be excluded from the analysis. These two factors combined result in a loss of approximately 2,000 observations when using lead ESG scores, which is about one-third of the cleaned sample size. To avoid losing preserved statistical power, this study therefore relies on same-year data. The choice to use contemporary data for both ESG scores and ESG-linked executive compensation is consistent with prior studies that investigated the relationship (Khenissi et al., 2022; Almici, 2023). Moreover, Carter et al. (2023), whose methodology most closely resembles the present study among existing research, found no significant differences in results when comparing models based on contemporaneous ESG data with those using a one-year lag, further supporting the validity of this choice. However, to address potential heterogeneity, a robustness test will be performed using lead ESG scores and lead E, S, and G scores in addition to the contemporaneous model.

Variance inflation factors (VIFs) were calculated to assess multicollinearity across the main models (see Appendix X). Models 1.2 and 2a show low multicollinearity, with mean VIFs of 2.5 and 1.8, well below the common threshold of 10. Model 2b, which includes the triple interaction ESG_ExecComp × postSRD × treatEU, has a higher mean VIF of 8.9, with a maximum of around 28 for the interaction terms. The higher VIF values in the DiDiD model compared to the DiD model are caused by the triple interaction term, which is made up of variables that are also included in the model individually, leading to higher multicollinearity values. Since multicollinearity affects only the precision, not the validity, of OLS estimates, the coefficients remain unbiased, but standard errors may be inflated. Therefore, the statistically insignificant triple interaction in Table 5 should be interpreted with caution, as it may reflect either a true null effect or reduced precision. VIFs for all control variables are below 2, indicating no concerns for their estimates.

5. Results

This section presents the empirical results that test the study's two hypotheses. It begins with descriptive statistics for the pre- and post-SRD II periods and then moves on to the regression results for each hypothesis. Pre-trend graphs and F-tests are included to validate the core assumptions underlying the difference-in-differences (DiD) and difference-in-difference-in-differences (DiDiD) models, which is that the pre-trends of the variables of interest followed a parallel path before the treatment years.

5.1 Descriptive Statistics

Table 2 reports summary statistics for the treatment group (EU firms) and the control group separately for the pre-SRD II (FY 2015–2018) and post-SRD II (FY 2020–2023) periods. The descriptive figures indicate a consistent pattern of higher ESG performance and larger board structures among EU firms across both time periods. For instance, the average ESG score among EU firms increases only 1.4 points, from from 59.44 pre-SRD II to 60.80 post-SRD II, while for the control group the average ESG score increased about 6.2 points, from 46.79 to 52.97.

In contrast, while the average adoption of ESG-linked executive compensation has increased by large amounts for both EU firms and firms in the control countries, the proportion of firms adopting ESG-linked executive compensation (ESG_Comp) rises more sharply in the EU sample (from 34.1% to 67.7%) than in the control group (from 21.3% to 49.2%). These descriptive differences already suggest a differential policy uptake and could point toward an SRD II-driven treatment effect in ESG executive compensation alone. On top of that the larger increase in average ESG executive compensation adoption in EU firms compared to the control group alongside a smaller increase in average ESG scores in EU firms may signal differences in the relationship between the EU and the control group.

Table 2. Summary Statistics: EU vs Control, Pre- and Post-SRD II

Variable	EU Pre	Control Pre	EU Post	Control Post
ESG_ExecComp	0.34 (0.47)	0.21 (0.41)	0.68 (0.47)	0.49 (0.50)
ESG_Score	59.44 (19.39)	46.79 (21.40)	60.80 (17.85)	52.97 (18.84)
E_Score	60.18 (26.18)	44.56 (27.22)	57.98 (24.14)	48.94 (25.09)
S_Score	66.46 (21.60)	50.09 (24.64)	65.55 (20.18)	54.26 (21.35)
G_Score	49.84 (23.29)	46.03 (22.66)	56.07 (21.64)	54.09 (21.55)
log_TotalAssets	22.58 (1.91)	22.42 (1.95)	22.22 (1.98)	21.98 (1.83)
Fin_Leverage	0.61 (0.23)	0.54 (0.24)	0.62 (0.24)	0.54 (0.25)
Board Size	11.46 (3.45)	8.85 (2.86)	10.26 (3.99)	8.08 (2.51)
Indep_BoardMembers	55.44 (18.31)	51.90 (34.51)	57.52 (25.20)	56.50 (34.06)
FoB	33.57 (12.35)	14.34 (11.45)	34.93 (12.91)	21.44 (13.04)
Avg_BoardTenure	7.13 (3.36)	8.28 (3.56)	6.52 (2.93)	7.64 (3.49)
ROA	0.05 (0.13)	0.04 (0.15)	0.03 (0.49)	0.02 (0.40)

N (firm-years): EU (pre-SRD II) = 2,294; Control (pre-SRD II) = 456; EU (post-SRD II) = 3,723; Control (post-SRD II) = 840.

5.2 Main Findings

Hypothesis 1 examines whether the implementation of the Shareholder Rights Directive II (SRD II) is associated with an increased adoption of ESG-linked executive compensation among EU firms compared to a control group. Table 3 presents the regression results for hypothesis 1, both with and without control variables. A key assumption of the DiD approach is the parallel trends assumption, which in this context requires that the average ESG-linked executive compensation trends were similar for both groups prior to the implementation of SRD II. If this assumption does not hold, the estimated treatment effect may capture pre-existing differences rather than the causal impact of SRD II. To assess this, pre-treatment trends are plotted in Figure 1, displayed below the regression results.

Table 3. Hypothesis 1: Main Model

Variable	**Model (1): Baseline**	**Model (2): Full Specification**
treatEU × postSRD	0.0712*	0.0733*
	(0.0382)	(0.0379)
log_TotalAssets		0.0763***
		(0.0260)
Fin_Leverage		-0.0787
		(0.0604)
Board_Size		0.00283
		(0.00437)
Indep_BoardMembers		0.000581
		(0.000520)
FoB		0.000884
		(0.000736)
ROA		0.00325
		(0.00703)
Constant	0.487***	-1.260**
	(0.0194)	(0.577)
Observations	7,310	7,310
R-squared	0.697	0.699

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

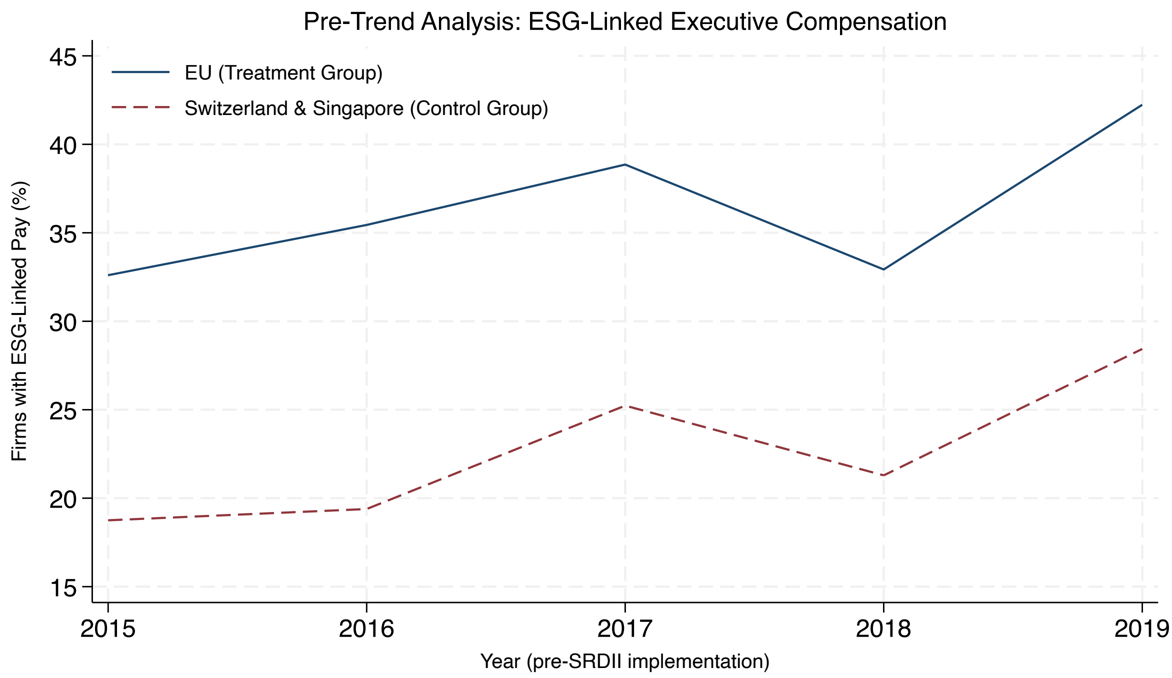

Figure 1.

Without controls, the interaction term (treatEU × postSRD) is positive and marginally significant (0.0712, $p < 0.1$), suggesting an approximate 7.12 percentage point increase in ESG-linked compensation adoption post-SRD II within EU firms relative to the control group. After including control variables, this coefficient remains robust (0.0733, $p < 0.1$). Although the results offer suggestive evidence supporting Hypothesis 1, they should be interpreted with caution given their marginal statistical significance.

As shown in the plotted pre-treatment trends in Figure 1, the parallel-trends assumption is satisfied, implying that the Difference-in-Differences estimator is unlikely to be biased by pre-existing dynamics and can therefore be interpreted as capturing the causal impact of SRD II on the adoption of ESG-linked executive pay. Moreover, a formal statistical test for pre-treatment differences yields an insignificant result, further reinforcing the internal validity of the identification strategy.

Hypothesis 2 investigates whether the association between ESG-linked executive compensation and ESG performance changed after SRD II implementation. This hypothesis was analyzed using two separate models: Model 2a (EU firms only, DiD) and Model 2b (EU versus control group, DiDiD). Table 4 presents the regression results for model 2a and Table

5 presents the regression results for model 2b. Figure 2 depicts the pre-treatment ESG-score trajectories for the EU sample and the control group.

Table 4. Hypothesis 2a: Main Model (EU Sample Only)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.644***	5.583***	5.030***	6.098***
	(0.650)	(0.956)	(0.869)	(1.006)
ESG_ExecComp ×	-3.292***	-4.350***	-3.149***	-1.387
postSRD	(0.728)	(1.077)	(0.967)	(1.156)
log_TotalAssets	4.443***	6.498***	2.880***	4.656***
	(0.665)	(1.395)	(0.758)	(1.123)
Fin_Leverage	-1.484	2.921	-1.249	-3.837
	(1.728)	(3.060)	(2.333)	(2.465)
Board_Size	0.057	0.132	0.195	-0.386**
	(0.132)	(0.185)	(0.179)	(0.185)
Indep_BoardMembers	0.112***	0.046**	0.041**	0.255***
	(0.0139)	(0.0202)	(0.0197)	(0.0215)
FoB	0.102***	0.074**	0.056**	0.168***
	(0.0202)	(0.0290)	(0.0260)	(0.0319)
Avg_BoardTenure	0.274**	0.220	0.300*	0.369**
	(0.118)	(0.172)	(0.158)	(0.184)
ROA	-0.340**	-0.134	-0.555***	-0.146
	(0.137)	(0.189)	(0.181)	(0.235)
Constant	-52.89***	-98.71***	-8.840	-68.90***
	(14.71)	(31.58)	(17.02)	(24.18)
Observations	6,014	6,014	6,014	6,014
R-squared	0.893	0.875	0.854	0.800
F-test (post-SRD	18.44	2.15	6.76	28.89
slope)	(p = 0.000)	(p = 0.143)	(p = 0.009)	(p = 0.000)

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table 5. Hypothesis 2b: Main Model (EU vs Control Triple DiD)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.308***	7.192***	5.947***	3.940**
	(1.538)	(2.741)	(2.016)	(1.947)
ESG_ExecComp ×	0.375	3.068	1.308	-1.246
postSRD × treatEU	(1.683)	(2.752)	(2.206)	(2.327)
log_TotalAssets	4.226***	5.963***	3.126***	4.329***
	(0.641)	(1.227)	(0.768)	(1.017)
Fin_Leverage	-0.328	4.356*	-0.225	-2.976
	(1.547)	(2.527)	(2.062)	(2.068)
Board_Size	0.0922	0.188	0.213	-0.362**
	(0.121)	(0.173)	(0.165)	(0.168)
Indep_BoardMembers	0.106***	0.0432**	0.0349**	0.250***
	(0.0123)	(0.0179)	(0.0172)	(0.0183)
FoB	0.0980***	0.0734***	0.0459*	0.170***
	(0.0184)	(0.0269)	(0.0246)	(0.0278)
Avg_BoardTenure	0.267**	0.208	0.277*	0.354**
	(0.106)	(0.160)	(0.143)	(0.156)
ROA	-0.424**	-0.292	-0.518***	-0.297
	(0.167)	(0.232)	(0.166)	(0.330)
Constant	-48.08***	-86.94***	-14.41	-60.88***
	(14.18)	(27.64)	(17.22)	(21.90)
Observations	7,310	7,310	7,310	7,310
R-squared	0.899	0.877	0.861	0.814

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

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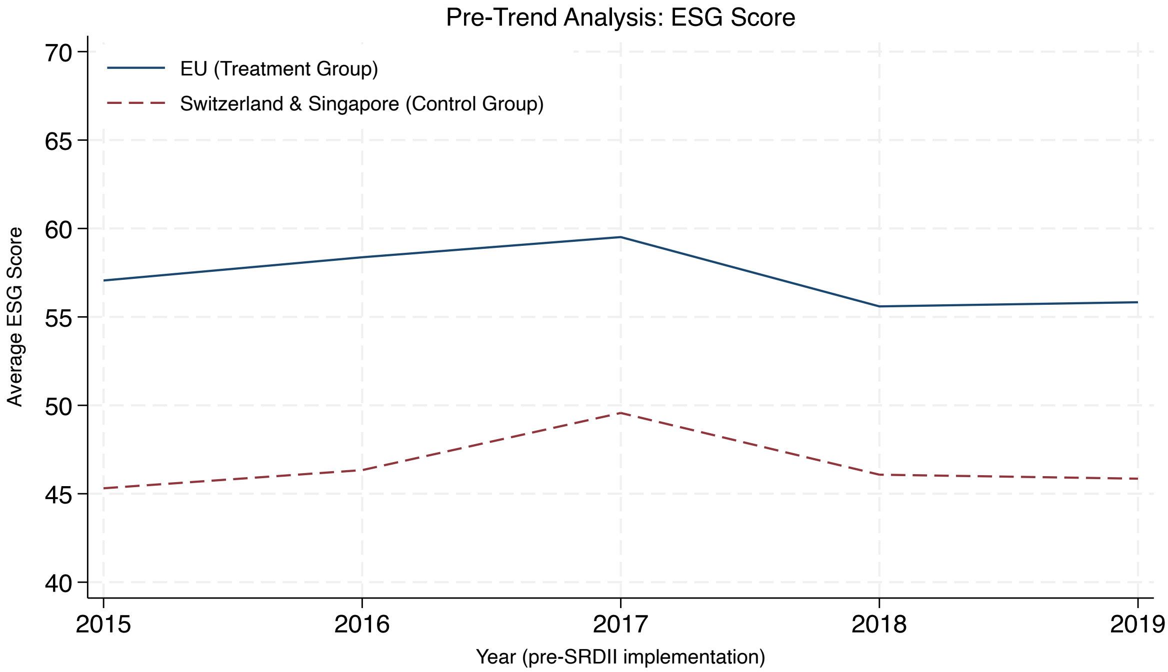

Figure 2.

Model 2a (EU firms only)

In the EU-only DiD analysis (Model 2a), ESG-linked executive compensation was positively and significantly associated with overall ESG performance before SRD II (coefficient: 5.644, p<0.01). Post-SRD II, this positive association significantly weakened by 3.292 points (p<0.01). The F- tests confirm that the combined effect post-SRD II remains positive and statistically significant (p<0.01). Similar trends appear in the individual ESG components: environmental (E-score) weakened by 4.350 points (p<0.01), social (S-score) by 3.149 points (p<0.01), and governance (G-score) by 1.387 points, though the latter change is not statistically significant. Notably, F- tests confirm ongoing significance for the ESG aggregate score (p<0.01), S-score (p<0.01), and G-score (p<0.01), but not the E-score (p=0.143).

Model 2b (EU vs. control group)

Model 2b extends the analysis through a DiDiD model comparing EU firms to a control group to ascertain whether the post-SRD II weakening effect is distinct to the EU context. The triple interaction term (ESG_ExecComp × postSRD × treatEU) was not statistically significant across the ESG aggregate and individual component scores, indicating that the weakening relationship observed in Model 2a is not significantly different from trends observed in the control group.

Interpretation of Model 2b requires caution due to high multicollinearity indicated by variance inflation factors (VIFs). The triple interaction term displayed elevated VIF values (mean VIF: 8.9, maximum around 28), driven by constituent variables' inclusion separately in the model. While multicollinearity does not bias coefficient estimates, it inflates standard errors, potentially explaining the lack of statistical significance and suggesting reduced precision rather than a definitive absence of effect.

In summary, Model 2a robustly demonstrates that SRD II coincided with a significant weakening of the positive ESG-pay relationship within EU firms. However, Model 2b's comparative analysis provides no conclusive evidence that this weakening effect is uniquely attributable to the SRD II directive itself.

Figure 2 displays the pre-treatment ESG-score trajectories for the EU sample and the control group, which run broadly parallel over the pre-SRD II period. A formal pre-trend test confirms this visual impression, yielding an insignificant statistic. Taken together, the parallel lines and non-rejection of the null hypothesis indicate that the Difference-in-Differences identification strategy is unlikely to be confounded by divergent pre-treatment dynamics, thereby strengthening the causal interpretation of subsequent treatment effects.

Robustness Check: Lead ESG Scores

To address potential reverse causality concerns, a robustness check using a forward-looking specification was conducted by measuring ESG performance at time t+1 while retaining ESG-linked executive compensation and other explanatory variables at time t. This specification evaluates whether ESG-linked incentives predict subsequent rather than contemporaneous ESG performance. Detailed regression results for the Lead ESG Score Robustness test models are presented in Appendix Table A1 and A2.

The findings from this lead ESG model closely mirror the baseline results, though with expected reductions in coefficient magnitudes, reflecting increased uncertainty in predicting future outcomes. Specifically, the pre-SRD II association between ESG-linked compensation and ESG scores remained significantly positive for the aggregate ESG score (4.016 points, $p<0.01$) and each individual pillar (Environmental: 3.993 points, $p<0.01$; Social: 3.242 points, $p<0.01$; Governance: 4.425 points, $p<0.01$). However, the interaction terms capturing the change in this relationship post-SRD II notably declined in magnitude and significance. For instance, the ESG aggregate interaction decreased to -3.279 ($p<0.01$), indicating that the post-SRD II effect became statistically insignificant when tested via a F- test ($p=0.216$). Similar patterns emerged for the Environmental (interaction: -3.946, F $p=0.957$) and social pillars (interaction: -3.017, F $p=0.773$), suggesting negligible post-SRD II effects. Only the Governance pillar retained statistical significance post-SRD II (interaction: -1.951, F $p=0.017$), although with reduced economic magnitude.

Extending this forward-looking specification to the comparative model including the control group (Model 2b), the triple interaction terms remained statistically insignificant across all ESG dimensions, confirming the baseline conclusion. Nonetheless, interpretation of these comparative results warrants caution due to elevated Variance Inflation Factor (VIF) values, indicating multicollinearity among the interaction terms. This multicollinearity inflates standard errors, potentially obscuring true effects by reducing precision.

Overall, the lead ESG robustness check substantiates the baseline findings. It confirms a significant positive relationship between ESG-linked executive pay and subsequent ESG performance prior to SRD II, a marked weakening after the directive's implementation, and no definitive evidence distinguishing the EU's post-SRD II weakening from broader trends observed in the control group.

Robustness Check: Propensity Score Matching (PSM)

To address potential selection bias and enhance the robustness of the DiD and DiDiD analyses, a Propensity Score Matching (PSM) procedure was conducted. This approach ensures that treated (EU) and control groups are comparable in observable characteristics, reducing bias and improving internal validity (Abadie, 2005; Stuart et al., 2014).

Comprehensive regression outputs for the propensity-score–matching (PSM) robustness tests are provided in Appendix Tables A3–A5.

The PSM-adjusted results broadly corroborate the baseline findings. For Hypothesis 1, the DiD regression shows nearly identical coefficients both with (0.074, $p<0.1$) and without controls (0.071, $p<0.1$), confirming the robustness of the positive relationship between SRD II implementation and increased adoption of ESG-linked compensation.

For Hypothesis 2 (Model 2a, EU-only), results after matching remain consistent with the baseline, maintaining statistically significant positive associations between ESG-linked executive compensation and ESG performance pre-SRD II for the aggregate ESG score (5.667 points, $p<0.01$) and individual pillars (Environmental: 5.515, $p<0.01$; Social: 5.016, $p<0.01$; Governance: 6.258, $p<0.01$). Post-SRD II weakening of these relationships also remains significant, except for the Governance dimension. F tests confirm that the post-SRD combined coefficients remain statistically significant for aggregate ESG ($p<0.01$), Social ($p=0.017$), and Governance scores ($p<0.01$), but not for the Environmental score ($p=0.235$).

The comparative DiDiD model (Model 2b) reveals no significant differences between EU and control groups regarding changes in ESG compensation effectiveness post-SRD II, mirroring the baseline results. The triple interaction terms remain statistically insignificant across all ESG dimensions. However, interpretation here remains cautious due to persistent multicollinearity concerns indicated by elevated Variance Inflation Factors (VIFs), inflating standard errors and reducing precision.

Overall, the PSM robustness check reinforces the stability of the core findings, suggesting that observed outcomes are not substantially driven by differences in pre-treatment firm characteristics.

Robustness Check: Placebo Test (2017)

To further test the robustness of the observed relationships and mitigate concerns that results may be driven by pre-existing trends, placebo tests were conducted using 2017 as an artificial treatment year. Detailed regression results for the placebo analysis are reported in Appendix Tables A6–A8.

For Hypothesis 1, the placebo analysis using 2017 as the treatment year revealed no significant impact of SRD II on the adoption of ESG-linked executive compensation. The DiD regression interaction term (treatEU × postSRD) was insignificant both without controls (0.0450, $p>0.1$) and with controls (0.0464, $p>0.1$). This contrasts with the main 2019 specification where the interaction term was weakly significant, reinforcing the conclusion that the observed increase in ESG-linked compensation post-SRD II is likely due to the directive itself rather than unrelated trends.

In contrast, the placebo tests for Hypothesis 2 revealed similar patterns to the baseline analysis. Significant positive associations between ESG-linked executive compensation and ESG performance pre-placebo year persisted across the aggregate ESG score (6.303, $p<0.01$) and individual pillars (Environmental: 5.253, $p<0.01$; Social: 6.978, $p<0.01$; Governance: 5.881, $p<0.01$). However, similar significant decreases post-placebo year were also observed, suggesting that the weakening relationship post-SRD II identified in the baseline may not solely reflect the directive's influence. F-tests confirmed that combined coefficients remained significant across all ESG dimensions, further suggesting caution in attributing post-2019 changes exclusively to SRD II.

In the comparative DiDiD placebo tests (Hypothesis 3), the triple interaction terms remained consistently insignificant across ESG aggregate and individual dimensions, aligning with the baseline findings. This further supports the conclusion that there is no unique differential effect attributable to SRD II implementation between EU and control groups. Nevertheless, interpretation remains cautious due to continuing high Variance Inflation Factors (VIFs), indicating potential multicollinearity issues that inflate standard errors and reduce precision.

Overall, the placebo test results strongly validate the causal inference for Hypothesis 1, raise important caution regarding Hypothesis 2, and reinforce the null findings in Hypothesis 3. These results imply that while SRD II likely drove increased ESG pay adoption, the subsequent weakening of its performance effect may reflect broader trends rather than direct causal impacts of the directive.

Robustness Check: Heterogeneity by pre-SRD II Say-on-Pay (SOP) Frameworks

As a final robustness check, the analysis examines whether the results differ based on the presence of binding Say-on-Pay (SOP) legislation at the time of SRD II implementation. This classification follows findings by Carter et al. (2023), they find that increases in ESG-linked executive compensation were mainly concentrated in countries with binding SOP frameworks. In contrast, countries with advisory or 'comply-or-explain' regimes showed no such trend. This may suggest that binding SOP countries have already adapted to similar SOP regulation that is introduced by SRD II, potentially limiting the directive's additional impact there. Out of all countries included in the EU sample, only Denmark, France, Spain and Sweden had binding SOP regulation before SRDII was implemented and therefore they are combined in a "preSOP" subgroup. The other 16 countries, which had no national (binding) SOP regulation prior to SRD II implementation grouped in a subgroup called "noSOP" regulation (Carter et al., 2023; Cyprus Stock Exchange, 2014; Government of Ireland, 2014; International Finance Corporation, 2015; Ljubljana Stock Exchange Inc. & Slovenian Directors' Association, 2021; Parlamentul României, n.d.; PwC Legal, n.d.; Wolf Theiss, 2024). Detailed regression outputs for the robustness tests using propensity-score matching (PSM), which split the EU sample into pre-SOP and post-SOP groups, are provided in Appendix Tables A9–A16. Additionally, the pre-trend graph that is referred to in the regression interpretation is in Appendix Figure A16.

To test for heterogeneity between the two groups, two analyses were conducted. First, separate DiD regressions were run: one comparing the preSOP group to the control group, and another comparing the noSOP group to the control group, excluding the other subgroup in each case. The results show a 12.6 percentage point post-SRD II increase in ESG-linked pay in preSOP countries (significant at the 1% level), versus only a 4-percentage point increase in noSOP countries, which is not significant. Pre-trend tests comparing each subgroup to the control group were insignificant, indicating that the parallel trends assumption holds in both cases.

Second, both subgroups were included in a combined model. The preSOP effect remained statistically significant (shrinking by about one percentage point), while the noSOP effect stayed insignificant. The F-test confirms that the difference between the two treatment effects is statistically significant ($p = 0.013$).

However, a pre-trend test comparing the two subgroups directly reveals that they were already on diverging trajectories before 2020, violating the parallel trends assumption required to attribute the difference between the two treatment effects to SRD II. As a result, this pooled comparison can only offer suggestive evidence that binding SOP regimes were associated with a stronger uptake of ESG-linked pay following the directive compared to countries without (binding) SOP legislation.

Although the preSOP group's separate regression against the control group is statistically significant and passes the pre-trend test, the clear upward trend in ESG-linked pay from 2018–2019 compared to the control group (see figure (n)) introduces uncertainty. This suggests that factors other than SRD II may have contributed. Thus, while consistent with a causal interpretation, the evidence remains suggestive rather than conclusive..

For Hypothesis 2, the robustness check was conducted separately for the preSOP and noSOP country groups. Both groups showed similar positive and statistically significant relationships ($p<0.01$) between ESG-linked executive compensation and ESG scores prior to SRD II implementation. After SRD II, both groups experienced a weakening in this relationship for the aggregate ESG and environmental (E) scores, with changes consistent in magnitude and significance.

However, divergences occurred in the social (S) and governance (G) pillars. Despite these divergences, the F-tests conducted to evaluate differences between preSOP and noSOP groups revealed insignificant results for the ESG aggregate score ($p=0.821$) and each individual pillar (E score $p=0.964$, S score $p=0.174$, and G score $p=0.210$), indicating no significant statistical difference between the two groups in terms of changes post-SRD II.

Additionally, the comparative DiDiD model (Hypothesis 2b) showed that triple interaction terms remain statistically insignificant across both SOP groups for all ESG dimensions, reaffirming that the observed weakening relationship post-SRD II is not significantly different between EU and control firms.

Pre-trend tests performed for both EU sub-groups against the control group revealed no significant pre-trends for ESG pay adoption, and only marginally significant indications emerged for ESG and E scores in the preSOP group. Taken together, these findings emphasize the moderating role of existing national SOP legislation on the relationship between ESG-linked executive compensation and ESG outcomes following SRD II implementation, particularly in social and governance domains.

Discussion

6.1 Recap of main findings

The results of this study reveal two main findings about the impact of the EU SRDII on the adoption and effectiveness of ESG-linked executive compensation in increasing sustainability performance (measured by ESG scores). Suggestive evidence was found that SRDII caused a slight increase in ESG-linked pay adoption of EU-listed firms of about 7 percentage points, and on top of that, highly significant evidence was found that the effectiveness of ESG-linked pay in improving ESG outcomes weakened substantially within EU-listed firms. While the coefficient between the two remained positive for total ESG scores, it dropped from about 5.6 points to a rounded 2.4 points in the post period. For the underlying environmental, social, and governance pillar scores, results differed. While the social pillar score experienced similar outcomes as for the weighted ESG scores, the environmental score experienced the largest drop in effectiveness, with a post-SRDII effect not statistically different from zero, and in contrast, the governance pillar did not experience a significant decrease in coefficient at all.

6.2 Theoretical implications

H1

The observed, marginally significant increase in ESG-linked pay adoption in listed EU firms following SRDII implementation aligns with theoretical expectations and findings from existing literature, which posit that Say on Pay regulation can increase the adoption of ESG-linked pay structures. According to agency theory, the mandatory say-on-pay mechanisms that were introduced in the EU SRDII should enable shareholders (principals) to better align managerial (agents) incentives with long-term value creation. Carter et al. (2023) found empirical support for this mechanism by finding that the likelihood of ESG metrics being included in CEO compensation increased approximately 10% following the introduction of national binding SOP legislation. Lastly, a possible explanation for why the present study finds only suggestive evidence, rather than a significant effect comparable to that of Carter et al., is that, although SRD II mandates binding SOP provisions by default, it allows individual member states to decide whether these provisions are ultimately implemented as binding or advisory in national legislation, potentially weakening the directive's overall impact.

Relatedly, to explore whether prior exposure to binding SOP frameworks shaped the directive's impact, an effect initially expected to be weaker in these contexts, given that the SRD II provisions would not represent a fundamental regulatory shift and firms in these countries may have already adjusted, a complementary robustness test compared countries with binding SOP regulation in place before SRD II separately with the control group. Those pre-SOP countries exhibited a post-directive rise in ESG-pay adoption of approximately 12 percentage points, whereas countries without such legislation showed an insignificant increase of about 4 percentage points. This pattern implies that the capacity of say-on-pay rules to promote ESG-linked pay may depend on the surrounding regulatory environment. The evidence, however, remains suggestive. Visual inspection of the pre-trend graphs reveals a modest divergence between the pre-SOP group and the control group, despite an insignificant formal pre-trend F-test. Moreover, a pooled specification that contrasts the two EU subgroups confirms a statistically significant difference yet fails its own parallel-trends test, and no further robustness checks were performed. Taken together, the result points to a potentially meaningful pattern but should be viewed with caution and not taken as hard evidence of a causal effect.

H2

The central finding of this study is that the effectiveness of ESG-linked compensation schemes, measured by their association with improved ESG scores, declined significantly in the post-SRDII period within EU firms compared to the period before SRDII implementation. While ESG-linked pay remained positively associated with overall ESG scores, the magnitude of this relationship decreased largely, with the most substantial weakening observed in the environmental pillar. The results suggest that although ESG pay continues to positively influence social and governance pillar scores to some extent, its ability to drive meaningful improvements has diminished.

This pattern may reflect symbolic rather than substantive adoption, consistent with the hypothesis. It also fits with the idea of coercive isomorphism from neo-institutional theory, which suggests that organizations sometimes adopt formal structures, like ESG-linked incentives, not to drive real change, but to signal alignment with external expectations or regulatory demands. On top of that, these findings align with research by Adu et al. (2022), who argue that ESG-related pay structures are particularly vulnerable to such symbolic use. Furthermore, Edmans (2023) extends this view, drawing on Holmstrom and Milgrom's

(1991) multitasking framework. He warns that linking compensation to ESG metrics may distort managerial effort toward measurable, low-effort targets, at the expense of more complex or long-term goals. The findings in this study are consistent with the concern proposed by Edmans. When addressed through the lens of Edmans reasoning, the fact that the largest drop in ESG-linked pay effectiveness was recorded for the environmental pillar may indicate that improving environmental performance is either more complex, harder to game, or less responsive to short-term incentives than social or governance targets. Given that the environmental pillar reflects how well a company addresses issues such as climate change and pollution, areas where substantial improvements in performance likely require structural change and long-term commitment, this reasoning appears plausible.

Despite the sharp post-SRDII decline in the ESG pay-performance relationship, no statistically significant evidence was found in this study that this decrease was caused by the implementation of SRDII. The triple interaction term, which tested the change in coefficient of the effect of ESG-linked pay on ESG scores in the post-SRDII period compared to the control group, was insignificant across overall ESG scores as well as all individual pillar scores, indicating that the observed weakening in the EU is not significantly different from the pattern observed by the control group. This result is reinforced by a placebo test that used an alternative transition year, which shows similar declines in effectiveness even prior to SRDII implementation. These findings suggest that the deterioration in the effectiveness of ESG-linked pay is part of a broader trend and not limited to the EU context.

6.3 Practical Implications

The findings of this study provide relevant insights for multiple stakeholders, predominantly for shareholders, policymakers, and firms. The analysis contributes to existing literature by offering a more nuanced understanding of how the effectiveness of ESG-linked executive compensation has developed in EU-listed firms and how this relationship is influenced by regulatory interventions such as the Shareholder Rights Directive II (SRD II).

Implications for Shareholders

For shareholders of publicly listed companies within the European Union, the results are particularly relevant. While mechanisms such as "Say-on-Pay" (SoP) included in SRD have expanded shareholder influence over executive remuneration policies, this study suggests that increased adoption of ESG-linked compensation structures does not necessarily translate into the intended improvements in ESG performance. Although the observed decline cannot be causally attributed to SRD II when compared to the control group and may reflect broader structural trends, shareholders must be aware that aligning remuneration structures with their own incentives does not always mean that the real actions of managers are aligned with their interests. Therefore, they should actively monitor not only the inclusion of ESG metrics in pay packages but also the actual ESG outcomes over time. Where misalignment remains, shareholders may need to adapt their future voting behavior to reduce residual agency problems and improve the integrity of ESG-linked incentives.

The recently introduced EU Corporate Sustainability Reporting Directive (CSRD) presents a potentially promising development in sustainability reporting rules for a broad range of EU firms, including listed firms, potentially enhancing shareholders' ability to assess the effectiveness of ESG-related incentives (European Union, 2022). By mandating standardized sustainability disclosures in line with the European Sustainability Reporting Standards (ESRS) and requiring independent verification of the reported information, the CSRD is expected to improve the quality, comparability, and credibility of ESG information. As a consequence, shareholders may become better equipped to assess whether ESG-related pay structures have effectively contributed to substantive improvements in ESG outcomes, thereby enabling them to exercise their voting power more effectively.

Implications for Corporations

For firms seeking to integrate ESG considerations into their incentive frameworks, the results indicate that the mere adoption of ESG-linked compensation mechanisms may not be a sufficiently effective strategy for enhancing sustainability performance. Just like for shareholders, it is important for firms to closely monitor the outcomes of ESG-linked pay incentives and adapt their implementation accordingly. One potentially effective tool in this context is the use of clawback provisions, contractual mechanisms that allow firms to reclaim previously awarded bonuses if it is later determined that the performance targets were not meaningfully achieved. Clawbacks can mitigate the risk of managerial manipulation or the gaming of incentive systems and have shown effectiveness in improving the impact of financially based incentive schemes in previous studies (Velte, 2020).

Implications for Policymakers

Lastly, the findings of this study also offer significant implications for policymakers. No evidence was found that SRD II causally weakened the link between ESG incentives and performance compared to non-EU firms. This implies that the directive, focusing on its remuneration provisions, did not increase ceremonial ESG pay adoption beyond broader global trends. Nevertheless, the post-2019 decline in the overall effectiveness of ESG-linked compensation suggests that merely increasing shareholder influence or enhancing transparency is most likely insufficient for driving meaningful sustainability improvements.

Regulators should therefore focus not only on enhancing disclosure and implementing SOP legislation but also on strengthening the substance and enforceability of ESG-related remuneration practices to better address agency issues. In addition, there is the suggestive indication that SRD II may have altered ESG-linked pay adoption practices differently across EU firms depending on their pre-existing regulatory environment. In order to determine whether this is actually true, more research is needed; however, understanding the interplay between national legislation of member states and EU-wide regulation and the way it influences outcomes may also help policymakers to design effective EU legislation.

6.4 Limitations

While the findings of this study offer valuable insights, they must be interpreted in light of several limitations.

One important limitation concerns the composition of the control group, which consists of only Switzerland and Singapore. This limits the generalizability of the results to other global regions. Efforts were made to expand the control group by other countries that met comparability requirements (comparable economically and no changes in SOP regulation during the studied timeframe). However, pre-trend tests revealed significant differences compared to the EU for all potential candidates, particularly in overall ESG scores as well as the social and governance pillars. These pre-trend tests including the list of countries can be found in table A17 in the Appendix. Although all countries except Hong Kong exhibited similar pre-trends in the environmental pillar, this alone was insufficient, as the main dependent variable of this study is the overall ESG score. Since the validity of the DiD and triple DiD approach depends on the parallel trends assumption, the control group was not extended beyond Switzerland, and Singapore.

Another limitation lies in the relatively short post-treatment window available, which may have constrained the ability to observe the full effects of SRD II, especially in the environmental pillar, which showed the steepest decline. As environmental improvements often require longer-term structural changes, related ESG actions may not yet be visible in the scores used in this analysis.

Besides, ESG scores data was sourced from only a single provider, Refinitiv Eikon. Since ESG ratings differ considerably between agencies due to methodological variation (Berg et al., 2022), results may have differed if alternative sources were used. More broadly, the use of ESG scores as a proxy for sustainability performance is itself contested, mainly because qualitative efforts may go unrecognized and calculation methods lack standardization. (Berg et al., 2022; Sahin et al., 2022). Nonetheless, ESG scores remain the most widely used and accessible metric in empirical sustainability research, offering a level of comparability that is difficult to achieve otherwise (Clément et al. 2023; Martiny et al. 2024).

Finally, the study applies a binary variable to capture ESG-linked pay, which does not account for heterogeneity in incentive design. Existing research suggests that the effectiveness of such pay schemes depends significantly on how they are designed (Flammer et al., 2021). Incorporating variation in the type, weighting, and measurability of ESG targets would allow for a more nuanced analysis.

7. Conclusion and Future Research

This study investigated whether the EU's Shareholder Rights Directive II (SRD II) caused (1) greater use of ESG-linked executive pay and (2) changed ESG-linked executive pay effectiveness.

The evidence shows a moderate 7-percentage-point rise in adoption of ESG pay plans among listed EU firms after SRD II. Yet a difference-in-differences comparison with a matched non-EU control group reveals no statistically significant treatment effect, implying that SRD II accelerated, but did not uniquely drive, this trend. However, due to the high multicollinearity inherent in the DiDiD model design, the results remain ambiguous.

More importantly, the effectiveness of ESG-linked pay has weakened, at least within the EU and the results suggest that this pattern may even be a broader phenomenon. While the pay–performance association remains positive overall, the post-SRD II effect size roughly halves, and the environmental pillar loses any significant positive effect. These patterns support concerns about ceremonial compliance: companies appear to bolt ESG metrics onto pay packages without embedding incentives that bite. Such symbolic adoption echoes neo-institutional predictions and Edmans' (2023) multitasking critique of incentive design for multidimensional goals.

For policymakers, this study offers relevant insights, suggesting that enhancing shareholder power or transparency alone is unlikely to resolve agency problems or significantly advance firm-level ESG performance. For boards, credible ESG pay mechanisms should be based on clear, measurable targets that are independently audited and subject to a critical evaluation of their effectiveness. And investors should critically assess the outcomes of their say-on-pay votes and incorporate insights from evolving disclosures, such as those under the CSRD in future voting decisions.

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9. Appendices

Table A1. Hypothesis 2a: One-Year Lead (t+1) Model (EU Sample Only)

Variable	ESG Score (t+1)	E Score (t+1)	S Score (t+1)	G Score (t+1)
ESG_ExecComp	4.016***	3.993***	3.242***	4.425***
	(0.721)	(1.030)	(0.969)	(1.235)
ESG_ExecComp × postSRD	-3.279***	-3.946***	-3.017***	-1.951
	(0.826)	(1.176)	(1.093)	(1.434)
log_TotalAssets	3.892***	6.073***	1.456*	5.149***
	(0.774)	(1.540)	(0.746)	(1.312)
Fin_Leverage	-1.486	-1.181	-0.455	-2.795
	(2.162)	(3.773)	(2.693)	(3.391)
Board_Size	0.0425	0.158	0.185	-0.469**
	(0.131)	(0.189)	(0.169)	(0.209)
Indep_BoardMembers	0.0907***	0.0534**	0.0267	0.193***
	(0.0145)	(0.0225)	(0.0217)	(0.0246)
FoB	0.0703***	0.0582*	0.0651**	0.0753**
	(0.0216)	(0.0316)	(0.0296)	(0.0352)
Avg_BoardTenure	0.192	0.184	0.363**	0.0405
	(0.124)	(0.191)	(0.170)	(0.216)
ROA	-0.348**	-0.354	-0.659***	0.266
	(0.163)	(0.252)	(0.180)	(0.202)
Constant	-35.02**	-83.75**	25.57	-68.80**
	(17.15)	(35.24)	(16.80)	(28.54)
Observations	4,222	4,222	4,222	4,222
R-squared	0.907	0.900	0.875	0.819
F-test (post-SRD slope)	1.530 (p = 0.216)	0.000 (p = 0.957)	0.080 (p = 0.773)	5.720 (p = 0.0170)

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A2. Hypothesis 2b: One-Year Lead (t+1) Triple DiD Model (EU vs Control Triple DiD)

Variable	ESG Score (t+1)	E Score (t+1)	S Score (t+1)	G Score (t+1)
ESG_ExecComp	5.072***	5.882**	5.319**	4.933*
	(1.755)	(2.923)	(2.227)	(2.595)
ESG_ExecComp × postSRD × treatEU	1.132	4.264	0.848	0.604
	(2.077)	(3.108)	(2.674)	(3.040)
log_TotalAssets	3.670***	5.453***	1.475*	5.235***
	(0.738)	(1.350)	(0.768)	(1.195)
Fin_Leverage	0.408	0.808	1.554	-0.885
	(1.883)	(3.122)	(2.477)	(2.925)
Board_Size	0.0648	0.199	0.202	-0.483**
	(0.124)	(0.182)	(0.159)	(0.193)
Indep_BoardMembers	0.0806***	0.0387**	0.0163	0.191***
	(0.0133)	(0.0196)	(0.0189)	(0.0219)
FoB	0.0715***	0.0486	0.0490*	0.103***
	(0.0206)	(0.0296)	(0.0288)	(0.0318)
Avg_BoardTenure	0.238**	0.237	0.393**	0.0510
	(0.116)	(0.181)	(0.160)	(0.188)
ROA	-0.349**	-0.406*	-0.647***	0.324
	(0.177)	(0.237)	(0.185)	(0.215)
Constant	-30.36*	-68.75**	24.34	-71.17***
	(16.24)	(30.62)	(17.09)	(26.06)
Observations	5,146	5,146	5,146	5,146
R-squared	0.914	0.900	0.881	0.831

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A3. Hypothesis 1: Propensity Score Matched Sample (PSM)

Variable	Model (2): With Controls
treatEU × postSRD	0.074*
	(0.038)
log_TotalAssets	0.080***
	(0.027)
Fin_Leverage	-0.094
	(0.068)
Board_Size	0.004
	(0.004)
Indep_BoardMembers	0.001
	(0.001)
FoB	0.001
	(0.001)
ROA	0.004
	(0.007)
Constant	-1.359**
	(0.608)
Observations	6,601
R-squared	0.686

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A4. Hypothesis 2b: Propensity Score Matched Sample (PSM) (EU Sample Only)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.667***	5.515***	5.016***	6.258***
	(0.653)	(0.962)	(0.872)	(1.010)
ESG_ExecComp × postSRD	-3.249***	-4.463***	-3.208***	-1.090
	(0.738)	(1.094)	(0.976)	(1.175)
log_TotalAssets	4.493***	6.588***	2.829***	4.750***
	(0.681)	(1.441)	(0.771)	(1.154)
Fin_Leverage	-1.907	2.673	-1.538	-4.307
	(1.984)	(3.513)	(2.649)	(2.853)
Board_Size	0.0667	0.149	0.220	-0.425**
	(0.134)	(0.189)	(0.180)	(0.191)
Indep_BoardMembers	0.107***	0.0437**	0.0347	0.249***
	(0.0149)	(0.0217)	(0.0212)	(0.0232)
FoB	0.102***	0.0748**	0.0572**	0.168***
	(0.0213)	(0.0307)	(0.0274)	(0.0336)
Avg_BoardTenure	0.272**	0.207	0.314*	0.356*
	(0.121)	(0.178)	(0.163)	(0.190)
ROA	-0.363**	-0.127	-0.582***	-0.180
	(0.145)	(0.198)	(0.183)	(0.247)
Constant	-53.25***	-100.3***	-6.847	-69.96***
	(15.16)	(32.86)	(17.43)	(24.90)
Observations	5,542	5,542	5,542	5,542
R-squared	0.884	0.868	0.844	0.790
F-test (post-SRD slope)	17.63	1.41	5.77	31.20
	(p = 0.000)	(p = 0.235)	(p = 0.017)	(p = 0.000)

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A5. Hypothesis 2b: Propensity Score Matched Sample (Triple DiD) (EU vs Control Triple DiD)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.221***	6.989**	5.762***	4.108**
	(1.556)	(2.780)	(2.042)	(1.964)
ESG_ExecComp ×	0.576	3.222	1.588	-1.138
postSRD × treatEU	(1.708)	(2.783)	(2.240)	(2.361)
log_TotalAssets	4.247***	6.077***	2.990***	4.448***
	(0.676)	(1.298)	(0.795)	(1.063)
Fin_Leverage	-0.419	4.485	-0.452	-2.850
	(1.733)	(2.821)	(2.291)	(2.321)
Board_Size	0.099	0.195	0.227	-0.389**
	(0.125)	(0.179)	(0.167)	(0.174)
Indep_BoardMembers	0.104***	0.043**	0.034*	0.244***
	(0.013)	(0.019)	(0.018)	(0.019)
FoB	0.097***	0.073**	0.041	0.172***
	(0.020)	(0.029)	(0.026)	(0.029)
Avg_BoardTenure	0.277**	0.203	0.301**	0.361**
	(0.111)	(0.168)	(0.149)	(0.164)
ROA	-0.391**	-0.161	-0.553***	-0.233
	(0.164)	(0.186)	(0.179)	(0.304)
Constant	-47.920***	-89.156***	-10.290	-63.047***
	(15.035)	(29.478)	(18.004)	(22.988)
Observations	6,601	6,601	6,601	6,601
R-squared	0.891	0.870	0.850	0.804

Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.

Table A6. Hypothesis 1: 2017 Placebo DiD Model

Variable	Model (2): With Controls
treatEU × postSRD	0.0464
	(0.0422)
log_TotalAssets	0.0821***
	(0.0284)
Fin_Leverage	-0.112*
	(0.0615)
Board_Size	0.000988
	(0.00497)
Indep_BoardMembers	0.000750
	(0.000652)
FoB	0.000769
	(0.000882)
ROA	0.000668
	(0.00664)
Constant	-1.373**
	(0.645)
Observations	5,063
R-squared	0.681

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A7. Hypothesis 2a: 2017 Placebo (EU Sample Only)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	6.303***	5.253***	6.978***	5.881***
	(0.994)	(1.362)	(1.373)	(1.445)
ESG_ExecComp × postSRD	-3.842***	-3.782***	-5.409***	-1.088
	(0.969)	(1.326)	(1.329)	(1.426)
log_TotalAssets	4.799***	6.146***	3.130***	5.651***
	(0.760)	(1.583)	(0.884)	(1.189)
Fin_Leverage	-3.471**	-0.537	-2.826	-5.771**
	(1.447)	(2.719)	(1.911)	(2.240)
Board_Size	-0.0337	0.0384	0.167	-0.585***
	(0.146)	(0.197)	(0.202)	(0.208)
Indep_BoardMembers	0.108***	0.0480*	0.0311	0.253***
	(0.0187)	(0.0257)	(0.0255)	(0.0279)
FoB	0.0856***	0.0662*	0.0472	0.141***
	(0.0241)	(0.0356)	(0.0323)	(0.0366)
Avg_BoardTenure	0.185	0.128	0.312*	0.142
	(0.136)	(0.201)	(0.185)	(0.218)
ROA	-0.505*	-0.511	-0.680***	-0.164
	(0.267)	(0.382)	(0.230)	(0.288)
Constant	-55.54***	-84.82**	-9.662	-84.74***
	(17.33)	(36.60)	(20.33)	(26.45)
Observations	4,238	4,238	4,238	4,238
R-squared	0.881	0.858	0.837	0.779
F-test (post-SRD slope)	20.25	3.05	4.50	30.01
	(p = 0.000)	(p = 0.081)	(p = 0.034)	(p = 0.000)

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A8. Hypothesis 2b: 2017 Placebo Triple DiD Model (EU vs Control Triple DiD)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.989***	6.827*	7.489**	3.660
	(2.273)	(4.012)	(2.952)	(2.781)
ESG_ExecComp × postSRD × treatEU	0.368	2.513	0.621	-1.137
	(2.272)	(3.804)	(2.963)	(3.115)
log_TotalAssets	4.555***	5.720***	3.273***	5.346***
	(0.764)	(1.423)	(0.920)	(1.111)
Fin_Leverage	-2.232	0.782	-1.756	-4.316*
	(1.521)	(2.514)	(1.997)	(2.247)
Board_Size	-0.0286	0.0551	0.121	-0.556***
	(0.137)	(0.188)	(0.187)	(0.190)
Indep_BoardMembers	0.103***	0.0446*	0.0288	0.245***
	(0.0167)	(0.0235)	(0.0224)	(0.0242)
FoB	0.0769***	0.0616*	0.0164	0.151***
	(0.0223)	(0.0334)	(0.0310)	(0.0322)
Avg_BoardTenure	0.193	0.105	0.258	0.239
	(0.124)	(0.190)	(0.168)	(0.186)
ROA	-0.531*	-0.550	-0.655***	-0.210
	(0.288)	(0.403)	(0.220)	(0.348)
Constant	-49.28***	-73.28**	-11.98	-77.98***
	(17.49)	(32.97)	(21.27)	(24.64)
Observations	5,063	5,063	5,063	5,063
R-squared	0.889	0.862	0.845	0.797

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A9. Hypothesis 1: Pre-SOP vs Non-SOP DiD

Variable	Pre-SOP vs Non-SOP DID
did_preSOP	0.117***
	(0.0417)
did_nonSOP	0.0419
	(0.0399)
log_TotalAssets	0.0737***
	(0.0260)
Fin_Leverage	-0.0744
	(0.0599)
Board_Size	0.00291
	(0.00433)
Indep_BoardMembers	0.000711
	(0.000519)
FoB	0.00104
	(0.000729)
ROA	0.00321
	(0.00653)
Constant	-1.218**
	(0.576)
Observations	7,310
R-squared	0.700
p-value ΔDID	0.0135

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A10. Hypothesis 2: Difference-in-Difference by SOP Implementation Timing (EU Sample Only)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.934***	5.400***	6.006***	5.667***
	(0.982)	(1.381)	(1.206)	(1.445)
ESG_ExecComp × postSRD	-3.416***	-4.265***	-4.162***	-0.329
	(1.038)	(1.504)	(1.298)	(1.587)
ESG_ExecComp × postSRD × preSOP	0.311	-0.0926	2.538	-2.792
	(1.373)	(2.030)	(1.866)	(2.226)
log_TotalAssets	4.475***	6.541***	2.993***	4.526***
	(0.664)	(1.390)	(0.764)	(1.127)
Fin_Leverage	-1.554	2.864	-1.540	-3.536
	(1.722)	(3.040)	(2.325)	(2.447)
Board_Size	0.0535	0.128	0.184	-0.375**
	(0.132)	(0.185)	(0.179)	(0.184)
Indep_BoardMembers	0.110***	0.0436**	0.0352*	0.260***
	(0.0139)	(0.0202)	(0.0197)	(0.0216)
FoB	0.0994***	0.0716**	0.0496*	0.175***
	(0.0204)	(0.0292)	(0.0259)	(0.0318)
Avg_BoardTenure	0.261**	0.207	0.265*	0.400**
	(0.118)	(0.173)	(0.158)	(0.185)
ROA	-0.339**	-0.133	-0.552***	-0.146
	(0.139)	(0.190)	(0.179)	(0.225)
Constant	-53.03***	-99.06***	-9.429	-68.03***
	(14.66)	(31.43)	(17.09)	(24.27)
Observations	6,014	6,014	6,014	6,014
R-squared	0.893	0.875	0.855	0.801
F-test (Δ diff)	0.0514	0.00208	1.851	1.573
	(p = 0.821)	(p = 0.964)	(p = 0.174)	(p = 0.210)

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A11. Hypothesis 1: Split by SOP Implementation Timing (Pre-SOP Countries)

Variable	**Pre-SOP Countries (Binding SOP before SRDII)**
treatEU × postSRD	0.126***
	(0.0422)
log_TotalAssets	0.0483
	(0.0339)
Fin_Leverage	-0.0145
	(0.0716)
Board_Size	0.00287
	(0.00641)
Indep_BoardMembers	0.000940
	(0.000757)
FoB	0.00170
	(0.00104)
ROA	0.00635
	(0.00466)
Constant	-0.742
	(0.745)
Observations	3,969
R-squared	0.707

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A12. Hypothesis 1: Split by SOP Implementation Timing (No-SOP Countries)

Variable	**No-SOP Countries (No binding SOP before SRDII)**
treatEU × postSRD	0.0419
	(0.0397)
log_TotalAssets	0.104***
	(0.0288)
Fin_Leverage	-0.0339
	(0.0742)
Board_Size	0.00177
	(0.00520)
Indep_BoardMembers	0.000859
	(0.000612)
FoB	0.00105
	(0.000868)
ROA	-0.0261
	(0.0209)
Constant	-1.936***
	(0.638)
Observations	4,637
R-squared	0.703

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A13. Hypothesis 2a: Pre-SOP Countries (Split Sample) (EU Sample Only)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.530***	6.030***	4.349***	6.418***
	(0.794)	(1.237)	(1.241)	(1.395)
ESG_ExecComp ×	-3.301***	-4.728***	-1.804	-3.304**
postSRD	(0.951)	(1.450)	(1.377)	(1.597)
log_TotalAssets	3.437***	4.653**	2.346**	2.938**
	(0.808)	(2.270)	(1.042)	(1.192)
Fin_Leverage	-0.0702	3.664	-1.398	-1.283
	(2.337)	(4.465)	(3.132)	(3.005)
Board_Size	0.0925	0.392*	0.356	-0.645**
	(0.160)	(0.229)	(0.229)	(0.294)
Indep_BoardMembers	0.121***	0.0641*	-0.00585	0.339***
	(0.0212)	(0.0344)	(0.0335)	(0.0377)
FoB	0.150***	0.126***	0.105***	0.219***
	(0.0281)	(0.0409)	(0.0396)	(0.0463)
Avg_BoardTenure	0.533***	0.419**	0.472**	0.789***
	(0.129)	(0.201)	(0.192)	(0.263)
ROA	-0.203*	-0.0445	-0.527***	0.0695
	(0.110)	(0.256)	(0.144)	(0.135)
Constant	-34.75**	-63.27	2.541	-38.90
	(17.20)	(50.07)	(22.57)	(25.57)
Observations	2,673	2,673	2,673	2,673
R-squared	0.911	0.903	0.869	0.829
F-test (post-SRD slope)	7.73 (p = 0.006)	1.19 (p = 0.277)	6.15 (p = 0.013)	5.55 (p = 0.019)

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A14. Hypothesis 2a: No-SOP Countries (Split Sample) (EU Sample Only)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.845***	5.300***	5.903***	5.585***
	(0.984)	(1.392)	(1.208)	(1.427)
ESG_ExecComp ×	-3.287***	-4.013***	-4.171***	-0.00416
postSRD	(1.043)	(1.523)	(1.306)	(1.607)
log_TotalAssets	5.315***	8.096***	3.584***	5.780***
	(0.859)	(1.130)	(1.162)	(1.491)
Fin_Leverage	-3.399	1.860	-1.738	-6.341
	(2.551)	(3.720)	(3.913)	(3.953)
Board_Size	0.00941	-0.0706	0.0301	-0.173
	(0.191)	(0.277)	(0.255)	(0.228)
Indep_BoardMembers	0.105***	0.0342	0.0531**	0.226***
	(0.0179)	(0.0253)	(0.0243)	(0.0259)
FoB	0.0680**	0.0413	0.0120	0.152***
	(0.0275)	(0.0404)	(0.0332)	(0.0413)
Avg_BoardTenure	0.0171	0.0119	0.0445	0.102
	(0.186)	(0.271)	(0.244)	(0.250)
ROA	-3.440**	-3.662**	-1.659	-5.188**
	(1.524)	(1.550)	(3.186)	(2.041)
Constant	-68.74***	-130.6***	-21.83	-90.94***
	(19.92)	(26.26)	(26.29)	(33.20)
Observations	3,341	3,341	3,341	3,341
R-squared	0.879	0.851	0.844	0.780
F-test (post-SRD slope)	12.42 (p = 0.000)	1.27 (p = 0.260)	3.28 (p = 0.071)	24.27 (p = 0.000)

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Table A15. Hypothesis 2b: Pre-SOP Countries (Split Sample) (EU vs Control Triple DiD)

Variable	ESG Score	E Score	S Score	G Score
ESG_ExecComp	5.239***	7.125***	6.074***	3.621*
	(1.512)	(2.740)	(1.985)	(1.938)
ESG_ExecComp ×	0.388	2.858	2.706	-3.187
postSRD × treatEU	(1.761)	(2.883)	(2.398)	(2.555)
log_TotalAssets	3.315***	4.147**	2.892***	2.916***
	(0.770)	(1.726)	(1.055)	(0.941)
Fin_Leverage	1.227	5.625*	0.153	-0.873
	(1.831)	(3.175)	(2.478)	(2.158)
Board_Size	0.143	0.431**	0.363*	-0.581**
	(0.142)	(0.212)	(0.198)	(0.241)
Indep_BoardMembers	0.107***	0.0514**	0.00668	0.285***
	(0.0166)	(0.0251)	(0.0244)	(0.0262)
FoB	0.127***	0.107***	0.0683*	0.206***
	(0.0243)	(0.0361)	(0.0354)	(0.0346)
Avg_BoardTenure	0.445***	0.350*	0.373**	0.637***
	(0.119)	(0.194)	(0.171)	(0.192)
ROA	-0.281***	-0.164	-0.468***	-0.0686
	(0.0825)	(0.159)	(0.133)	(0.127)
Constant	-31.61*	-52.20	-10.35	-34.97*
	(16.71)	(38.24)	(23.06)	(20.54)
Observations	3,969	3,969	3,969	3,969
R-squared	0.915	0.897	0.875	0.843

*Note: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.*

Figure A16.