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Executive Compensation and Environmental Performance: a Cross-Industry Analysis Through an Agency-Institutional Perspective

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Abstract

This study explores the relationship between Environmental Performance and Total Executive Compensation. For the first time in the literature, to our knowledge, this relationship is analyzed considering the ESG Environmental Score as a measure for environmental performance. The study is conducted applying an agency-institutional theory perspective. In addition to that, this study will provide an updated examination of the topic discussed in prior studies expanding the research by conducting a cross-industry analysis. So far, the study from an economic and managerial perspective contributes providing empirical evidence that companies should support environmental strategies by linking environmental indicators to executive compensation.

We investigate two research questions: 1) Is the company's environmental performance related to executive compensation? In which industry do these linkages are stronger? and 2) To which extent do company environmental policies, environmental governance mechanisms and executive compensation strategies affect the relationship?

To test our hypotheses, we collect data from 1509 organizations, and we obtain a sample of 420 companies that we have grouped by industry according to the Global Industry Classification Standard (GICS). Therefore, we analyze the relationship between Environmental Performance and Total Executive Compensation through four multiple linear regression models.

The models support our four hypotheses and prove empirically that the Company's Environmental Performance is positively related to the level of Executive Compensation. This relationship is stronger for high pollution industries. Moreover, the models prove that the positive effect of environmental performance on executive compensation is more significant for companies that adopt pollution prevention policies than companies that adopt pollution control policies. Secondly, the models prove that LTIPs positively affect subsequent environmental performance and increase the success of pollution prevention strategies. Moreover, the models emerge that Environmental Governance Mechanisms strengthen the linkage between environmental performance and executive compensation.

Finally, we discuss the relevance of linking executive compensation to environmental performance as an opportunity to build a sustainable competitive advantage and long-lasting economic performance.

Keywords: environmental performance, executive compensation, LTIPs, environmental governance mechanisms, pollution prevention strategies and pollution control strategies.

Chapter 1: Introduction

This study aims to deepen our understanding of the link between companies' environmental performance and the level of CEO pay by analyzing how it varies according to the sector in which the company operates, mainly whether it is a high-polluting sector or not. In addition, this study aims to investigate the importance of pollution prevention versus control strategies on environmental performance. Finally, this research explores several factors that contribute to sustaining and modifying environmental performance by influencing managers' compensation levels. In particular, the impact of long-term incentive plans for CEOs and environmental corporate governance mechanisms on environmental performance.

There has been abundant literature on these topics, for example, Airoldi G. and Zattoni, 2003; Finkelstein S. and Boyd B., 1998; and Klassen R. D. and McLaughlin C. P., 1996. However, only recently have scholars started to analyze the relationship between environmental performance and executive compensation (Coombs & Gilley, 2005; Russo & Harrison, 2005; Stanwick & Stanwick, 2001). More importantly, to our knowledge, no study aims to investigate this relationship by also focusing on the sector of the companies studied. This work contributes to three different branches of business research. First, we combine institutional and agency theories elements to bring a new perspective to executive compensation research, which has traditionally focused primarily on financial performance (Barkema & Gomez-Mejia, 1998; Gomez-Mejia & Wiseman, 1997). Second, we contribute to environmental research by recognizing the importance of executives' pay in promoting good environmental behavior. Finally, we contribute to the corporate governance literature by analyzing whether board committees specializing in the environment and CEO compensation policies serve to monitor and control environmental actions indirectly by acting on managers' behavior.

Therefore, this research aims to fill a gap in the literature by empirically testing two research questions. First, this study tests whether there is a relationship between environmental performance and the level of executives' compensation and whether this relationship is more robust in those industries with high pollution. Secondly, to what extent do corporate environmental policies, environmental governance mechanisms, and executive remuneration strategies influence this relationship.

The interest in the two main topics discussed in this study - environmental performance and executive compensation - stems from the recognition of their extreme relevance for the growth of companies, more than ever in the current economic scenario in which the legitimacy of companies in the eyes of stakeholders is one of the main factors determining business survival and profitability.
Investors are increasingly using environmental performance as a criterion for their investment decisions. Indeed, companies that show good environmental performance to the public are considered to be more advantageous in terms of returns and investment risk. It has been proven that industries with good environmental performance enjoy advantages in terms of cost, legal compliance, and status.

Using a unique and original collection of hand-picked data from a variety of sources (the BoardEx Core Reports by Euromoney Institutional Investor and the Refinitiv Eiko database), initially collecting data for approximately 1509 US firms operating in a variety of industries, this study bases its inferences on an analysis of longitudinal data comprising a sample of 406 firms over the period 2021.

This study addresses two research questions: 1) Is the company's environmental performance related to executive compensation? In which industry do these linkages is stronger?; and 2) To which extent do company environmental policies, environmental governance mechanisms and executive compensation strategies affect the relationship?

In order to answer these questions, we analyze four hypotheses that we attempt to answer by constructing four linear regression models that test whether there is empirical evidence for the formal hypothesis based on the literature and our intuitions.

Our results support the hypotheses. First, they confirm the existence of a positive relationship between environmental performance and managers' remuneration. They show that managers are more likely to undertake environmental policies when properly incentivized. Indeed, they should be rewarded with a premium commensurate with the greater risk involved in undertaking environmental strategies, which are risky by nature. Second, our results confirm that this relationship between environmental performance and the level of executives' compensation is stronger for those industries that operate in high-pollution sectors. These are the industries for which legitimacy is most crucial,

and which need to improve their environmental performance to look good in the eyes of investors. Furthermore, empirical results from the models confirm that including long-term incentive plans in executives' compensation packages indirectly increases the environmental performance of firms. This is because it encourages managers to make decisions with a longer time horizon than they would otherwise. This shift in the strategic perspective of CEOs benefits environmental performance, which has manifest results over a longer time horizon than other more common types of investment. Finally, the models show us that environmental corporate governance mechanisms help stakeholders better monitor managers' environmental performance. However, the results also tell us that such mechanisms still play too formal and superficial a role.

The study advances the literature on understanding the link between these two important and seemingly unrelated components (environmental performance and the level of executives' remuneration). From a managerial economic perspective, the research finds out that executives become directly accountable for environmental performance, which improves environmental performance by raising the prestige and social recognition. As a consequence this increase company’s financial performance, because the greater social recognition makes easier to raise resources, and gives organizations greater bargaining power over their competitors in the same sector.

Chapter 2: Literature Review and Hypothesis Development

To investigate the relationship between Environmental Performance and Executive Compensation and how this relationship is affected by different company's visions and strategies, Chapter 2 will examine what scholars have found about these topics, comparing firms in different industries, and introducing the idea behind the hypothesized relationship. Firstly, Environmental Performance and its dimensions are presented, investigating how it is measured and what strategies companies today generally adopt. Secondly, it deepens Executive Compensation. Thirdly, are discussed the Agency Theory, the Institutional Theory, and their theoretical frameworks. Moreover, prior research on the topic is briefly analyzed to give a more critical perspective. Finally, some specific relationships between Environmental Performance and Executive Compensation are predicted and explained through the theory illustrated in this chapter.

2.1 Environmental Performance

The world has entered a new era of environmental concern as demonstrated by the growing number of initiatives promoted, like the "Kigali Amendment to the Montreal Protocol", the "UN Sustainable Development Goals", and the "Paris Climate Agreement". Governments are increasingly being asked by organizations to pay more attention to their environmental performance. Indeed, since 1987 when the World Commission on Environment published the Brundtland Report to address sustainable development, managers, scholars, and business owners have tried to determine why and how big corporations should incorporate environmental aspects into their policies. In recent years, an increasing number of companies have pledged to protect natural environments and have committed to monitor and measure their environmental performance. Today, Environmental Performance is an increasingly relevant topic. Globalization reduced geographical and cultural distances so that business decisions and activities are available to public opinion and exposed worldwide. The responsibility of all organizations in protecting the environment has been globally recognized. This global interdependence has been highlighted in the Rio Declaration on Environment and Development (1992), the ILO Declaration on Fundamental Principles and Rights at Work (1998), the Johannesburg Declaration on Sustainable Development (2002). It is clear how globalization intensified the impact of organizations on the environment

(Fazio, 2016). Shareholders, consumers, communities, and in general stakeholders are pressuring firms towards Environmental Performance. In this view, OECD is also focusing on environmental performance, implementing effective policies to address environmental problems and sustainably manage natural resources. The OECD Environment Policy Papers concentrate many of today's environment-related policy issues putting lots of attention on the linkages between environmental performance and the economy. Environmental Performance officially entered the European Union's agenda through Corporate Social Responsibility. During the European Council in Lisbon in 2000, it was considered one of the strategic assets to a competitive and socially cohesive society to modernize the European Social Model (Fazio, 2016). In the Green Book, published by the European Commission in 2001, Corporate Social Responsibility is defined as "the integration of social and environmental concerns in business operations and interaction with stakeholders on a voluntary basis" (European Commission, 2001). Therefore, one critical concept of Corporate Social Responsibility expressed by the European Commission's Green Book in 2001 concerns the environmental performance dimension, namely Corporate Environmental Responsibility. Environmental Performance metrics measure it, and it refers to a company's duties to abstain from damaging natural environments. (Mazurkiewicz, 2012). The environmental aspect of CSR has been debated over the past few decades, as stakeholders increasingly require organizations to become more environmentally aware. (Duker and Olugunna, 2014). The public sector has been focused on developing regulations and the imposition of sanctions as a means to facilitate environmental protection. Recently, the private sector has adopted the approach of co-responsibility towards the prevention and alleviation of environmental damage. The sectors and their roles have been changing, with the private sector becoming more active in protecting the environment. Many governments, corporations, and big companies are now providing strategies for environmental protection and economic growth. (Mazurkiewicz, 2012). Corporate Environmental Responsibility is, in many ways, connected to Corporate Social Responsibility, as both influence environmental performance. Corporate Environmental Responsibility, however, is strictly about the consideration of environmental implications and protection within corporate strategy. Corporate Environmental Responsibility is focused more on the connection between corporate strategy and environmental performance, while Corporate Social Responsibility relates more to social aspects whit little attention on the economic

perspective. Therefore, Corporate Environmental Responsibility covers company's operation implications over the organization's environmental performance. It is about:

- Eliminate waste and emissions
- Maximize the efficient use of resources and productivity
- Minimize activities that might impair the enjoyment of resources by future generations.

Among the main drivers for Corporate Environmental Responsibility are government policies and regulations. Many states provide their legislation, regulations, and policies, which are essential in creating a positive environmental attitude. Subsidies, tariffs, and taxes play a vital role in the implementation of these policies. Another significant factor is the competitive environment among companies generated by media, public, shareholder, and NGO awareness, which are also significant drivers of Corporate Environmental Responsibility. (Przychodzen and Przychodzen, 2013). The idea of Corporate Environmental Responsibility is for humans to be more aware of the environmental impact and counteract their pollution footprint on natural resources (González-Rodríguez, Rosario, Díaz-Fernández, and Simonetti, 2019*).* One of the main factors is to reduce carbon footprint and carbon emissions (Zhang, 2019). Many of the studies focus on trying to find a balance between economic growth and reducing waste and cleaner environments (Zhang, 2019). Furthermore, in a recent study, the researcher found that firms support climate change legislation as a means of gaining power over their competitors. Essentially, even if a new regulation hurts a firm in the short term, the firm may embrace it because they know that it will hurt their competitors even more. This allows them to come out on top in the long run (Kennard, 2020).

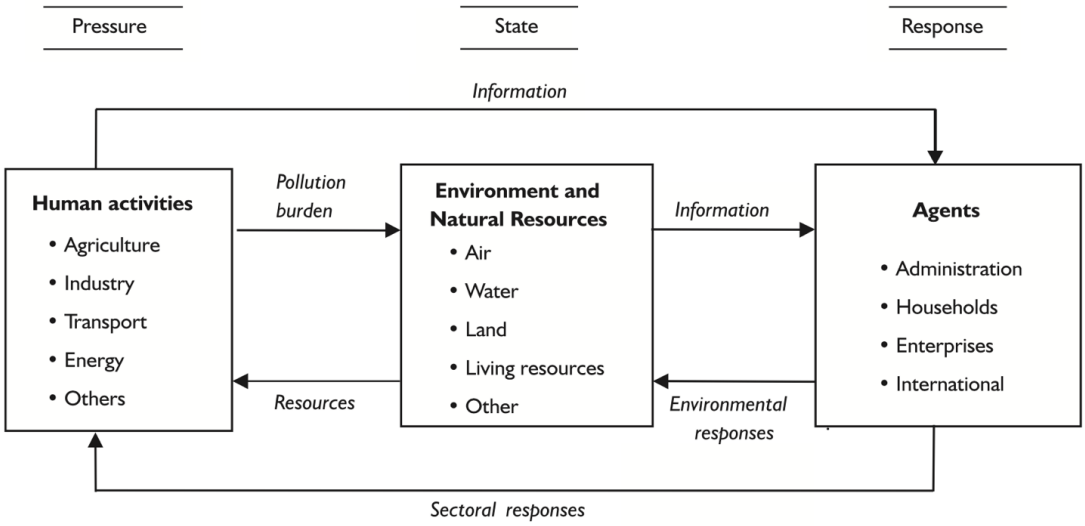
2.1.1 How to Measure Environmental Performance

As demonstrated by the quantitative targets recently established by organizations, the economy is living a new era of data-driven environmental policymaking. Governments increasingly demand to validate their environmental performance with data. A more empirical approach to environmental protection promises to make it easier to spot problems, track trends, highlight best policy practices, and optimize investments in sustainable development. Shareholders and stakeholders have more frequently started to base their financial and investment decisions on achieving good environmental results. Hence, they require a quantitative approach for environmental performance measurement. The new trend is growing the need to measure the environmental

performance results analytically and with more reliable methods. This new requirement for organizations, ardently claimed by stakeholders, result from the booming popularity of studies attesting a relationship between Environmental Performance and Corporate Performance. There is extensive empirical research on understanding this relationship because it is crucial, as companies are increasingly required to be profitable and environmentally responsible (Lankoski, 2000; Orlitzky et al., 2011). The capacity of understanding and managing risks can help in prevention, while the ability to communicate transparently and effectively may maximize the related benefits. Investors increasingly pressure organizations towards sustainable management of core business and ask for non-financial data. Environmental Performance is a generally accepted proxy for Corporate Social Responsibility (Salazar, Husted, Biehl, 2011). The value of Environmental Performance can be measured in several ways, both quantitively and qualitatively. These methods highlighted many advantages related to Environmental Performance, such as reducing operating costs and improving risk management, financial performance, brand image and reputation, productivity and quality, employee attraction and retainment, relationships with public authorities, and supply chain management (Fazio, 2016). According to the International Standard Organization (ISO), Environmental Performance Evaluation (EPE) is a "process to facilitate management decisions regarding an organization's environmental performance by selecting indicators, collecting and analyzing data, assessing information against environmental performance criteria, reporting and communicating and periodically reviewing and improving this process". The Performance Monitoring Indicators Handbook (1996) discusses how to structure indicators within a logical framework, how to elaborate performance monitoring indicators in general, and how to link them to the objectives of different levels (Mosse and Sontheimer, 1996). Performance monitoring vis-à-vis the environment applies to many types of organizations. Companies that specifically address environmental issues, as well as whose activities may have a direct or indirect impact on the environment, need environmental performance indicators to evaluate their impact on the environment, to ensure that they are having the desired positive impact, to monitor any possible adverse impacts, and to guard against unanticipated effects (World Bank Environment Department, 1991). Given the diversity of environmental problems, the variety of contexts in which they arise, and the numerous possible solutions, no "correct" set of indicators exists (Segnestam, 1999). Adriaanse A. (1993), in "Environmental Policy

Indicators", proposed a framework based on the input-output-outcome-impact model. The OECD subsequently adopted the framework in 1994. The institution developed the "*The Pressure-State-Response framework" to classify different environmental indicator typologies. It is suitable to be applied at the national, sectoral, community, or individual firm level. While Adriaanse's approach distinguishes between project outcomes and project impacts, the OECD format bundles the two together. For this reason, the proposed framework speaks of "impact"* indicators.

Figure 1 - The Pressure – State – Response Model



Source: Technical report, OECD Paris, 2020

The framework distinguishes three different aspects of environmental problems:

- The pressure variable describes the cause of the problem. It may be an existing problem (for example, air pollution from buses), or it may result from a new project or investment (for example, air pollution from a new thermal power plant).
- The state variable usually describes measurable characteristics of the environment that result from the pressure. Ambient pollution levels of air or water are standard state variables used in analyzing pollution.
- The response variables are measures or policies introduced to solve the problem. They can affect the state either directly (for example, by installing pollution control equipment) or indirectly by acting on the pressures at work. (OECD)

Therefore, the framework suggests the following classification of environmental indicators:

- Input indicators: monitor the project-specific resources provided

- Output indicators: measure goods and services provided by the project
- Outcome indicators: measure the immediate or short-term results of project implementation
- Impact indicators: monitor the longer-term or more pervasive results of the project

There is no universal set of indicators that is equally applicable in all cases. According to World Bank, Environmental Performance Indicators should have the following characteristics:

- Limitation in the number
- Clarity in design
- Practical and Realistic (so collection or development costs have to be considered)
- Clear identification of causal links
- High quality and reliability
- Appropriate spatial and temporal scale.

Today to measure environmental performance the MSCI ESG Index methods is the ones most commonly used by organizations and recognized by governments. The index complies with the above-mentioned World Bank requirements regarding the characteristics of an excellent Environmental Performance Index. The MSC ESG Index is a benchmark that includes companies with high Environmental, Social, Governmental (ESG) standards. In particular, the ESG Ratings are evaluations of a Company based on a comparative assessment of their quality, standard or performance on environmental, social or governance issues. It is typically a score that complies with data collected surrounding specific metrics related to intangible assets. It could be considered a form of corporate social credit score (Ocean Tomo, 2020). Data providers assign a rating from AAA to CCC based on Corporate Social Performance and provide a score from 0 to 100. The ESG Rating is a helpful tool for investors for evaluating risks and opportunities during portfolio building and management (Segnestam, 1999). ESG comprise a label that is adopted throughout the United States financial industry. (Eccles, Ioannou and Serafeim, 2018). Therefore, the ESG Index measures the Corporate Social Performance, and it is divided into three dimensions: Environmental, Social, and Governance (ESG). For the purpose of the study, we will focus on the ESG Index's environmental dimension, leaving aside the social and governance dimension. The Environmental Dimension focuses on companies' environmental impact. It

includes waste management, water management, and the use of other environmental resources (Refinitive Workspace, 2021). The ESG Index Environmental Dimension is measured by the Environmental Pillar Score Index. It is the weighted sum of the Resource Use, Emissions and Environmental Innovation category scores (Interactive Brokers LLC, 2020). It represents the environmental risks related to business operations and how the company manages them. The pillar includes three categories: (Refinitive Workspace, 2021)

- Emissions: it encompasses toxic emissions, product carbon footprint, waste, biodiversity, and environmental management system.
- Innovation: encompasses product innovation and green revenues, research and development expenses, and capital expenditures.
- Resources use: it includes water energy consumption, sustainable packaging, and environmental supply chains

The Environmental Categories' weights vary across the industries so that the scores are comparable across sectors.

2.1.2 Problems concerning Environmental Performance Measurement

As the general public pays more attention to companies' environmental performance, measurement issues are becoming increasingly important, and demand is growing for relevant information to assist stakeholders in making critical decisions. Environmental issues are becoming increasingly important to many corporate stakeholders, including consumers, shareholders, investors, creditors, and regulators (Bringer and Benforado, 1994). Thus, environmental performance measures have proliferated in the absence of clear, generally accepted guidelines for what constitutes good and bad environmental performance. As a result, the public is becoming increasingly confused about the interpretation of such data. Environmental Performance measurement requires measurement of non-financial performance, which is measurement under tremendous uncertainty, and aggregating multiple types of metrics (Boffo and Patalano, 2020). Therefore, for their intrinsic nature, environmental metrics could be inadequate or incomplete. This type of measurement should be adapted to specific organizations on a case-by-case basis and should continuously be assessed in the context it relates. Environmental performance measurement is not an objective process, but a communication tool, and the system boundaries and the basis for comparison are arbitrary (Ilinitch, Soderstrom and Thomas, 1998). Moreover, environmental

performance measurements are vulnerable to insufficient data. (Semenova, Åbo Akademi University and the Graduate School of Accounting at the Academy of Finland, 2010). Indeed, organizations often do not grant book access to their sensitive data, so obtaining data for environmental measurements may be difficult. In addition, the companies could provide inaccurate data because of the desire to obtain good scores to attract investors and improve their reputation and public image. Today, companies are subject to fast business transformation processes. The technologies employed, the outcome produced the company structure change often and very quickly. Therefore, an environmental performance indicator that could be considered reliable in a short time could become inadequate and obsolete. Another weak point of environmental indicators, on which improvement should be made, is comparability. For their nature, the environmental performance indicators may be hard to compare country to country to denominator problems. Indeed, although many improvements have been made, indices denominator calculations are made in different ways from one country to another. Therefore, comparison is still not possible or would result as inappropriate. Comparability of indicators is often hampered by problems with the adoption of different measurement systems and measurement units. It creates confusion in the collection of data by performance-based environmental ranking agencies. Then progress in the direction of more homogenized indices is still needed. Moreover, another common error in calculating most of the environmental performance index is that in different parts of the planet, the composition of the atmosphere changes from one country to another (e.g., tropospheric ozone concentration). It, of course, affects emissions and environmental impact indicators concerning air pollution. However, this property of our atmosphere is not considered in the calculation of environmental performance because it is not too influential. Recent studies, however, have begun to stress that although negligible, a method should be found not to underestimate this phenomenon. Many scholars suggest creating weighting parameters, each linked to the specific level of influence of the troposphere on a given geographic area. In this way, the direction would be making these measurements more and more precise. For this reason, all companies should align and calculate environmental performance using those globally recognized indices. Indeed, they are reliable and have precise guidelines and describe calculation processes to minimize arbitrariness and maximize reliability. So that organizations and governments can better and more efficiently monitor environmental performance. Another factor to consider when measuring environmental

performance is to consider what environmental policy the organisation has chosen to adopt. In fact, depending on whether the company has adopted a pollution prevention or pollution control strategy, measurements must be applied and interpreted differently. In detail, the environmental management literature has recognized two common varieties of environmental strategies: pollution control and pollution prevention (Christmann, 2000; Hart, 1995; Klassen and Whybark, 1999; Russo & Fouts, 1997; Sarkis & Cordeiro, 2001). Pollution control strategies capture, handle and distribute pollutants and waste at the end of a manufacturing process. Focusing on compliance, hazard control, and remediation, pollution control strategies include devices and tools as the last stage of production. They thus do not require the firm to develop expertise or skills in managing new environmental technologies (Russo and Fouts, 1997). In opposition, pollution prevention strategies decrease or exclude toxic chemical agents during the various stages of production and thus necessitate structural investments in new, cleaner technologies (Klassen and Whybark, 1999; Russo and Fouts, 1997). At the same time, research has shown that pollution prevention efforts provide organizations with unique advantages (Christmann, 2000; Hart, 1995; Klassen and Whybark, 1999; Russo and Fouts, 1997) and may even improve production performance because they need a radical rethinking of processes and products that can generate possibilities for improvements and innovation. Klassen and Whybark (1999) found empirical evidence showing that pollution prevention strategies positively affect manufacturing performance, while the reverse was valid for pollution control strategies applications. Pollution prevention strategies can also lessen costs through more meticulous inputs, waste administration costs, and the elimination of redundant steps in production processes. Furthermore, since pollution prevention strategies decrease and eradicate waste creation, they can potentially diminish emissions below required levels and thus reduce compliance costs and legal liabilities. Therefore, the two strategies are wildly conflicting and affect the business differently, so it is fundamental to consider them when measuring environmental performance.

2.2 Agency Theory

2.2.1 Agency Theory, Agency Costs, and Agency Problems

Agency theory is an important yet controversial theory (Eisenhardt, 1989). The agency theory paradigm, first formulated in the academic economics literature in the early

1970s (Ross, 1973; Jensen and Meckling, 1976), had diffused into business. Agency theory describes the risk-sharing problem that arises when cooperating parties have different attitudes (Eisenhardt, 1989). The theory broadened the risk-sharing literature to include the so-called agency problem that occurs when cooperating parties have different goals and visions of labor (Jensen & Meckling, 1976; Ross 1973). Indeed, agency theory is about solving agency problems, defined as agency conflicts arising from a divergence between agents' and principals' utility (Lan and Heracleus, 2010). The agent acts or represents the principal, who delegates specific activities and tasks to the agent. Therefore, the principal, who establishes the rules that supervise the relationship and how to administer the remunerations, depends to a certain extent on the agent's behavior because the agent carries out the activities delegated voluntarily adopting a course of action. Agency theory assumes that people are rational and maximize their own utility. In this view, agents are inclined to adopt opportunistic behaviors to pursue their interests at the principal's expense. Therefore, agency problems arise when the agent's action is not directly observable by the principal (information asymmetry) or when the outcome of the agent's action is influenced by events beyond human control (uncertainty) (Zattoni, 2020). An important factor in the survival of organizational forms is control of agency problems (Fama, and Jensen, 1983). Agency problems arise because contracts are not costlessly written and enforced. Agency costs include the costs of structuring, monitoring, and bonding a set of contracts among agents with conflicting interests, plus the residual loss incurred because the cost of full enforcement of contracts exceeds the benefits. (Jenden and Meckling, 1976). The contract structures of organizations limit the risks undertaken by most agents by specifying either fixed payoffs or incentive payoffs tied to specific measures of performance (Fama and Jensen, 1983). Such problems would be easily solved if the information could be exchanged at no cost and if the parties would have consistent incentives. However, uncertainty and information asymmetry subsist and determine agency costs. They represent the negative difference in well-being, and they cannot be eliminated but only minimized (Zattoni, 2020). They include the *control cost* that is the control incurred by the principal to monitor the agent's behavior, the *reassurance cost*, that is the cost incurred by the agent to reassure the principal about his behavior, and the *residual loss* that is the residual loss of well-being that the relationship creates, given the impossibility of reconciling the divergent interests. (Zattoni, 2020). Corporate

literature underlines that organizations may be affected by three types of different agency problems:

- First Type Agency Problem: is between shareholders and top managers
- Second Type Agency Problem: arises between controlling and minority shareholders
- Third Type Agency Problem: is between the firm or its shareholders and the stakeholders. (Zattoni, 2020)

Therefore, the principal recommendation is to incorporate an agency perspective in studying the many problems of a cooperative structure. (Eisenhardt, 1989).

Agency Theory has become a cornerstone of the corporate governance fields, not only in terms of its impact on the literature but also in terms of policy and practice (Daily, Dalton and Cannella, 2003).

2.2.2 Agency Theory Development Path: Positivists and Principal-Agent Views

From its roots in information economics, agency theory has developed along two lines: positivist and principal-agent (Jensen, 1983). The two flows share a common unit of analysis: the contract between the client and the agent. They also share similar assumptions about information, people, and organizations. However, they differ in their mathematical rigor, dependent variable, and style (Eisenhardt, 1989). Positivist researchers concentrated on identifying circumstances in which the principal and the agent are likely to have conflictual aims and then explain governance mechanisms limiting the agent's opportunistic behavior. Positivist research adopts a qualitative approach. On the contrary, principal-agent studies have broadened the research by applying both qualitative and quantitative approaches. Also, positivist researchers have focused almost exclusively on the special case of the principal-agent relationship between owners and managers of large, public forms (Berle & Means, 1932). The positivist approach provides governance mechanisms that limit the agent's opportunistic behavior, and it focuses on situations where the conflict between the principal and the agent may arise. Two propositions describe the theory:

Proposition 1: When the contract between the agent and the principal is outcome-based, the agent is more likely to behave in the principal's interests.

Proposition 2: Usage of information systems that help the principal verify the agent's behavior will lead to the agent's more probable behavior in the principal's interest.

The positivist approach lacks mathematical evidence, and that is why many of the critics of the agency theory have claimed the theory is not valid (Perrow, 1986). Also, the positivist approach has focused on the CEO-Owner relationship and has neglected many other principal-agent similar relations (Hirsch, Michaels, and Friedman, 1987). At its best, positivist agency theory can enrich economics by offering a more complex view of organizations (Jensen, 1983). However, it has been criticized by organizational theorists as minimalist (Hirsch, Michaels, and Friedman, 1987) and by microeconomists as tautological and lacking rigor (Jensen, 1983). Nonetheless, positivist agency theory has ignited considerable research (Barney and Ouchi, 1986) and widespread interest. In line with positivist theory is the principal-agent theory, which expands its analysis and fills some gaps. Principal-agent researchers are concerned with a general theory of the principal-agent relationship, which can be applied to employer-employee, lawyer-client, buyer-supplier, and other agency relationships (Harris and Raviv, 1978). While the positivist approach arranges many different contact options, the principal-agent approach establishes which contract is most effective under different risk aversion, information levels, and outcome uncertainty. The theory states that the best strategy is acquiring the agent behaviors, and the simple model assumes that the outcome can be simply measured. In addition, the model assumes that the agent is more risk-averse because the principal has more opportunities to diversify its investments. So, the agent is more risk-averse because it has less possibility to diversify its role in the company. Therefore, the principal is risk-neutral while the agents are risk-averse. The model assumes that the problem lies in the conflict of objectives. Two cases may occur:

1. The principal knows what the officer did. A performance-based contract is the most efficient contract between the client and the agent in such a situation.
2. The principal does not know how and what the officer did. In this situation, the issue is that the principal does not know whether the agent performed correctly or not.

Accordingly, the principal has two options:

Investing in information systems to learn about the behavior of the agent. Thus, it can be concluded that:

Proposition 3: Information systems have positive relationships with behavioral contracts and antagonistic relationships with results-based contracts.

The next option is to have a performance-based contract, transferring the risk of result uncertainty to the agent. Therefore, regarding the fact that agents are naturally risk-averse then we can conclude that:

Proposition 4: The uncertainty of the result has positive relations with behavioral contracts and antagonistic relations with results-based contracts.

The decision is made between the two options based on comparing the cost of the information system and the cost of the measurement of the result to transfer the risk to the agent. The simple model has been extended by considering that all the agents do not have similar risk aversion attitudes (MacCrimmon and Wehrung, 1986). As they have less risk aversion, outcome-based contracts are more attractive to them, therefore (Harris and Raviv, 1979):

Proposition 5: The agent's risk aversion has positive relationships with behavioral contracts and antagonistic relationships with performance-based contracts.

The relationship is in separate directions:

Proposition 6: The principal's risk aversion has positive relationships with outcome-based contracts and antagonistic relationships with behavior-based contracts.

Another extension to the model is achieved in a goals conflict relaxation (Baiman, and Demski, 1980). In other words, in the situation of clan organizations (highly socialized) (Ouchi, 1979) or in situations in which self-interests are aligned, the attraction of behavior-based contracts is more regarding the assumption of the risk-averse agent. Thus:

Proposition 7: The conflicts between principal and agent negatively affect behavior-based contracts and positively influence outcome-based contracts.

Proposition 8: Programmability has positive relationships with behavioral contracts and antagonistic relationships with result-based contracts.

Measurability is the characteristic of the task which determines how easy the outcome can be measured (Anderson, 1985; Eisenhardt, 1985). The simple model assumes that the measurement can be easily measured. When results are measured with difficulty, performance-based contracts are not very attractive.

Proposition 9: The measurability of results has negative relationships with behavioral contracts and positive relationships with results-based contracts.

Proposition 10: The length of the agency relationship has positive relationships with behavioral contracts and antagonistic relationships with results-based contracts.

2.2.3 Private Benefit of Control

The benefits of control over corporate resources play a central role in modern thinking about finance and corporate governance (Dyck and Zingales, 2004). From a modeling device the idea of private benefits of control has become a centerpiece of recent literature (Grossman and Hart, 1980). Research shows that today many public corporations have one or more shareholders who own a large-percentage block of the firm's com- mon stock. (Barclay and Holderness, 1989). As the extent of concentrated ownership has become known, researchers have begun to analyze the impact of block ownership on corporate decisions.' Some of these studies suggest that managers who own large blocks of stock receive corporate benefits disproportionate to their fractional ownership (Barclay and Holderness, 1989). In fact, the main focus of the literature on investor protection and its role in the development of financial markets is on the number of private benefits that controlling shareholders extract from companies they run (La Porta, Lopez-de-Salines, and Shleifer, 2000). Private benefits of control arise because agents undertake actions and take decisions aimed at maximizing their own benefits, even if those decisions are not the best for the principal and company's stakeholders. Therefore, agents who control the organization and have decision power enjoy the private benefit of control which is defined as the non-monetary (psychological) and the monetary (economic) benefits of controlling a company, that are not shared with shareholders and stakeholders (Zattoni, 2000). The non-monetary private benefits of control are particularly high in family businesses and when the firm has particularly high public visibility because they are benefits that arise from networking and the possibility to establish personal relationships with influential people and as a consequence the resulting social prestige thanks to the position held in the company. Instead, the monetary private benefits of control are more tangible benefits as economic benefits. Indeed, executives often have the possibility to exploit their dominant position in the company to enjoy privileges at the expense of the firm and the stakeholders.

2.2.4 How to Measure Private Benefits of Control

In spite of the importance of this concept, there are remarkably few estimates of how big these private benefits are. The lack of evidence is no accident. By their very nature, private benefits of control are difficult to observe and even more difficult to quantify in a reliable way. A controlling party can appropriate value for himself only when this

value is not verifiable (e.g. provable in court). If it were, it would be relatively easy for noncontrolling shareholders to stop him from appropriating it. Thus, private benefits of control are intrinsically difficult to measure (Dyck and Zingales, 2004). Basically, there are two different empirical methods recognized for quantitatively measuring private benefits of control. The first method, pioneered by Barclay and Holderness (1989), focuses on privately negotiated transfers of controlling blocks in publicly traded companies. It consists of measuring the premium for control paid when someone buys the controlling shareholders of a listed company (Zattoni, 2000). The price per share an acquirer pays for the controlling block reflects the cash flow benefits from his fractional ownership and the private benefits stemming from his controlling position in the firm. By contrast, the market price of a share after the change in control is announced reflects only the cash flow benefits noncontrolling shareholders expect to receive under the new management (Dyck and Zingales, 2004). Hence, as Barclay and Holderness have argued, the difference between the price per share paid and the market price per share measures the private benefits of control after some adjustments. The second method relies on the existence of companies with multiple classes of stock with differential voting rights (Lease, McConnell, and Mikkelson, 1983). It consists in measuring the difference between the value of shares characterized by different voting rights in the same organization. Thus, the differential payoff measures the value of company voting rights, which represent the measure of private benefits of control. Indeed, the voting market value could be cashed out and becomes relevant only when the controlling position is significant. Using this second measurement technique, if there are special privileges associated with non-voting rights, their value is considered in the total value of voting rights.

2.3 Executive Compensation

2.3.1 Executive Compensation Objective and Key Components

A well-designed executive compensation system aims to attract, retain, and motivate CEOs (Conyon, 2006). According to scholars, another objective is to reduce the cost of managerial compensation by using mechanisms that do not impose costs on the income statement as stock option plans or options in a specific country that are incentivized by tax breaks. Executive compensation is strictly linked to agency theory because the separation between ownership and control in widely held organizations generate a

principal-agent problem. Decision-making responsibilities are delegated to managers by shareholders, and conflicts of interest occur. In this context, executive compensation is one of the corporate governance mechanisms that companies use to attenuate or eliminate managerial opportunism (Zattoni, 2020). Therefore, executive compensation is a way to align directors and executive interests, linking them together. Compensation packages for executive directors generally consist of four essential components (Murphy, 2003). First, executives gain a base salary, which is generally benchmarked against peer firms. Second, they receive an annual bonus plan, usually based on accounting performance measures. Third, they hold stock options, which represent a right but not the obligation to purchase shares in the future at some pre-specified exercise price. Lastly, pay includes additional compensation such as restricted stock, long-term incentive plans, short-term incentive plans, and retirement plans (Conyon, 2006). Short-term and long-term incentives differ because, on the one hand, short-term incentives may increase executives' convenience in achieving short-run improvements in profitability. However, this may also mean that top managers pursue short term objectives at the expense of long-term interests. Indeed, research by Hoskisson, Hitt and Hill (1993) tends to support this interpretation by showing that bonuses based on annual performance are negatively related to investments in R&D. For this reason, it is generally believed that longer-term incentives are more effective in aligning managerial interests with those of shareholders as managers are less likely to underinvest in the short term. It helps avoid potential agency problems and, consequently, is now a critical part of compensation packages. One of the consequences of longer-term incentives is that managers are more exposed to uncontrollable risks such as market fluctuation and their wealth is more inflexibly tied to the firm. It reduces the value of such long-term incentives to managers and explains the considerable rise in compensation to CEOs of this nature. Research shows, however, that despite the huge compensation packages of stocks and options, CEOs are more rewarded for the size of their firm than firm performance (Tosi, Werner, Katz and Gomez-Meija, 2000). It underlines the difficulty of using compensation as an effective agency mechanism. Finally, executives received several other items such as company cars, jets, villas and luxury homes, club memberships, various forms of insurance and tax benefits. (Zattoni, 2020). Moreover, compensation packages may include benefits for retirement and early termination in the contract as golden parachutes and unique executive retirement plans. The value of these

additional components of executive compensation packages is usually unrelated to firm performances, and often they represent a notable amount of remuneration.

2.3.2 Executive Incentive Plans

To adequately understand the landscape of executive compensation, however, one must recognize that the design of compensation arrangements is also partly a product of this same agency problem. (Bebchuk and Jesse, 2003). Indeed, if shareholders desire to monitor an agent's behavior perfectly, an efficient compensation contract is required. However, it is impossible for principals to create a compensation system totally based on top managers' observed behavior. As information asymmetry persists, the more effective strategy for principals is to design an outcome-based compensation system. Indeed outcome-based compensation systems are more effective than behavior-based compensation systems, even if they shift part of the risk to the agents who are assumed to be risk-averse (Zattoni, 2020). Incentives, then, and other compensation elements must become mechanisms for structuring the kind of "partnership" you will have with those responsible for the outcomes and how a unified financial vision within the company will be defined (Blenko, Mankins, and Rogers, 2010). By creating a link between executive compensation and organization, performances agency costs are relevantly reduced. The principal can take advantage of incentive plans to create this link between business performance and product output. The objective of incentive compensation is to incentivize individual and collective performance and recognize and reward this performance (Primeum, 2021).

In general, incentive plans for executive remuneration are distinguished by:

- short term incentive plans
- long term incentive plans.

In the following two paragraphs, both are presented in more detail.

2.3.2.1 Short Term Incentive Plans

Short-term incentives, also often referred to as annual incentives, are intended to compensate executives for achieving the company’s short-term business strategy based on the achievement of goals by the board compensation committee (Execcomp, 2021). The nature of these goals varies depending on organizational features such as the maturity of the business, the industry, the market in which they operate, the competitive environment, the business strategy, and other factors.

Short term incentives plans have several advantages:

- They are easy to verify.
- By linking executive pay to some metrics, they increase executive capacity to predict the consequences of their actions.
- They promote greater efficiency and higher company performance.

Despite the advantages, short term incentives plans may, however, generate dire consequences:

- *Short-termism*: they may push top managers to pursue short term strategies even if they are not the best for the company.
- *Managerial myopia*: managers who tend to be short term oriented may be pushed to ignore future consequences of their actions. Thus, they undermine the continuity of the business in favor of more outstanding performances in the immediate time perspective.
- *Gaming the incentive system*: being too short term oriented may increase the gap between shareholders and executives. It happens, for example, when executives settle accounting and budgeting goals. In deciding, managers may take advantage of their decision-making power by establishing thresholds and adopting measures for their self-interests.

Short-term incentives metrics are generally financial, such as ROE, ROA, and revenue growth and others. Many organizations, especially in recent years, include non-financial metrics that are consistent with their business strategy. Examples of common non-financial metrics that organizations adopt are environmental standards, timely delivery of products, company safety, meeting attendance, product quality assessment and others. Short-term incentives are generally expressed as percentage thresholds on executive salary and are employed to set goals and establish maximum outcome levels. Typically, performance below the established threshold level will result in no payout, while performance above the maximum level may be capped at the maximum payout tier (often 200% of target) to mitigate risk-taking (Execcomp, 2021).

2.3.2.2 Long Term Incentive Plans

Long-term incentive plans generally constitute the most significant component of executive pay packages. They represent typically over 60 per cent of the median S&P 500 company (S&P 500 website). Usually, long-term incentives are adopted by large US organizations. Indeed, almost all 1000 Fortune companies assign equity incentive

plans to their executives (Fortune Website). Indeed, considering that these forms of compensation are widespread nowadays, not including such incentive plans into a compensation package would make the company seem less attractive for potential top managers. The LTIP is an equity-based or shared based incentive program that has several primary objectives. The purpose of the long-term incentive is to align principals and agents' interests (Bebchuk and Fried, 2004), encouraging value creation and top management proactivity by attracting and retaining the best talent. Therefore, LTIP wants to compensate executives for achieving the company's strategic goals that will maximize shareholder value. Moreover, LTIP decreases the executives' average cost and increases employees' sense of identification with the organization. Long-term incentive goals vary by company, but the most prevalent focus is on total return to shareholders, operational measures such as earnings per share and return measures, such as return on assets (Execcomp, 2021). They are typically structured to incorporate a targeted level of performance and define a range to reward executives if they succeed in achieving the established thresholds. Investors consider long-term incentives an essential part of a well-balanced pay plan, as they ensure alignment with the shareholder interest, especially when combined with appropriate stock ownership guidelines. The long-term incentive plans are rarely made up of additional cash but are, instead, equity-based due to the previously mentioned risk of "manager myopia." The performance period for a long-term incentive typically runs between three and five years, with the executive not receiving any pay from the incentive until the end of the performance period. (Zattoni, 2020). The specific forms of long-term incentive plans can be classified into two categories. The first is the "Stock-Option Plans" and the second the "non-option stock plans" (Bebchuk and Fried, 2004). Therefore, LTIP is a mix of equity incentives and may include a cash component (Bachelder, 2014; Zattoni, 2020). Generally, are divided in:

- Stock option plans
- Non-options stock plans

Indeed, LTIPs are provided in the form of stock-based compensation, such as stock options, restricted stock, performance shares, cash, or stock-settled performance units. On the one hand, stock options (ESO) manifest in the form of regular call option plans and give employees the right to buy company shares at a fixed price and within a certain period (Zattoni, 2020). They are an important element of executive pay and are valued at the firm's cost of making the grant. It means that options are valued as the economic

cost to the firm of granting an option to an employee (Conyon, 2006). Usually, executives of high growth companies such as biomedical or high-tech companies are likely to obtain a higher portion of stock option plans as compared to executives in other more stable and mature industries (such as oil and gas) since the growth prospects and the relative risk of the industries tend to vary more. The stock option plans significant variables are, in fact, according to the relevant literature, based upon the beneficiaries, the vesting period, the exercise period, the number of options, the exercise price, the method of payment, the type of shares and the sale restrictions (Baker, 2006; Zattoni, 2020). All of these elements are established by the compensation committee on a contract that the executive signs. There are two key parties in the ESO, the grantor (the company that employs the grantee) and the grantee, also known as the optionee (the executive). The grantee is given equity compensation in ESOs, generally with several restrictions. One of the most important is the vesting period. It is the period in which the options exist but cannot be exercised by the beneficiary. Moreover, there is the exercise period which is the period in which executives' right to buy the stock can be exercised. Another essential element to be analyzed in stock option contracts is the exercise price. The price at which the beneficiary is entitled to buy the company's shares when trading a call or put an option, respectively. It is also referred to as the strike price and is known when an investor initiates the trade (Investopedia, 2021). Another interesting and less frequent feature of the exercise price is given by the “indexed” or “variable plans” (Meulbroek, 2001). Traditionally the exercise price is fixed. It means that once it is set, it cannot change during the entire life of the option. On the other hand, variable plans occur whenever the exercise price is linked to an external index which can vary, for instance, as stock index or any other variable measure such as an industry index. The rationale behind this sub-form of exercise price is related to the fact that the company’s performance might be affected by external factors in the environment in which the company operates. Factors that are beyond the executives’ control. The purpose, therefore, is to incentivize the executives to achieve not just a positive performance, but an above-market performance. Another factor is the method of payment from the beneficiary. It is usually cash. The company can allow paying executives with the company's stocks that he/she already owns, or, as Blocher (2018) indicated, the company might grant a loan to the beneficiary, permitting him to pay for the options. These loans have meagre interest rates, and the shares acquired with the loan are the collateral. The executive gains its profit from the difference between the

market price of the underlying security and the fixed exercise price. There are two main types of stock options:

- Incentive stock options (ISOs) that are also known as statutory or qualified options. Generally, ISOs give the right to obtain preferred tax treatment. Indeed, ISOs delayed taxes on options from the exercise date to the sale date and reduced tax income rate. It became the difference between the stock market value and the option's exercise price. However, to access the benefits provided for incentive stock options, the plan must meet numerous conditions established by the Internal Revenue Code (Zattoni, 2000). Indeed, the shareholders must approve the plan, indicate the beneficiaries, and set a maximum value of shares that the executive can buy in one year, at an exercise price that is not lower than the market price at the grant date, and other conditions.
- Non-qualified stock options (NSOs) can be designed without complaint with ISR regulations. However, an executive with this kind of plan does not receive any tax advantage because the bonus is considered as the executive income. NSOs are also known as non-statutory stock options.

An extra element is the number of options granted by contract to the executive. Allock (2017) recommends that two crucial elements influence the number of options. On the one hand, it depends on the dilution force on other pre-existing shareholders (for newly issued stock). On the other hand, the minimum level of shares should be considered that will trigger the motivation in the beneficiary. Therefore, the number of options must then be neither too nor too low. Unluckily, there is no absolute combination. The number of options may be few if, for instance, the controlling shareholder would dissipate his predominant position due to the potential exercise of the options within the stock options plan. On the contrary, many options may be high if the company is still a younger and riskier but fast-growing company. The last consideration about stock option plans components is about the eventual presence of sales restrictions. The restriction is the "lock-up period" in which the shares acquired cannot be sold, whose length might vary from a couple of months to a couple of years. Scholars identify two major reasons why such plans exist. Wheeler (2004) suggests that the first one is to assure that the exercise of the option and the subsequent selling of the shares does not occur within a short-term speculative period. Secondly, if all the beneficiaries were to sell the acquired stock jointly, it would hurt the value of the company's shares, driving down the share price. These significant features have to be taken into account arranging

the plan, and no perfect combination exists, so the compensation committees that control the compensation policies need to evaluate them in detail. The table below summarizes the variables related to a stock option plan and their alternatives.

Table 1 - Stock Options Plan Variables Description

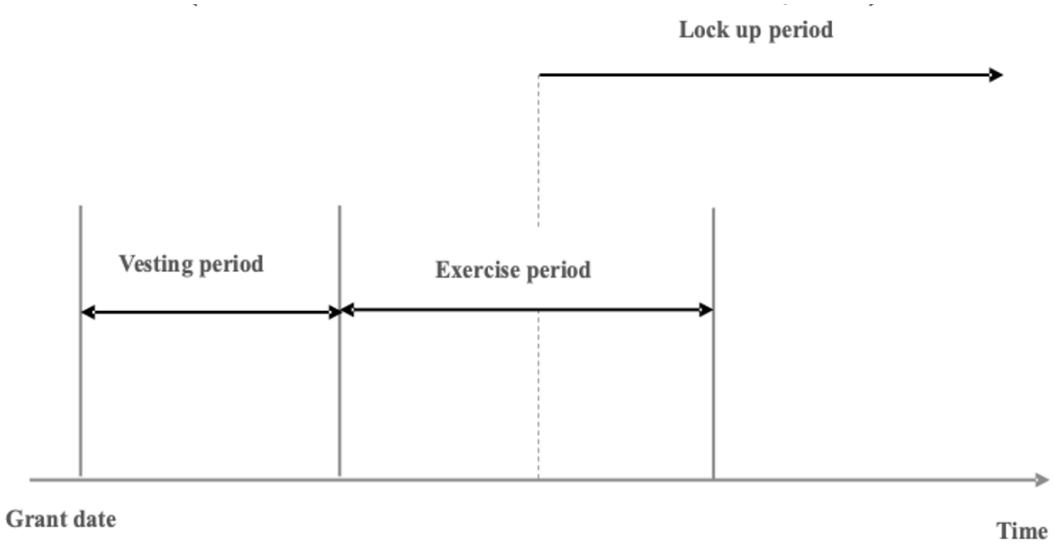
Variable	Description
Beneficiary	The holder of the right that can decide whether to buy or not the stocks of the company
Exercise Period	The period during which the beneficiary can exercise the owned rights
Excercise Price	The price at which the beneficiary has the right to buy the shares of the company
Vesting Period	The period in which the rights exists but cannot be exercised by the beneficiary
Options Number	The number of instruments the beneficiary has and the number of shares that each options gives the beneficiary the right to buy
Payment Method	The source of payment the beneficiary can use to buy the shares of the company
Sale Restrictions	The different mechanisms that the beneficiary has. It can be sale restrictions, time restrictions and others

Source: Personal Elaboration from Zattoni 2020

The plan's scope to connect the value of the company's shares with the beneficiary's compensation measures how the company, and therefore the executive, is performing. In general, the most significant profits of a stock option occur when the exercise price is lower than the stock price. The difference between the stock price and the exercise price generates the benefit. Therefore, when the stock price increases above the exercise price, the stock option owner should sell them to earn money. Typically, ESOs are issued by the organizations and cannot be sold, unlike standard listed or exchange-traded options. When a stock's price increases above the call option exercise price, call options are exercised, and the owner receives the company's stock at a discount price. The possessor may choose to hold the stock overtime or sell it immediately on the open market to profit. It follows an example of how stock option plans work. For instance, a company CEO may be granted the right to buy 1,000 shares, with the options vesting 35% per year over four years with a term of 10 years. Therefore, the 35% of the ESOs, conferring the right to buy 350 shares, would vest in one year from the option grant date, another 35% would vest two years from the grant date, and so on. If the executive chooses not to exercise his/her 35% after year one, he/she would have a cumulative

increase in exercisable options. Thus, after year two, the executive would now have 70% vested ESOs. Therefore, if the executive does not exercise any of the plan's options in the first four years, he/she would have 100% of the stock option vested after that period, which he/she can choose to exercise in whole or in part. As mentioned earlier, we had assumed that the ESOs have a term of 10 years. It implies that after ten years the executive would no longer have the right to buy shares. Therefore, the stock option must be exercised before maturity. The figure below summarizes the structure of a stock option, how it works, and all stock option elements described.

Figure 2 - Stock Option Structure and Functioning



Source: Zattoni 2020

On the other hand, there are the non-option incentive plans for executive remuneration. This category includes a wide range of equity-based incentives with a different feature. The most common are performance shares, phantom stock, stock grants, stock appreciation rights (SARs), employee stock ownership plans (ESOPs), and restricted stock plans. Performance shares are allocations of company stock granted exclusively if specific company-wide performance criteria are met in the medium-long term. The bonus assigned is linked to some economic targets, such as return on investment (ROE) and earnings per share (EPS). In many instances, the distribution of performance shares depends on the company's performance compared to some specific metrics. For example, the shares might only be issued if the firm's stock attains a specific value on the market. Organizations also structure performance share plans based on total shareholder cash flow from operating activities and return on capital. The performance

shares aim to drive executives to prioritize company strategic drivers that positively influence shareholder value. Their scope is to link executive and stakeholder's interests. In the case of performance shares, executives receive shares or stock options as compensation for meeting some specific predetermined targets. The difference with traditional stock-option plans is that executives do not receive stock options as part of their standard compensation package. Thus, it is a form of compensation paid out only to the best employees who have achieved high-quality standards or to executives who have reached critical strategic milestones. The organization generally sets a time period wherein the executive is granted voting rights on those shares even though they have not yet been released from the restricted period (Investopedia, 2021). The executive might also have rights to dividends based on those shares, which would be dispensed according to the terms laid out in the compensation agreement. Secondly there are phantom stocks that are an agreement between the organization and the executive of phantom shares that bestow upon the grantee the right to a cash payment at a designated time or in association with a designated event in the future. The payment is to be in an amount tied to the market value of an equivalent number of shares of the corporation's stock (Adams et all., 2021). Therefore, the amount of the payout will increase as the stock price rises, and decrease if the stock falls, but without the grantee actually receiving any stock. Like other forms of stock-based compensation plans, phantom stock broadly serves to align the interests of executives and shareholders, incent contribution to share value, and encourage the retention or continued participation of contributors (Adams et all., 2021). Thirdly there is the stock grant. They may sound similar to stock options incentive plans, but stock grants are equipped to keep a company's high-quality employees working for the company and ensure that the employee would not change for another job that offers them the best conditions. Therefore, stock grants are contracts adopted by companies to retain talent. An example of this would be a company granting a new employee 100 shares of shock that are vested over four years. The employees will obtain this stock only once these four years of working at the company are completed (The Kelley Financial Group, 2021). The employees will lose the stock if they leave before this period of four years is over. The fourth type of non-option incentive plan are the stock appreciation rights (SARs). Stock appreciation rights (SAR) is a method for companies to give their executives a bonus if the company performs well financially. They differ from stock options in that the holder does not have to purchase anything to receive the proceeds (Phantom Stock and Stock,

2018). It is a form of executive compensation linked to the company's stock price during a determined time. Executives are not required to pay the exercise price. Instead, they would automatically receive the amount of the increase in the stock price in cash or stock. They receive the sum of the increase in stock or cash. Generally, these types of bonuses are paid in cash. Moreover, another common form of non-option incentive plan is the employee stock ownership plan (ESOP) which occurs when the executive can benefit from receiving ownership shares of stocks in the company. ESOPs give the issuer organization several tax benefits. They are usually formed to facilitate succession planning in a closely held company by allowing employees the opportunity to buy shares of the corporate stock. ESOPs are organized as trust funds and are powered by the organization putting newly issued shares into them, putting cash in to buy existing company shares, or borrowing money through the entity to buy company shares (Investopedia, 2021). Finally, as the least type of non-option incentive plan, there are the restricted stock plans. They are a common way to share stock with employees in public companies. The compensation committee approved a plan that simply allows for the issuance of stock to selected employees. Unlike stock options, employees receive the total starting value of the shares (Phantom Stock and Stock, 2018). Restricted stock will carry a vesting schedule so that employees will forfeit some or all of the shares unless they remain with the company for a specified number of years. Executives who receive restricted stocks must pay ordinary income taxes on the value of the shares, and tax is due no later than the time the shares vest. Notwithstanding what has been described so far, it is crucial to highlight that there is no perfect combination of these forms of compensation. However, the compensation committee must move to find the combination that, case by case, best suits the company. The compensation committee should not ignore that this scenario can change and that the combination of compensation must be constantly updated overtime to ensure that it is always the best for the company.

2.4 The difference Between Stock Option and Non-Stock Incentive Plans

Today both types of incentives are widely used. Therefore, it is essential to dwell on the main differences that distinguish them. Both types are equity-based incentive plans and have the primary purpose of aligning the interests of executives with those of shareholders. The differences that distinguish them, therefore, make them

complementary rather than the alternative. A good compensation package cannot be separated from having a good mix of both. So far, the two types of incentives differ principally among three main variables. Firstly, stock option incentive plans and non-options incentive plans differ substantially in terms of their risk profile (Hall and Brian, 1998). Indeed, stock option plans impose to the executive only the cost associated with the option at its distribution. Indeed, the option owner can choose to exercise or not his/her right and the choice depends on if he/she would have confidence in doing that or not. Therefore, as we have already explained, the executive who possesses company options would choose not to exercise the right if the share price is lower than the exercise price and vice versa. Moreover, the implicit cost of the option generally issued is widely compensated by other benefits that are part of the executive compensation package. On the other hand, the value of the options depends on volatile future company performances and are not treatable on the market. For instance, if the value of the shares on the market falls, the option's value is downgraded for a higher amount than the shareholders' loss. The executive may lose the entire value of the option if the market price falls well below the exercise and options are almost expired. However, considering this type of incentive, it is effortless to lose everything, but it is also easy to make big profits. Therefore, although executives are considered adverse risks, they will also willingly accept this type of compensation. The stock option incentive plans have substantial leverage, and if the price of the shares on the market is raised, the profit of the executives is much greater than the rise of the price on the market. A strong sensitivity in earnings characterizes the stock option incentive plan. Assuming the same transfer of value as that of a non-option incentive plan, stock incentive plans, when they are "at the money", have a sensitivity of approximately 70% more significant than the non-option incentive plans. The expression at the money indicates a stock-based incentive plan with an exercise price equal to the market price. When the exercise price is higher than the market price, they say, "out of the money" and entail an even greater sensitivity. Therefore, the higher risks associated with an option-based incentive plan compared to a non-option stock-based plan are offset by the possibility of making much higher profits. Secondly, stock option incentive and non-stock option incentive plans differ regarding the impact of the dividend policy, unlike the shareowner. This executive possesses options that change managers' attitudes towards dividend policy because the option's value decreases if the organization favors the distribution of dividends on shares. The decrease in value occurs because, in an efficient market, the

current value of the shares reflects their expected rate of return, which equals the sum of distributed dividends and the increase in shares' market value. Indeed, executives who own stock options, to avoid or reduce the potentially negative impact of the dividend policy on the market value of the shares, are more likely to promote share buy-backs than the executive who owns non-options incentive plans. Indeed, they prefer to repurchase the company shares instead of distributing high dividends to shareholders. Therefore, to avoid executive aversion to profit distribution, shareholders should adjust the exercise price to counterbalance the loss of share value induced by the dividend distribution. Companies cannot just adopt them both. Then it is up to the compensation board or who is in charge of deciding on the remuneration of executives to choose which is the optimal combination for their company based on the individual circumstances.

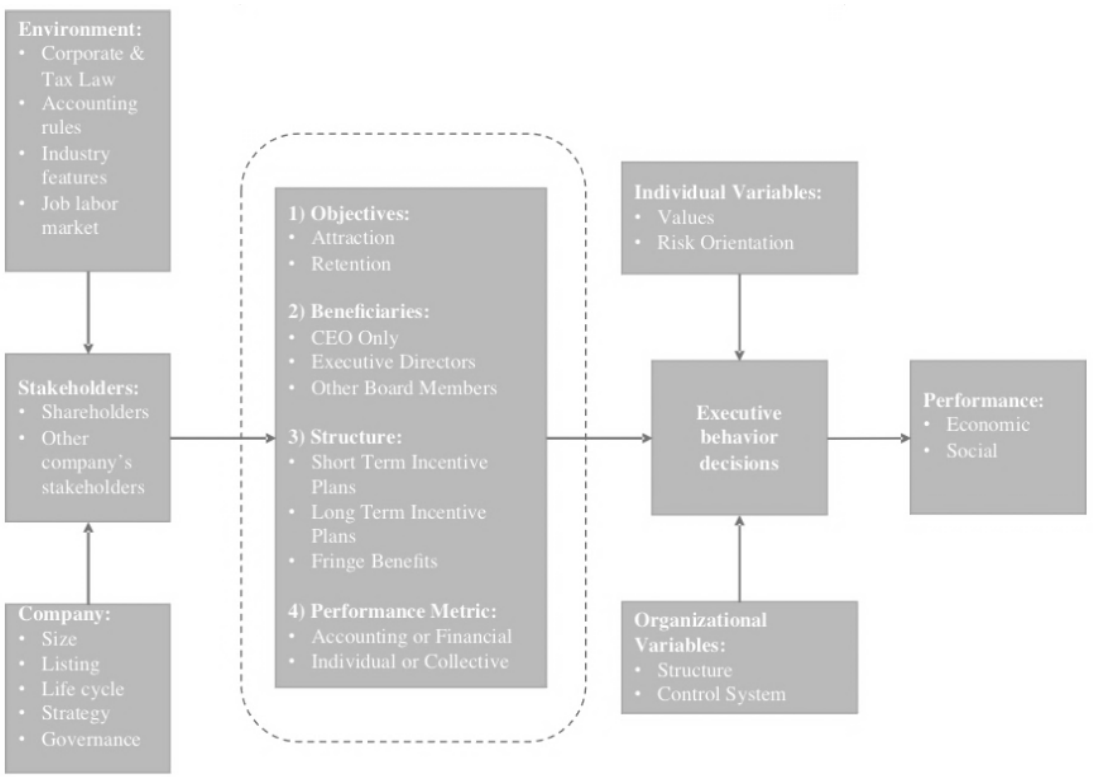
2.5. Executive Compensation Design Systems and Practices

On this subject, many scholars have tried to define and describe a general scheme that includes the main aspects and that is adopted equally by companies. No one model exists for designing, implementing, and operating a pay for performance system. While agencies can learn from the experience of others, ultimately, each organization must consider the issues carefully in order to make the best decisions given their unique circumstances. According to previous research, three interrelated factors, each supported by a specific theory, must be considered in designing a compensation system. The first one is *Informativeness* (Holmstrom, 1979). Holmstrom defines *informativeness* as how the performance measurement reflects the agent's contribution to the principal's wealth. He states that moral hazard and incentive problems arise with information asymmetry because the principal cannot directly observe what the agent does. Therefore, the ideal solution would be to control the agents and set up contracts using the information collected monitoring information. However, complete observation is either prohibitively costly or impossible. Hence, according to Holmstrom, contracts are based on imperfect information used to attenuate principals-agents agency problems. When the agent produces a measurable productive output, the information gap between the principal and the agent is shorter. Consequently, the imperfect information increases because contracts develop, the more the principal and the agents' wealth increases. The second factor is "*Risk Bearing*" (Bloom and

Milkovich, 1997; Gomez-Mejia, 2007), or the extent to which an agent may incur potential losses in pursuit of performance targets (such as lower reputation or high employment risk). Indeed, Agency Theory asserts that agents will accept the more significant risk if provided with insurance that helps protect their interests (Conlon and Parks, 1990; Holmstrom, 1987). As agent risk-bearing increases, compensation should increase accordingly (Bloom and Milkovich, 1997). If principals attempt to align agent behaviors through incentive pay, the actual measures used to determine incentive compensation payouts are fundamental. It is of great importance since some results differed depending upon how risk was characterized. For example, the association between risk, pay, and performance might be positive when a clear performance target is established, employees believe they can affect the performance target, and pay is genuinely contingent upon changes in the target. Under such a scenario, we would expect a positive relationship, even if the firm was pursuing a riskier strategy (Bloom and Milkovich, 1997). Therefore, if risk-averse CEOs are not rewarded for the increased risk associated with risky investments, especially in the short-term perspective, they will presumably allocate capital into less uncertain alternatives. Therefore, at similar payment conditions, a good CEO may leave for an organization with limited responsibility and slight pressure, where the additional effort and risk are not demanded. The third factor is "Controllability" (Antle and Demski, 1988; Demski, 1994; Demski and Feltham, 1978), or the extent to which an agent can exert some influence over a performance criterion. It means that an agent should be evaluated and rewarded by a performance measure if he/she can control or significantly influence that measure (Franco, 2007). During the "Relevance Lost" debate in the late 1980s, Johnson and Kaplan initiated their "A Performance Measurement System for the Future" theories. They stressed the importance of assuring congruence between the long-term strategic objectives of the company and short-term goals for control and performance management. They also highlighted the possibility of using non-financial measures, as short-term financial measures often are invalid indicators of the actual recent overall performance of the enterprise (Johnson and Kaplan, 1987). The design of this control system and the measurement of each employee's contribution to shareholder value are challenging but not impossible. Compensation packages are imperfect in their ability to monitor and control the strategies of managers. They focus on financial performance as a measurable outcome, as strategic decision-making is complex and non-routine and impossible to supervise directly. Performance outcomes are also the result of an

extended period of decision making, and so it is not easy to assess current strategic decisions. Moreover, Airoldi, 2003, developed a summary scheme to describe the functioning and the main features of the executive remuneration system. Airoldi's macro framework, represented in the figure below, considers most of the more relevant variables of the process.

Figure 3 - Airoldi's Framework



Source: Airoldi G. and Zattoni A. 2003

The first variable identified by the author is environmental, which describes the level of riskiness of the sector in which the company operates. The general level of risk determines the compensation strategy. If the company operates in a mature and stable industry, equity-based compensation policies are less frequent. On the contrary, in riskier and more volatile sectors, perhaps because they are younger, executives need to be more controlled by the shareholders, who will tend to link executive remuneration more closely to the company's performance using incentive plans of various kinds. In the set called environmental variables, local laws and tax laws are included. The characteristics of the legal system of a company can significantly influence the equity incentives of executives. Next, the framework presents the accounting rules, which are essential because they determine how the company recognizes the cost of equity compensation in its financial statements. The form in which a cost item is recorded

directly impacts the profits of the company. Other environmental factors include industry characteristics, such as competitors' remuneration structures, often used as benchmarks when designing one's own. The second set of variables described by the framework concerns instead the characteristics of the company and no longer those of its context. The first variable considered is size. The more complex and the larger the company, the more it needs to hire high skilled executives. However, the more skilled they are, the more they require high compensation and more complex incentive formulas. The second variable of the set investigates whether the company is listed on the market or not. Listed companies, on average, have more fragmented and less active ownership concerning unlisted companies generally have a higher concentration of ownership. It implies that the shareholders of listed companies must have more control over the executives, who have more decision-making powers. Therefore, executives of listed companies with highly fragmented ownership will have more extensive and more complex compensation packages to avoid agency costs. In addition, Airoldi also considers the company life cycle. Younger companies, such as start-ups, have less cash to invest in staff remuneration, but being riskier than mature, stable companies, they include a substantial component of equity-based incentives in their executives' compensation packages. Mature or decaying companies tend to use cash bonuses for executives' compensation as well. Airoldi also considers the strategy of the business and the governance of the company. Horizontal conglomerates emphasize egalitarian pay, whereas vertically integrated companies tend to have a hierarchical linked compensation structure. Also, Airoldi identifies as additional variables involved in the compensation design such as the shareholders' compositions, which directly influences the composition and the way of operating of the compensation committee, which is the corporate body that makes the decisions regarding the compensation of the executives and creates the design of the compensation package. Moreover, Airold's framework includes other aspects that must be considered when creating the compensation package design. These additional variables are the ultimate recipient of the compensation package, the purpose of the compensation strategy. Indeed, it is crucial to consider whether the compensation strategy is more about retaining the manager or aligning the interests with the shareholders. Alternatively, whether the compensation relates to the CEO or the CFO, the remuneration package may have different characteristics according to the different needs of the beneficiary, depending on his specific position within the company. The third set of variables concerns the choice of benchmarks to be

included in the compensation packages, which we will see in more detail in the following section. Therefore, we can conclude that these are some of the variables included by Airoldi in his framework, which proposes several others since many external and internal, subjective, and objective variables influence and interact with each other when designing the remuneration strategy. It is also essential to add that it is crucial to consider all of them since the remuneration strategy of executives should not be underestimated as it is one of the main determinants of a company's success. Moreover, as we will see later, the trend today is to pay more and more attention to ESG variables in executives' compensation design. Indeed, high social performance might not be related to financial statements, but it can significantly impact the company's legitimacy and, most importantly, reputation, among other characteristics. That is why many companies are designing compensation packages related to ESG or CSR (corporate social responsibility) practices and gas emissions measures, waste management, and energy efficiency. That is why many companies are designing compensation packages related to ESG or CSR (corporate social responsibility) practices and gas emissions measures, waste management, and energy efficiency.

2.5.1 The Link Between Executive Compensation and Firm Performance

The analysis of pay for performance has gained considerable prominence over the past decade as executive pay has attracted political, regulatory, and economic attention (Gerakos, 2005). In addition, the Dodd-Frank Act has mandated the SEC to amend its executive compensation disclosure rules to demonstrate more clearly the “relationship between compensation actually paid and the financial performance of the issuer.”. In addition, more and more researchers are conducting studies on the relationship between corporate performance and executive compensation. However, it should be noted that there are still conflicting views on this issue. On the one hand, some scholars have shown that management compensation can influence firm performance when certain thresholds are exceeded. On the other hand, other studies have found no relevant relationship between executives who own company equity and company performance. For example, Michael C. Jensen and Kevin J. Murphy’s (1990) showed that there was virtually no link between how much CEOs were paid and how well their companies performed for shareholders (Rappaport, 1999). Nevertheless, after lots of in-depth research, this paper tends to support those scholars who have found and demonstrated that there is a link between executive compensation and firm performance. In fact,

numerous empirical studies show that these two factors are positively correlated with each other and with some strategic business decisions, such as acquisitions, stock repurchase, restructuring, capital investments, layoff, and others (Lilling, 2006). However, it must be stressed that it has also been abundantly demonstrated that growth through an acquisition strategy increases the CEO's pay but not the company's performance. This example shows that the executives' compensation strategy may influence the manager's decisions, but not always in the desired direction of increasing corporate performance. As for many other governance variables, it is very difficult to reach a definitive conclusion on the relationship between corporate performance and CEOs' remuneration, although at least there is evidence that it can influence their decisions. Moreover, some issues arise because of some methodological and measurement problems such as the CEO's characteristics, the firm's environment level, the interaction of compensation with other governance practices and others, that prevent scholars from reaching a definitive conclusion. Chomping uses different strategies and parameters to decide on their set of performance goals. Some leave total freedom to the compensation board to choose from many possible financial and non-financial indices. Generally, large companies statistically have on average between 2 and 3 financial indicators, which are the most common. The use of non-financial indicators, on the other hand, is not yet a completely common and widespread practice. Generally, the most used financial metric was revenue. Earnings per share (EPS) and operating income followed as the second and third most used financial metrics, respectively. Another common indicator used as financial metrics is relative share price performance/total shareholder return (TSR). Several studies show that generally companies that are implementing a growth strategy tend to use financial indicators heavily in measuring executives' performance and tend to be focused on the long term. The following chart is an industry breakdown showing the most used financial metrics for the sectors studied in the models in this paper. The percentage breakdown column represents the number of companies that used each metric in their annual incentive plans during either fiscal year divided by the total number of companies that used the metric in either fiscal year.

Table 2 - Financial Metrics by Industry

Sector	Common Financial Metric	Descriptions
Communication	ROE	It is expressed as a percentage, and it is calculated as the ratio between net income (calculated before dividends paid to common shareholders and after dividends paid to preferred shareholders and interests to lenders) and the average shareholder's equity value.
Consumer Discretionary	EVA	It is calculated as the difference between the net operating profit after taxes and the invested capital multiplied for the weighted average cost of capital.
	Revenue	They are calculated as the average sales price times the number of units sold.
Consumer Staples	Gross Margin	It is calculated as the difference between the net sales, calculated as the revenue, and the cost of goods sold.
Energy	EPS	They are calculated as the ratio between the difference of net income and preferred dividends and the value of shares outstanding at the end of the period.
	Free Cash Flow	It is represented by the cash generated by the company from business operations after subtracting any capital expenditures.
Financials	EPS	They are calculated as the ratio between the difference of net income and preferred dividends and the value of shares outstanding at the end of the period.
Health Care	Revenue	They are calculated as the average sales price times the number of units sold.
Industrial	EPS	They are calculated as the ratio between the difference of net income and preferred dividends and the value of shares outstanding at the end of the period.
	Free Cash Flow	It is represented by the cash generated by the company from business operations after subtracting any capital expenditures.
Informatin Technology	Operating Income	It is calculated as the difference between the gross income and the operating expenses.
Materials	EPS	They are calculated as the ratio between the difference of net income and preferred dividends and the value of shares outstanding at the end of the period.
Real Estate	EVA	It is calculated as the difference between the net operating profit after taxes and the invested capital multiplied for the weighted average cost of capital.
	Revenue	They are calculated as the average sales price times the number of units sold.
Utilities	Net Income	It is calculated as the difference between sales and the cost of goods sold

Source: Personal Elaboration from Deloitte Touché Tohmatsu Limited, 2019

One of the most important decisions to make when designing the executive incentive plan is to place the performance thresholds with a given budget. The minimum performance relative to a payoff is the threshold, while the highest level of performance beyond which there are no incremental benefits is called the maximum. Organizations strive to plan realistic and achievable goals for executives by setting thresholds that satisfy both shareholders and executives. In addition, companies must consider the factor of volatility and the possibility of unforeseen events over which they have no control. Therefore, all these considerations and elements determine the range of performance for the various selected metrics that determine executives' benefits. The performance range is referred to as performance leverage, where the narrower the range, the more volatile the executive's income is and vice versa. Studies by Deloitte Touche Tohmatsu Limited and others have found that many companies' boards of members and executives are indeed interested in non-financial performance measures, even though their ability to monitor these factors remains inadequate. (Deloitte Touche Tohmatsu Limited, 2019.) It is because financial performance measures such as return on assets or earnings are considered tracking performance measures. By themselves, these metrics do not appropriately capture the company's strengths and weaknesses. On the other hand, Merchant and Van der Stede (2003) discussed how to use both financial

performance measures and non-financial measures in the performance measurement system. Indeed, how companies decided to rely on performance measurement and the different criteria they chose to adopt are important, because they have a direct impact on the decisions taken on how to remunerate executives. Moreover, non-financial performance measures can serve as leading indicators of future financial performance and provide insight into an organization's impact on stakeholders and society (Ittner and Larcker, 2003). The great attribute about non-financial measures is that companies can use them to understand why specific financial upshots occurred and what they require to modify to develop their financial metrics. Several meaningful non-financial metrics can be divided into four classes according to which dimension of the corporate performance they impact (Merchant and Van der Stede, 2003)

- Company reputation
- Customer influence and value
- Competitiveness
- Innovation

Adopting non-financial metrics instead of financial ones can offer several benefits. Managers can see the business's progress well before a financial verdict is pronounced, and the soundness of their investment allocations has become questionable. Employees can receive better information on the specific actions needed to achieve strategic objectives. Furthermore, investors can better understand the company's overall performance since non-financial indicators usually reflect realms of intangible value, such as R&D productivity, that accounting rules refuse to recognize as assets. However, companies, when setting non-financial metrics, must be careful not to make the following mistakes. Firstly, organizations must be aware of choosing the non-financial metrics considering the strategy of the business. The major challenge for companies is determining which of the hundreds, if not thousands, of non-financial measures to track to identify which performance areas, and which drivers, make the most outstanding contribution to the company's financial outcomes. More successful companies have attacked this problem by choosing their performance measures based on causal models, also called value driver maps, which lay out the plausible cause-and-effect relationships that may exist between the chosen drivers of strategic success and outcomes. Scholars also examined the use of financial result control in the presence of uncontrollable factors (Merchant and Van der Stede, 2003). The methodology developed by Merchant

and Van der Stede, 2003, links six performance measures from all organizational levels with the overall company strategy, using four perspectives: financial, customer, internal processes, and innovation and learning. Today we observe many versions of the Balanced Scorecard in both multinational organizations and smaller companies. One of the challenges for achieving company success is combining the strategic management system with the performance measurement system, consisting of goals, measures, evaluation, and incentives. Secondly, companies must check if the link between the strategy and the indicators chosen works, empirically and not only formally as the preliminary study predicts. Indeed, even those companies that create causal models rarely go on to prove that actual improvements in non-financial performance measures affect future financial results. Businesses that do not scrupulously uncover the fundamental drivers of their units' performance face several potential problems. They often measure too many things, trying to fill every perceived gap in the measurement system. The result is a wild profusion of peripheral, trivial, or irrelevant measures. Amid this excess, companies cannot tell which measures provide information about progress toward the organization's ultimate objectives and which are noise. If companies cannot prove causality, they certainly cannot determine the relative importance of their selected measures. And not being able to weigh these measures makes it hard to allocate resources according to their most beneficial uses or create meaningful incentive plans. Thirdly, organizations must consider the fact that they must set the correct performance targets. Target setting is inherently difficult because it always takes a while for improvements in a driver of corporate performance to produce improvements in the performance it is meant to affect. Sometimes, efforts to improve non-financial measures can even damage short-term returns. However, if a company can reasonably estimate when the non-financial performance improvements will pay off and how much, it can set lower interim financial goals, which can subsequently be adjusted upwards. Unfortunately, many companies do not try, preferring to focus on initiatives that promise short-term financial results even though other initiatives may have higher long-term payoffs. At least organizations must also pay attention to measuring the metrics correctly. Even companies that build a valid causal model and track the correct elements can fall when determining how to measure them. Measures can also lose validity and reliability when evaluating non-financial attributes that are inconsistent across the company. We found that business units within the same company often used different methodologies to measure the same thing. Sometimes the

problem lies like the thing being measured. Most businesses have trouble discovering how they are doing at such elusive endeavors as developing leadership or maintaining supplier relations and difficulty quantifying qualitative results. These, then, are some points that companies should always consider when deciding which non-financial indicators to use, regardless of the industry they operate in or their size. In 2019, 181 CEOs signed the Business Roundtable's Statement on the Purpose of a Corporation and committed to leading their companies for the benefit of all stakeholders, including customers, employees, suppliers, communities, and shareholders. Notwithstanding the above, however, it must be considered that non-financial performance indicators have many advantages to non-financial performance measures, they are not without drawbacks. Researchers have found five negative aspects regarding non-financial performance metric adoption. Firstly, a greater number of diverse performance measures frequently requires significant investment in information systems to draw information from multiple (and often incompatible) databases. Evaluating performance using multiple measures that can conflict in the short term can also be time-consuming. The second drawback is that, unlike accounting measures, non-financial data are measured in many ways, there is no common denominator. Evaluating performance or making trade-offs between attributes is difficult when some are denominated in time, some in quantities or percentages and some in arbitrary ways. Indeed, like all subjective assessments, these methods can lead to considerable error. Lack of causal links is a third issue. Many companies adopt non-financial measures without articulating the relations between the measures or verifying that they have a bearing on accounting and stock price performance. Fourth on the list of problems with non-financial measures is lack of statistical reliability, whether a measure represents what it purports to represent, rather than random “measurement error”. Many non-financial data such as satisfaction measures are based on surveys with few respondents and few questions. These measures generally exhibit poor statistical reliability, reducing their ability to discriminate superior performance or predict future financial results. Finally, although financial measures are unlikely to fully capture the many dimensions of organizational performance, implementing an evaluation system with too many measures can lead to “measurement disintegration”. This occurs when an overabundance of measures dilutes the effect of the measurement process. To conclude, although non-financial measures are increasingly important in decision-making and performance evaluation, companies should not simply copy measures used by others. The choice of measures must be linked

to factors such as corporate strategy, value drivers, organizational objectives and the competitive environment. In addition, companies should remember that performance measurement choice is a dynamic process and measures may be appropriate today, but the system needs to be continually reassessed as strategies and competitive environments evolve.

2.6 Institutional Theory

Institutional theory suggests both that firms benefit from conforming to societal expectations and that managers have the capacity ("internal power"; Oliver [1991]) and the motivation ("fear of novelty"; Oliver [1997]). Considering institutional theory's main thesis, that company's primary aim is to preserve their legitimacy (Scott, 1995) by meeting the expectations of shareholders and institutions (Aldrich & Fiol, 1994; DiMaggio & Powell, 1983) organizations indirectly also follow society's expectations (Meyer & Rowan, 1977). Therefore, concern over legitimacy forces firms to adopt managerial practices that are expected to have social value (Deephouse, 1999; Scott, 1995). Use of environmental criteria in executive pay schemes is consistent with findings by institutionalist scholars (Peng, 2004; Staw & Epstein, 2000) that investors, boards of directors, and their compensation committees do use evidence of managerial actions believed to procure legitimacy to assess the effort and value of their top executives, and not just observed economic performance, particularly if the link between actions and results is blurred. The institutional prediction discussed above is consistent with an agency perspective.

2.7 Hypothesis Development

By the findings emerging from the literature review described in Chapter 2, I outline the following assumptions to be tested empirically in a uniform and up-to-date context. The results of the hypotheses that will be tested by the research serve to create an empirical basis for answering the research questions. The first question this study seeks to answer is whether there is a relationship between executives' compensation and company's environmental performance, and in which industry this relationship is the strongest. Previous studies have revealed the existence of this relationship even if considering different samples and with the use of different approximations for Environmental Performance measurement and Compensation. Indeed, it is important to

test whether this relationship still exists with the ESG Indicator environmental dimension as a proxy of Environmental Performance and with a new and updated sample of Companies in different industries. Once this question has been answered, our aim is to investigate to what extent company environmental policies and company's environmental governance mechanisms affect the above-mentioned relationship. Therefore, the aim of the paper is to find an answer to the following questions by investigating through the development of the following hypotheses:

2.7.1 HP 1a. Company's environmental performance has an impact on Executive's compensation

Companies are expected to recognize the value of adhering to environmental expectations, as the resulting legitimacy reduces the probability of organizational collapse (Scott, 1995; Singh, Tucker, and House, 1984) and can strengthen financial performance (King and Lenox, 2002; Klassen and McLaughlin, 1996). So, Institutional theory suggests both that firms benefit from conforming to societal expectations and that managers have the capacity "internal power" (Oliver, 1991) and the motivation "fear of novelty" (Oliver, 1997) to resist these institutional pressures. Firms therefore need incentive mechanisms to dissuade managers from avoidance because as several studies have shown, companies have many advantages in implementing a good environmental strategy. Shareholders, therefore, profit from good environmental performance. To do this, they need executives who are active in this respect. Therefore, the environmental interests of the shareholders must be aligned with those of the executives. As explained above, one of the main ways of aligning these interests and reducing agency theory problems is to do so by using an executives' remuneration strategy that incentivizes management towards effective environmental practices. CEOs who exhibit good environmental performance should be rewarded with higher pay because on the one hand they are enhancing their firms' chances of survival, and on the other hand higher pay will make them less reluctant to engage in environmental actions with uncertain economic benefits. Indeed, from the managers' perspective, the link between environmental operations and financial performance is not straightforward (Bansal, 2005; Sharma, 2000). For example, in order to implement a strategy that increases environmental performance, managers may need to implement new technologies that may reduce the quality of the company's product, that may fail, or that may generate increased costs. Managers are responsible for the outcome of such

operations, which can be very risky (Klassen and Whybark, 1999; Russo and Fouts, 1997). Moreover, good environmental performance may take time to come to fruition, increasing uncertainty about outcomes (Aragon-Correa, 1998; Aragon-Correa and Sharma, 2003; Hart, 1995; Khanna and Damon, 1999). Environmental investments are risky, since "there is little reason to believe that this investment will result in enhanced short-term profits" (Hart, 1995). Indeed, although there is empirical evidence that good environmental performance improves long-term economic performance (King and Lenox, 2002; Klassen and McLaughlin, 1996), studies have also shown that environmental performance can impair financial results, especially in the short term (Hart & Ahuja, 1996; Sarkis and Cordeiro, 2001). Therefore, if CEOs are not compensated for the increased risk associated with environmental investments, they may allocate resources to more conservative investments. Even when managers recognize the importance of good environmental performance for their firm and its stakeholders, they may be tempted to focus on the actions that are easiest to observe (Russo and Harrison, 2005). Also, a good CEO may leave for a job in a sector less environmentally sensitive, where the additional effort and risk are not demanded. So, in conclusion, executives who are properly compensated for the increased risk associated with environmental investments will undertake green policies and increase the company's environmental performance, otherwise not.

2.7.2 HP 1b. Company's environmental performance has a higher impact on Executive's compensation for high-pollution industries

Indeed, as already explained in Chapter 2, institutional theory predicts that firms will obtain legitimacy by displaying excellent environmental performance (Bansal, 2005; Bansal and Clelland, 2004; Hoffman, 2001). Firms in polluting industries are all subject to the same regulatory framework and arguably face similar media attention, scrutiny from activists, community concerns, and changes in consumer preferences. The institutional theory prediction is that companies in this strong institutional field will gain legitimacy by exhibiting good environmental performance more than organizations in other fields. (Bansal, 2005; Bansal and Clelland, 2004; Hoffman, 2001). In sum, firms in polluting industries are more likely to recognize the value of conformity to environmental expectations, as the resultant legitimacy reduces the probability of organizational failure (Scott, 1995; Singh, Tucker, and House, 1984) and may enhance financial performance (King and Lenox, 2002; Klassen and McLaughlin,

1996). Hence, firms in polluting sectors have more need to motivate their CEOs to engage in strategies to improve environmental performance. Indeed, the weight of environmental results on executives' remuneration is greater because it is more important for high pollution industries whose success depends largely on legitimacy and environmental outcomes.

2.7.3 HP2. The positive effect of environmental performance on executive compensation is more significant in companies that adopt pollution prevention policies rather than for companies that adopt pollution control policies

There is a fair degree of consensus among environmental scholars that pollution prevention strategies are more valuable than pollution control solutions. To the extent that pollution prevention efforts provide greater benefits than pollution control strategies, agency theory, via the informativeness principle discussed earlier, suggests that pollution prevention success should be compensated more than pollution control strategies. At the same time, pollution prevention strategies are more complex and riskier than pollution control strategies. They are technologically complex because they require changes in systems, processes, and products (Aragon-Correa and Sharma, 2003), socially complex because they involve diverse stakeholders at different levels (Russo and Fouts, 1997); and structurally complex because they require managerial commitment and cross-functional coordination (Aragon-Correa, 1998). Moreover, their systemic approach requires risky investments in low-impact technologies, product innovation, and source reduction processes. Thus, from an agency perspective principals should be more inclined to reward pollution prevention rather than pollution control results. The same proposition holds from an institutional perspective. It has been argued that "the appearance rather than the fact of conformity is often presumed to be sufficient for the attainment of legitimacy" (Oliver, 1991). This suggests that CEOs may try to secure compliance and meet minimal standards of environmental performance through pollution control strategies, which may be more visible than pollution prevention, in order to manage impressions and fulfill their obligations to external constituencies. However, some authors (Ashforth and Gibbs, 1990; Staw and Epstein, 2000; Suchman, 1995) have argued that exceeding minimum requirements confers greater legitimacy, so that "once minimal standards are met, corporations are likely to continue working to be the best or the most admired" (Staw and Epstein, 2000: 526), and that firms' constituents prefer more definitive responses (Suchman, 1995).

According to this logic, CEOs who are committed to environmental excellence (through pollution prevention strategies) should receive higher pay than those who merely meet minimum requirements. Moreover, achieving legitimacy with more substantive, though less visible, strategies, such as pollution prevention, may be easier in a strong institutional field, where objective measures are made public and institutional pressures are steady.

2.7.4 HP 3. Long-term pay has a positive effect on subsequent environmental performance and increases the success of pollution prevention strategies.

Long-term pay forms, like stock options, are explicit incentives, since their final value is contingent on future performance (Murphy, 1999) and induce executives to actively seek business opportunities and make strategic investments. Managers who receive long-term pay contingent on the future value of their companies are likely to perceive the potential value of green practices more easily, because good environmental behaviors are widely believed to have an enduring impact on performance (Hart, 1995; Russo and Fouts, 1997). Klassen and McLaughlin (1996) used event study methodology to gauge investor reactions to news about environmental performance awards and environmental crises. These authors found significant, positive returns for firms with strong environmental management and significant, negative returns for firms with weak environmental management. Thus, to the extent that stocks appreciate if firms avoid actions with negative environmental impacts, and/or the executives believe this is the case, CEOs should make decisions that reduce pollution. In addition, executives have an incentive to reduce pollution in the future to the extent that new stock options may be awarded if environmental performance improves. Furthermore, Sanders and Hambrick (2007) reported that stock option pay was positively associated with greater levels of investment in risky long-term projects such as R&D, capital equipment purchases, and acquisitions. Since good environmental performance, particularly pollution prevention, requires a multiyear commitment to demanding and risky environmental strategies, to the extent that long-term pay reinforces those types of behaviors, it should improve environmental performance. Given that pollution prevention is more valuable to firms than pollution control and should be rewarded accordingly (as per Hypothesis 2), we would expect that executives receiving long-term income would tend to devote more attention to improving pollution prevention results than to improving end-of-pipe results.

2.7.5 HP 4 Environmental governance mechanisms strengthen the linkage between environmental performance and executive compensation.

One way to reward executives for desirable behaviors is through a compensation policy that permits considering the value of strategic actions, not just financial results, what Baysinger and Hoskisson (1990) referred to as "strategic controls". Institutional pressures are likely to influence the presence of such a compensation policy (Gomez Mejia and Wiseman, 2007; Lubatkin, Lane, Collin, and Very, 2007). Boards may consider environmental performance implicitly or explicitly when designing an executive compensation policy. Indeed, by making an environmental pay policy explicit, a firm assumes a public commitment and clearly signals its beliefs (Peng, 2004). Gross deviations from that policy would be perceived as hypocritical and thus would be likely to impair legitimacy. However, an explicit environmental pay policy may not be enough to guarantee that a CEO will value environmental performance. Implementing strategic controls also requires additional information, much more than is needed for implementing financial controls (Baysinger and Hoskisson, 1990). Incentives based on executives' behavior depend on a board's knowledge of that behavior (Boyd, 1994; Dalton, Daily, Ellstrand, and Johnson, 1998; Fama and Jensen, 1983; Jensen and Meckling, 1976; Lorsch and MacIver, 1989; Mizruchi, 1983). Conyon and Peck (1998) argued that a compensation committee within a board of directors is an important tool for evaluating CEO performance and designing appropriate rewards for top executives. Baysinger and Hoskisson (1990) also argued that board composition may influence the assessment of the strategic value of executive decisions. And although forming committees related to certain social issues may be a response to institutional pressures (Luoma and Goodstein, 1999), these committees may also improve firm performance (both socially and financially) (Greening and Gray, 1994). It is reasonable to expect that when environmental oversight responsibilities are explicitly and formally delegated to a subgroup of a board (that is, an environmental committee), the board is in a better position to assess executive performance on the environmental dimension (for instance, tracking relevant pollution data and judging the extent to which executive choices reduce pollution) and to consider this assessment in CEO pay decisions. In the parlance of agency theory, delegating environmental issues to a committee made up of knowledgeable board members should reduce the information asymmetries between principal and agent, allowing for a more accurate

assessment of the executive's environmental performance and a tighter linkage between that performance and total pay. We therefore expect firms that have a CEO environmental compensation policy and a specialized environmental board committee to tie executive pay more strongly to environmental performance. And given the arguments underlying Hypothesis 2, we expect this moderating effect to be stronger for evidence of pollution prevention strategies than for evidence of end-of-pipe pollution control.

Table 3 recaps the hypotheses of this study by highlighting the impact of the independent variables on Innovation.

Table 3 - Hypothesis Summary

Hp	Variables	Expected Impact	Relevanti Lietrature
H1a	Environmental Performance	+	Scott, 1995 Singh, Tucker, and House, 1984 King and Lenox, 2002 Klassen and McLaughlin, 1996 Oliver 1997 Bansal, 2005 Sharma, 2000 Russo and Fouts, 1997 AragonCorrea, 1998 AragonCorrea and Sharma, 2003 Hart, 1995 Khanna and Damon, 1999 King and Lenox, 2002 Hart and Ahuja, 1996 Sarkis and Cordeiro, 2001 Russo and Harrison, 2005
H1b	Industry Industry Pollution Score	+/-	Bansal, 2005 Bansal and Clelland, 2004 Hoffman, 2001 Scott, 1995 Singh, Tucker, and House, 1984 King and Lenox, 2002 Klassen and McLaughlin, 1996
H2	Pollution/Pollution Control Policy Pollution Prevention Policy Score Pollution Control Policy Score	+/-	Aragon-Correa and Sharma, 2003 Russo and Fouts, 1997 Aragon-Correa, 1998 Oliver, 1991 Ashforth and Gibbs, 1990 Staw and Epstein, 2000 Suchman, 1995
H3	LTIPs Value	+	Murphy, 1999 Hart, 1995 Russo and Fouts, 1997 Klassen and McLaughlin, 1996 Sanders and Hambrick, 2007
H4	Environmental Governance	+/-	Baysinger and Hoskisson, 1990 Gomez Mejia and Wiseman, 2007 Lubatkin, Lane, Collin, and Very, 2007 Peng, 2004 Boyd, 1994 Dalton, Daily, Ellstrand, and Johnson, 1998 Fama and Jensen, 1983 Jensen and Meckling, 1976 Lorsch and MacIver, 1989 Mizruchi, 1983 Conyon and Peck, 1998 Luoma and Goodstein, 1999 Greening and Gray, 1994

Source: Personal Elaboration

Chapter 3: Research Methods

Chapter 3 is focused on describing the methodology applied in model building research. In doing so, we represent how the hypothesized relationships were collected and evaluated. Firstly, it describes the data collection process and the distribution of our sample. Secondly, we define the variables used in the models, their characteristics, and the method used to calculate them. We devote one section to the description of the dependent variables and one to the independent variables. This section is also made for describing the control variables used in the various regressions. Finally, in the third section of this chapter, brief section devoted to hypothesis checking is included to verify that the regression subsequently presented is in line with all the parameters and respects all the properties necessary for the conclusions obtained to be reliable.

3.1 Sample and Data Collection Procedure

This study research data has been collected from two datasets: the BoardEx Core Reports by Euromoney Institutional Investor and the Refinitiv Eikon database by Thomas Reuters. The BoardEx Core Reports are sets of Excel files containing all the available data about public company boards, board directors and senior managers from companies around the globe. The database will provide data on executive compensation as well as other critical data required for the analysis. Indeed, BoardEx has in-depth profiles of over 380,000 business leaders, mainly in Europe and North America and contains details on more than 952,000 persons and over 1.45 million organizations, both public and private. Geographical coverage of companies includes North America 8,000, UK 2,600, Europe 2,500, Australasia 700, India 225, and the rest of the world 900. Data is updated daily, about 300 research analysts assure quality, and data coverage is from 1999 (BoarEex, 2021). The Refinitiv Eikon is one of the world's most extensive financial markets data and infrastructure providers, serving over 40.000 institutions in 190 countries. The database will provide data on companies' environmental performance, policies and mechanisms, and other critical data required for the analysis. Indeed, Refinitiv is one of the most comprehensive ESG databases in the industry, covering over 70% of global market capitalization across more than 450 different ESG metrics, with data from 2002 to 2020 (Refinitiv Report, 2020). Then to collect the data, the starting point was searching for active public companies operating in the US in different industries. As a result, I have obtained an initial population of over fifteen

thousand companies. Consequently, I have only left those companies meeting the following criteria:

- Companies having a primary listing of the following US exchanges in one of the primary listings in the US as described in the Exchange Official Listing of S&P 1500. Those are the followings:
    - NYSE
    - NYSE Arca
    - NYSE American
    - NASDAQ Global Select Market
    - NASDAQ Select Market
    - NASDAQ Capital Market
    - CboeBZ
    - CboeBY
    - CboeEDGA
    - CboeEDGX
- Companies that have a portion of fixed assets and revenues constitutes a plurality of the total but need not exceed 50%.
- Companies that have the following organizational structure and share type: corporations (including equity and mortgage REITs) and common stock.
- Companies with a financial viability that fall under the following criteria: the sum of the most recent four consecutive quarters' Generally Accepted Accounting Principles (GAAP) earnings (net income excluding discontinued operations) are positive as the most recent quarter.

Then, the availability of data about environmental performance, executive compensation data and, data on environmental governance mechanisms has reduced the sample once more from the starting point to 1509 companies. Subsequent reprocessing of the data further reduced the sample to 406 industries. In fact, we kept only those data that were meaningful to our work, and we have eliminated all zero or unavailable values. Furthermore, the 406 companies are the companies included in the economic sectors listed in the table below, that are the industries classified by the Global Industry Classification Standard (GICS). The industry classification divided the remaining sample as follow (see the table below):

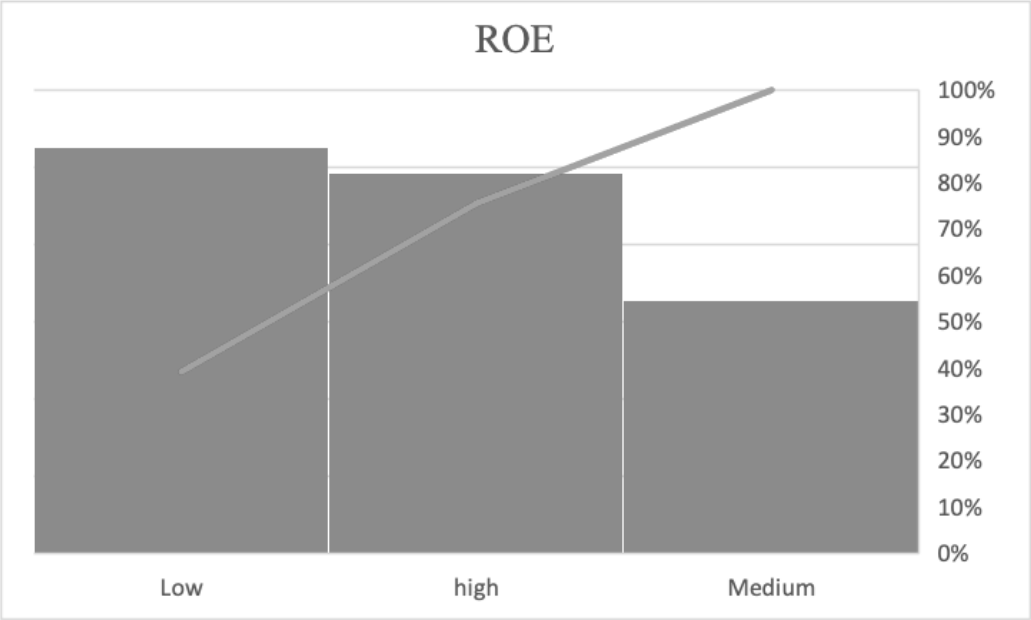
Table 4 - Sample Distribution by Industry

Economic Sector	Frequency	Percentage
Communication	14	3,45%
Consumer Discretionary	61	15,02%
Consumer Staples	14	3,45%
Energy	12	2,96%
Financials	47	11,58%
Health Care	59	14,53%
Industrials	61	15,02%
Information Technology	47	11,58%
Materials	27	6,65%
Real Estate	44	10,84%
Utilities	20	4,93%
Total	406	100,00%

Source: Personal Elaboration

The sample of 406 organizations has been sorted for ROE as a proxy of companies' size. ROE has been calculated as the Income Available Excluding Extraordinary Items for the trailing twelve months divided by the same period Average Common Equity and it is expressed as a percentage.

Table 5 - Sample Distribution by ROE



Source: Personal Elaboration

High (From 67% +)

Medium (From 33% to 67%)

Low (From 0% to 33%)

Moreover, we considered the Environmental Pillar Score as a measure for environmental performance, and we assigned a grade from 0 to 100 to each company in the sample, converting the ESG grade system into numbers. ESG grade system scores organizations from A to D-. The table below shows the grade conversion system we used in this study:

Table 6 - Environmental Pillar Score Grade Range

Grade	Range
A+	$91.67 < \text{Score} \leq 100$
A	$83.33 < \text{Score} \leq 91.67$
A-	$75 < \text{Score} \leq 83.33$
B+	$66.67 < \text{Score} \leq 75$
B	$58.33 < \text{Score} \leq 66.67$
B-	$50 < \text{Score} \leq 58.33$
C+	$41.67 < \text{Score} \leq 50$
C	$33.33 < \text{Score} \leq 41.67$
C-	$25 < \text{Score} \leq 33.33$
D+	$16.67 < \text{Score} \leq 25$
D	$8.33 < \text{Score} \leq 16.67$
D-	$0 < \text{Score} \leq 8.33$

Source: Personal Elaboration

Therefore, considering environmental performance, the sample is distributed as follows:

Table 7 - Sample Distribution by Environmental Pillar Score

Environmental Pillar Grade	Frequency	Percentage
A+	6	1,48%
A	4	0,99%
A-	20	4,93%
B+	48	11,82%
B	65	16,01%
B-	101	24,88%
C+	72	17,73%
C	57	14,04%
C-	21	5,17%
D+	5	1,23%
D	6	1,48%
D-	1	0,25%
Total	406	100%

Source: Personal Elaboration

3.2 Variables and Measures

3.2.1 Dependent and Independent Variables

In this study, the *Executive Total Compensation* is the dependent variable. Considering the importance of this variable it seems necessary to provide a framework to understand how the value of Executive Total Compensation was computed. Executive Total Compensation, consisted of the sum of base salary, direct compensation, and the equity linked compensation. Therefore, Executive Total Compensation is the result of a sum of various values, all of which were contained in the BoardEx database. We present below a summary panel of the components of the summation and a description of them to better understand from where our variable comes from and how it fits into the general context of this research.

$$Executive\ Total\ Compensation = Base\ Salary + Direct\ Compensation + Equity\ Linked\ Compensation$$

Table 8 - Executive Compensation Composition

Base Salary	Base annual pay not including any benefits, bonuses, or raises	
Direct Compensation	*D.C. Pension*	Employer's contribution towards the individual's direct compensation, pension or retirement plan
	Bonus	An annual payment made in addition to salary generally linked to some thresholds
	Other	Other annual ad hoc cash payments such as relocation costs and fringe benefits
Equity Linked Compensation	*Shares*	Value of shares held at the end of the report for the individual. These are valued at the closing stock price of the Annual Report Date selected.
	LTIPs	Value of LTIPs held at the end of the report for the individual. These are valued at the closing stock price of the Annual Report Date selected. The amounts pertaining to the maximum performance hurdle are recorded. It is generally composed by stock options, restricted stock and other long-term compensation mechanisms.
	Shares Under Option	A valuation of Options held at the end of the period for the individual. These are valued at the closing stock price of the Annual Report Date selected. Valuation uses a Generalized Black - Scholes option pricing model using the following variables: - Volatility is measured using 100 days of historic stock prices - Risk free rate is measured using the following: - UK= 6months Liborrate, Europe = EURIBOR, US = 10 year T-Bill, otherwise = 6.5% It is assumed that exercise is on expiry date whether known or assumed.

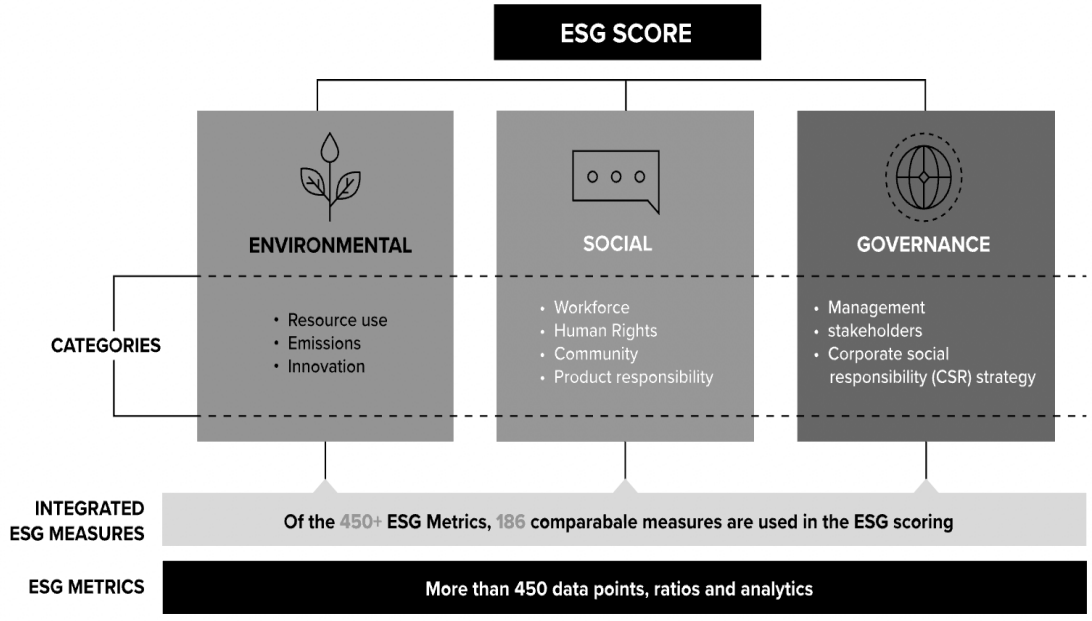
Source: Personal Elaboration

Moreover, it must be made clear how the value of stock options was calculated. There are two available and recognized ways of assessing stock options value. One proposed by Lambert and colleagues (1993), that values stock options at 25 percent of their exercise value, that is the one it is used in this study. The second method is the Black-Scholes method, which adopt a sophisticated model to estimate the value of stock option that is used by many studies of executive compensation (Balkin et al., 2000). However, this study adopts Lambert's method over the latter one for several reasons. Firstly, in some cases, Black-Scholes values were not reported in BoardEx, the database used to collect data about executive compensation in this research, even when stock options

were granted. Secondly, as it has also been in previous research (Finkelstein and Boyd, 1998; Lambert et al., 1993), the correlation between the values yielded by the two methods, in our sample, was very high. Thirdly, some analyses using Black-Scholes values yielded results almost identical to those reported here. A variable also related to the executives' compensation package, that is used in this study as an independent variable, is the *LTIPs Value*. It was calculated as the total sum of all long-term components of executive compensation pay, as stock options, restricted stock options and others, and all the values for the calculations were found on BoardEX Reports.

In this study, the *Environmental Performance*, measured by the ESG Environmental Pillar Score, is an independent variable. It seems necessary to provide a framework to understand how ESG scores are computed by Thomas Reuters' Refinitiv Eikon database. The ESG Environmental Pillar score is one of the three main scores measured by the ESG metrics. ESG scores measure a company's ESG performance, commitment, and effectiveness by analyzing publicly reported data

Figure 4 - ESG Score Structure



Source: Refinitive Workspace ESG Report

Refinitiv experts collect over 450 ESG metrics for each company, then a subset of 186 comparable measures at the industry level is used in the ESG scoring. These measures are chosen based on comparability, impact, data availability, and industry relevance. These 186 measures are grouped into 10 categories, which reflect the three pillar scores: environmental, social, and corporate governance. Our study is only interested in the

environmental dimension. The ESG Environmental Pillar scores is a relative sum of the category weights. The weights vary per industry and pillar weights range between 0 to 100, where a higher score means higher performance. ESG Environmental Pillar score categories are emissions, innovation, and resource use. The table above provides a detailed view on the ESG Environmental Pillar themes covered in the category, with the respective data points evaluated as proxies of ESG magnitude per industry group.
In any case, all variables are summarized in the table at the end, where an explanation of how they were calculated is insert as a brief description of each variable. In addition, among the independent variables present in the models of this study, we also included *Industry*. This variable divides the values of our sample according to the Global Industry Classification Standard (GICS), as we saw in the previous paragraph. This independent variable assigns different scores based on the industry to which the company in the sample belongs. Indeed, this work aims to make a cross-industry analysis of the results obtained and, therefore, verify in which industries the conclusions we draw are more significant. The independent variable Industry was then transformed into a "*categorical independent variable*", a variable that can assign several possible values at the same time. It means that for each level of the Industry variable (which corresponds to a specific industry), a transformation was made, and a dummy variable was created. Therefore, it allows us to investigate our hypotheses by analyzing which sectors the results are most significant. Furthermore, among the independent variables in this research, we also insert as independent variable the *Environmental Committee*, which is simply a dummy variable that assigns 0 or 1 depending respectively on whether the company has an environmental committee or not. More complex is the *Environmental Committee Score*, an independent variable that assesses the actual quality of such committees within companies, assigning a score from 0 to 100.

3.2.2 Control Variables

We included several variables suggested by previous studies as control variables for regression analysis to ensure that the results are not affected by confounding variables. The first two are *Firm Size* and *Firm Performance.* We insert those variables as a controlling measure because they are the most widely recognized determinants of CEO pay (Tosi, Werner, Katz, and Gomez-Mejia, 2000). We captured firm size as the firm's total assets (Bloom and Milkovich, 1998), and we calculated firm performance using return on capital, that is a profitability ratio calculated by dividing a company's net

income by total equity of common shares. In addition, we included *Liquidity* measured as current ratio. According to academics, liquidity is positively correlated to firms' performance and so indirectly influences executive compensation (Finkelstein and Boyd, 1998). Liquidity points to the ability of firms in paying back their short-term liabilities. It plays an important role in smoothening all operations of a firm (Elangkumaran and Karthika, 2013). The importance of liquidity to the performance of a company might determine the level of profitability of a company (Zygmunt, 2013). Current ratio sets the association between short term assets and short-term liabilities. Generally, when the current ratio is high it can be said that the firm's ability to pay back its short-term obligations is good (Owolabi, Obiakor, and Okwu, 2011). Wang (2002) found that aggressive liquidity management boosts the operating performance of a firm and usually results in higher values for a firm. In keeping with relevant work on executive compensation, we controlled for two measures of CEO power and influence. The first was *CEO Board Member*, a dummy variable that assign 1 if the CEO is a board member otherwise the variable has value zero. It is used as a proxy for CEO influence inside the company. Another set of control variables accounted for governance structure. First, we controlled for the *Independence Board Members Scor*e, measured as the percentage of independent members as reported by the company. This measure is often used as an indicator of board independence (Baysinger, Kosnik, and Turk, 1991; Westphal and Zajac, 1994). Third, we included *CEO Duality*, the situation in which the same individual is both CEO and board chair, which purportedly reduces board independence (Boyd, 1994; Westphal and Zajac, 1994). This was measured as a dummy variable coded 1 if a CEO held both positions and 0 otherwise. Lastly, we use a dummy variable, coded 1 if the company has a *Compensation Committee* and 0 otherwise. It is used as a proxy for identifying the quality of the compensation procedure. Moreover, to control for the possibility that firms may improve their environmental performance simply by divesting from highly polluting sectors, we use an *Industry Pollution Position Index* that reflects the mix of sectors in which a firm operates and accounts for their pollution intensity. We expected this index to be inversely related to our environmental measures. That is, firms with greater presences in highly polluting sectors should exhibit worse environmental scores.

3.2.3 Interactive Variables

So far, to complete the picture of the variables that are used in this study to investigate the research questions, in order to have models that are as reliable as possible, we added an interaction. An interaction occurs when an independent variable has a different effect on the outcome depending on the values of another independent variable. Therefore, this study presents these interactions, concerning organizations pollution policy (pollution prevention policy or pollution control policy). The interaction is a dummy variable that assigns 1 if the company has a pollution prevention policy or that assigns 0 if the company adopts a pollution control_strategy. The process to calculate the interaction was complex. Indeed, it was necessary first to create two indices: the *Pollution Prevention Index* and the *Pollution Control Index*. Then we constructed, based on the results obtained, a ranking assign to each result of the indexes a score. Suddenly based on the ranking, we checked if the company adopted a control policy or a pollution prevention policy. The *Pollution Prevention Score* and the *Pollution Control Score* are created by ranking respectively the pollution prevention policy index and the pollution control index. The first one is calculated by comparing the waste management score, and the total waste to revenues calculate as the total amount of waste produced in tonnes divided by net sales or revenue in US dollars, with the real CO2 emission index, calculated considering the total carbon dioxide (CO2) and CO2 equivalents emission in tonnes and the following gases: carbon dioxide (CO2), methane (CH4), nitrous oxide (N2O), hydrofluorocarbons (HFCS), perfluorinated compound (PFCS), sulfur hexafluoride (SF6), nitrogen trifluoride (NF3). On the other hand, the pollution control score is calculated by ranking the pollution control index. It is measured as the ratio between the total waste recycled index, calculated as the total recycled and reused waste produced in tonnes, considering also the waste used through incineration to generate energy, and the waste used for composting and, the total value of generated waste by the company.

Below, a summary of all variables used in this study is reported:

Table 9 - Variable Summary

Variables	Variable Name in the Model	Type of Variable	Definition
Dependent Variable			
Executive Total Compensation	ToT_Compensation		It is the sum of Base Salary, Direct Compensation and Equity Linked Compensation
Independent Variables			
Industry	Industry		Global Industry Classification Standard (GICS)
LTIPs Value	LTIPs		It is the total sum of all long-term components of executive compensation
Environmental Performance	EPS		ESG Pillar Score
Environmental Committee	Env_CommTRUE	dummy	State 1 if the company has an environmental committee
Environmental Committee Score	Env_Comm		Assign a score from 0 to 100 assessing the quality of the environmental committee
Control Variables			
Firm Size	Firm_Size		Total Assets
Firm Performance	Firm_Perf_ROE		ROE
Liquidity	Liquidity		Liquidity Current Ratio
CEO Board Member	Ceo_Board_Member	dummy	Sate 1 if the CEO of the company is also a member of the board
Independence Board Members Score	Ind_BoardM_Score		It is measured as the percentage of independent members as reported by the company.
CEO Duality	CEO_Duality	dummy	State 1 if the CEO is also the Chair of the Board
Compensation Committee	Comp_Board_Comm	dummy	State 1 if the company has a compensation committee
Industry Pollution Position Index	Ind_poll		Ranking companies based on the emissions and the waste produced
Interactions			
Pollution Prevention/Pollution Control Policy	Poll_Contr_Policy	dummy	State 1 if the company has a pollution prevention policy otherwise 0

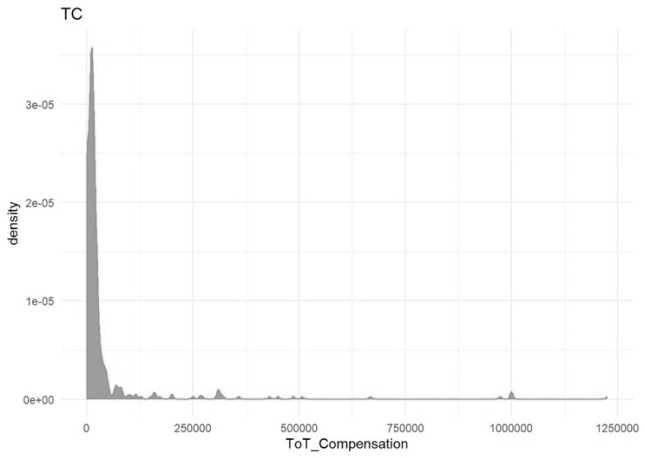
Source: Personal Elaboration

3.3 Research Models

In the preceding paragraphs, we have statistically described the sample of industries we use in the models and the various variables employed. We then perform a normality test on the dependent variable, the Total Executive Compensation. With the normality test, we check the data distribution and assess the need for a logarithmic transformation of the variables. Indeed, the Normal distribution (or Gauss distribution) is a continuous probability distribution, often used as a first approximation to describe real-valued random variables that tend to concentrate around a single mean value. Below is the graph of the distribution of our dependent variable.

Before Logarithmic Transformation

Figure 5 - Total Executive Compensation Distribution (No Log. Transformation)



After Logarithmic Transformation

Figure 6 - Total Executive Compensation Distribution (Log. Transformation)

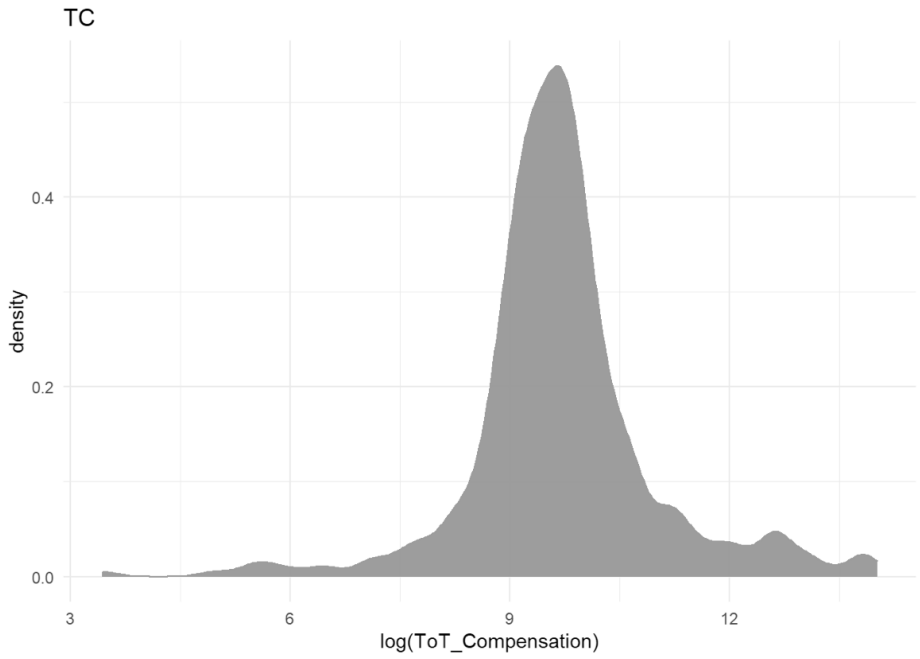


Table 10 - Total Executive Compensation Descriptive Statistics

	Log(Executive Compensation)
Mean	9,710165748
Median	12,20974589
Std. Deviation	1,283134785
Skewness	0,0418303
Kurtosis	3,709346313
Minimum	3,432946289
Maximum	14,01888534

Source: Personal Elaboration

After transforming the variable into logarithmic form, the associated probability density function graph becomes symmetric and has a bell shape, known as the Gauss bell. The main features of our normal distribution curve are as follows:

- The highest frequency coincides with the central mean value and decreases moving to the right or left
- The total area under the normal curve (the grey area) is equal to one (i.e. 100%) since it is a probabilistic curve and includes all possible events, i.e. all possible values from plus infinity to minus infinity. The area under the curve can be calculated with an integral
- Mean, mode, and median coincide with the central value

- Each normal curve is uniquely identified by two parameters: mean and standard deviation, which determine its position on the X-axis and the amplitude in terms of probable values.

To draw the graph of the normal distribution, a special function f(x) is used:

$$\frac{1}{\sigma\sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}}$$

σ= standard deviation

μ= mean

π= 3,14159

e= 2,711828

From our variable's distribution graph, we see that we are dealing with a particular case of normal distribution: standardized normal distribution with mean equal to zero and standard deviation equal to one. This test is fundamental because it allows us to understand how a variable is distributed, and it is crucial in order to generalize the results obtained from our observation sample. In fact, in our case, where the sample is quite large, this step, called inference, is crucial because it models the data trend with a probability distribution. In this way, parametric statistical techniques can be applied. The hypotheses of our study are tested through *four* models, based on multiple linear regression. The multiple linear regression model is particularly well suited for this analysis because it considers more than one independent variable and assumes a linear relationship between the variables. Although the relationships are not linear, this approach simplifies the complexity of the real world and seems reasonable for seeking conclusions. The multiple linear regression model is presented in this form:

$$y_i=\beta_0+ \beta_1 x_{i1}+\beta_2 x_{i2}+...+\beta_p x_{ip}+\varepsilon$$

where Y_i is the dependent variable, $x_{i1}+x_{i2}+...+x_{ip}$ are the independent variables, β_0 is the intercept, $\beta_1+\beta_2+...+\beta_p$ are the model parameters, and ε is the variable error parameter. The above equation represents the population regression line and connects the dependent variable - Total Executive Compensation - and the independent variables. The beta coefficient and error terms estimate the unknown parameters since the research does not consider all companies in the United States, only those in the collected sample. As mentioned at the beginning of the chapter, we use a population consisting of 406

observations to develop the regression models. The sample was collected randomly to avoid any bias in the analysis. The estimation of the various coefficients was carried out using the so-called "least squares method," according to which among all possible lines passing through the points of the scatterplot representing the values of the dependent variable, the most accurate line is the one that minimizes the sum of the quadratic residuals, which ultimately represent a measure of error prediction. Therefore, the equation estimated using the sample data and not the entire population is called the "estimated" regression line, the formula for which is as follows:

$$E(y_i) = b_0 + b_1 \cdot x_1 + b_2 \cdot x_2 + \cdots + b_p \cdot x_p$$

In this case, the former Greek letters β have been replaced with the corresponding Roman letters b. The symbols $E(y)$, represent the expected or predicted value of the response variable (the dependent variable). The response variables' values obtained through the estimated regression line are called "predicted values." These values usually tend to differ from the actual observed values, and the difference between the actual and predicted values is represented by the so-called "residuals" (or "prediction errors"), which are defined as follows:

$$e = y - E(y_i)$$

As we will see later, the residuals provide important information for assessing the overall goodness of fit of the model. In the study, we uploaded the data to R for each model, a statistical computing, and graphics software. This software provides access to several different statistical and graphical techniques. In addition, we used some graphical tools provided by R to analyze the various models better and more correctly (including Correlation Matrix and Diagnostic Plots). The analysis of this information was necessary to verify whether the hypotheses of each model were acceptable or should be rejected. The information used to evaluate whether to accept or reject a hypothesis was:

- The t-values, which represent the coefficient of the statistic test
- The p-values, which assess the reliability of the estimates
- The estimates of the coefficients
- The standard errors of the coefficients, which provide an estimate of uncertainty

- The overall significance measure: the information regarding the overall goodness of fit obtained by analyzing the multiple R-Square and the Adjusted Multiple R- Square

To decide whether or not a coefficient (and its associated predictor) is significant for our study, then to confirm or reject the hypothesis, p-values were observed. As a general rule, the lower the p-value, the higher the statistical significance of the Predictor in explaining variations in the variable. Thus, the lower the p-value, the more significant the impact of the related independent variable on the dependent variable. Moreover, we adopted the standard threshold of a 95% confidence interval ($\alpha = 0.05$) to confirm or reject the null hypothesis, the one with beta=0. In addition, as anticipated in the previous sections, there are several dummy variables in the model. As per practice, we conduct the hypothesis test for each model and check the eventual presence of multicollinearity. Therefore, for every model, the following preventive analyses and the analysis of the relative graphs have been carried out:

- Residuals vs Fitted Values Plot: which allows us to check both the adequacy of the model and the overall linearity of the distribution, which is obtained if the data expand in the graph following an approximately horizontal line
- Normal Q-Q Plot: which checks the "normality" relationship between the predictor and the response. It means that, for any value of x, the residuals should be normally distributed, and this relationship can be verified graphically in the plot if it shows observations lying on an approximately 45 degrees line
- Scale-Location Plot: which checks whether the Standardized Residuals (the square roots of the residuals) are equally distributed along with the range of Predictors. If the points are not randomly distributed and their distance increases as we move toward the right side of the graph, it means that the variance of the residuals is not constant for each value of the predictors, thus violating the assumption of "homoscedasticity", which assumes that the residuals have an equal level of variance for each x
- Residuals vs Leverage Plot: that verifies the presence or absence of "Influential Cases". It means that the observations are characterized by an excessive value of residuals that can influence the regression results. In particular, to verify the adequacy of the model, we looked at, among others, the mentioned "Residuals vs Fitted Values Plot" (RvFV). Residuals are the prediction errors of the model and are calculated as follows: $e = y - E(y_i)$.

Where y is the actual observed value and y_i is the predicted response value. The RvFV is a scatterplot that plots for each sample observation the residuals (e) in the vertical axis and the fitted values (y_i) in the horizontal axis. This graph is helpful because it provides information about the response after being tested against the predictors included in the model. It means that if this graph does not show a linear type of distribution of values (roughly distributed on a horizontal line), other significant information was not considered when predicting the Response.

Finally, we checked whether the models were characterized by an excessive relationship between the predictors (multicollinearity) or excessive heteroscedasticity. The first problem, related to multicollinearity, could arise whenever two or more predictors are excessively correlated (positively or negatively). This presence could affect the individual p-values of the output, making them less reliable. Therefore, to detect the presence of such multicollinearity among the predictors, we used the so-called "Variance Inflation Factor", a tool that can allow understanding if this problem is present or not. On the other hand, the methodology to test if homoscedasticity is present is to implement the so-called "Breusch-Pagan Test". Before presenting the models one by one, we insert the descriptive statistics of our variables below to give an overview of the work and the quality of the sample used. Below is a table showing the key descriptive statistics for the various variables to understand better how they are distributed. This table includes information regarding the minimum, first quartile, median, mean, third quartile, and maximum distribution. Binary variables, such as CEO Duality, CEO Board Member, and Compensation Board Committee, are not included in the table because their integer distributions consist of only two values (0 and 1).

Table 11 - Study Variables Descriptive Statistics

Variables	Min	1st Quartile	Std Dev	Median	Mean	3rd Quartile	Maximum
Executive Total Compensation	3,43	9,12	1,28	9,63	9,71	10,12	14,02
Environmental Performance (EPS)	0,57	43,17	15,39	53,50	53,53	63,40	97,94
Independence Board Members Score	0,00	37,40	27,31	62,35	59,75	84,21	99,66
Firm Size	187497000,00	2328711750,00	103160441328,76	7258450000,00	33640037764,37	20619659500,00	1163028000000,00
Firm Performance	-2,94	0,06	0,51	0,12	0,17	0,22	6,12
Liquidituy	810351,08	13064589,84	660706395,31	39002627,91	191607239,81	122459180,92	9998565771,92
Industry Pollution Position Index	1,00	27,00	23,24	44,00	44,12	62,00	91,00
LTIPs Value	0,00	8464,00	572970,89	13707,50	129451,46	21682,25	4929983,00
Environmental Committee Score	0,00	0,00	41,82	83,97	48,37	83,97	87,37

Source: Personal Elaboration

Chapter 4: Results and Analysis

Chapter 4 presents the various models developed in the study. The chapter investigates the interactions between our variables and addresses the hypotheses we set. Specifically, we study how executive compensation affects firms' environmental performance and whether and how much the application of corporate governance mechanisms affects this relationship. The analysis is performed by testing four models. Each model aims to provide an answer to each of the four hypotheses that are analyzed in this study. Moreover, multiple linear regression analysis requires that the errors between the observed and predicted values (i.e., the residuals of the regression) are normally distributed. The various models will be presented one by one in the following paragraphs. The display of each model will follow the following structure in terms of content. First, the model's output is analyzed (whose information will allow us to accept or reject the various hypotheses), a brief analysis is presented to demonstrate that the regression conditions are all respected and that there are no disturbing elements of reliability of the outputs. Then, the general equation of the model and the graphs to verify the respect of the main regression conditions (hypothesis testing) are exposed. To conclude, two different tests are illustrated to verify the absence of multicollinearity and heteroskedasticity. They are the VIF Test and the BP Test (Breusch-Pagan Test).

4.1 Model 1

The first model was divided into Model 1a and Model 1b. These models are included together since they both aim to provide an answer to hypothesis number 1 (HP1a and HP1b). The models investigate the relationship between Total Executive Compensation and the environmental performance of the firms in our sample. Model 1b, moreover, aims to investigate whether this effect is stronger for high pollution industries. Indeed, the sample is clustered in various industries, and we expect that executive compensation will affect firms' environmental performance more in those industries with higher pollution, where environmental impact is more important for legitimacy in the eyes of stakeholders. Therefore, the model conducts a cross-industry analysis and performs an in-depth analysis of the relationship between our dependent variable and the independent variables in the model. To investigate whether indeed this relationship was more intense in high-pollution industries, we included in model 2 an interaction between Industry Pollution Position Index and Environmental Performance. We have

also inserted, always in model b, an independent categorical variable that assigns different possible values for each industry. For this reason, in the model, we find included among the independent variables also the different sectors in which the companies of our sample operate. To this point we can illustrate the general equation of the MLR models on the base of which it will come generated the output. The equations are set up according to the characteristics of multivariate linear regression described in chapter three. Therefore:
Model a:

$$Log\ Tot\ Compensation = \beta_0 + \beta_1 * EPS + \beta_2 * CEO\ Duality + \beta_3 * CEO\ Board\ Member + \beta_4 * Industry + \beta_5 * Independence\ Board\ Members\ Score + \beta_6 * Firm\ Size + \beta_7 * Firm\ Performance + \beta_8 * Liquidity + \beta_9 * Compensation\ Committee + \varepsilon$$

Model b:

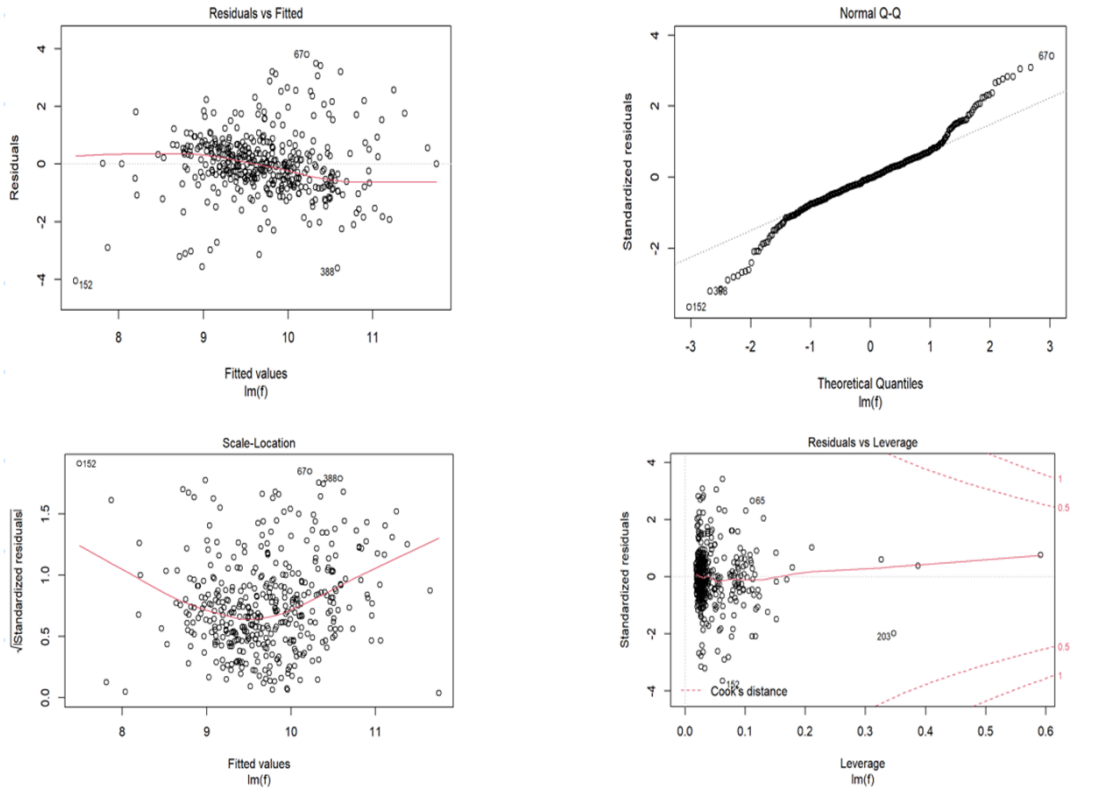
$$Log\ Tot\ Compensation = \beta_0 + \beta_1 * EPS + \beta_2 * CEO\ Duality + \beta_3 * CEO\ Board\ Member + \beta_4 * Industry + \beta_5 * Independence\ Board\ Members\ Score + \beta_6 * Firm\ Size + \beta_7 * Firm\ Performance + \beta_8 * Liquidity + \beta_9 * Compensation\ Committee + \beta_{10} * (Industry\ Pollution\ Position\ Index * EPS) + \varepsilon$$

Given the structure of the model, we can now analyze the diagnostic plots of model 1a and model 1b to test whether the main MLR regression assumptions are verified. To do so, we report below the four diagnostic plots for hypothesis testing for each. Looking at the graphs, which include the Residuals vs Fitted Plot, the Scale-Location Plot, the Normal Q-Q Plot, and the Residuals vs Leverage Plot as described in Chapter 3, we can see that overall, the model is correctly specified. In fact, the plot of Residuals vs Fitted values (top left) in both models shows an approximate horizontal pattern. Moreover, the normal Q-Q plot (top right) shows that the residuals are distributed on an oriented diagonal line, which means that the "normality" condition is met, both in model 1a and model 1b. At the same time, the Scale-Location plot (bottom left), for both shows an approximately linear pattern and, more importantly, a variance of the residuals that does not increase as one moves toward the right-hand side of the plot, suggesting the non-violation of the "homoscedasticity" condition. Finally, looking at the Residuals vs Leverage graph (bottom right), we can see that most of the data is clustered in the lower

left part of the graph. There are no particular issues in terms of influential observations, as there are no observations outside of the red boundaries.

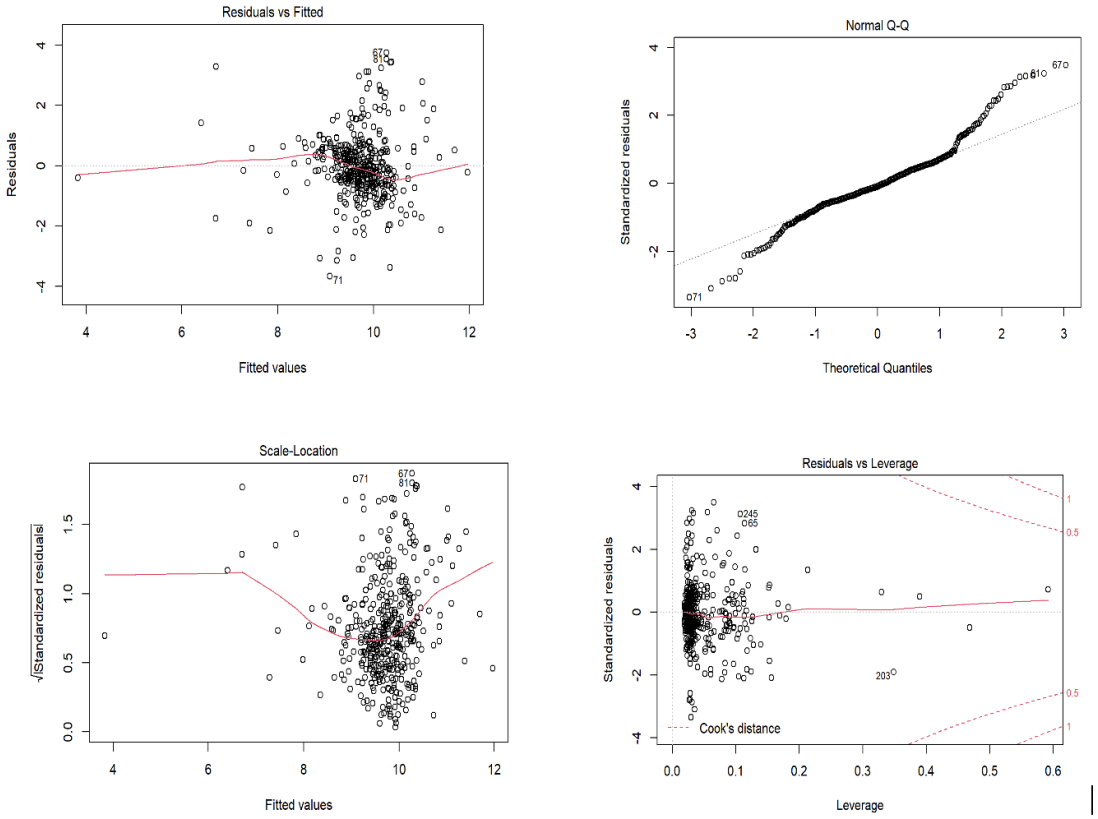
Model a Hypothesis Test:

Figure 7 - Model 1a Diagnostic Plots



Model b Hypothesis Test:

Figure 8 - Model 1b Diagnostic Plots



Observing the graphs above, the model turns out to be correctly specified and the hypotheses respected. To further check the validity of the model we perform a further verification of multicollinearity. Then, we conduct a Variance Inflation Factor Test (VIF), which gives us as output an index, calculated for each independent variable. The index demonstrates the reduction in precision of the coefficient estimate. If the value of this index is close to 1, it means that the variable does not have multicollinearity problems and is a good predictor for the model. On the other hand, if the value is close to 5, it means that the independent variable has multicollinearity, and thus is not a good predictor for the model.

Model 1a VIF Test:

Table 12 - Model 1a VIF Test

Variable	VIF
EPS	1,043081
CEO_Duality	1,042090
Ceo_Board_Member	1,054848
Industry	1,266309
Ind_Board_M_Score	1,042121
Firm_Size	1,145280
Firm_Perf_ROE	1,052221
Liquidity	1,217632
Comp_Board_Comm	1,052568

Source: Personal Elaboration

From the table shown in which the test results are illustrated we can see that all VIF values for all independent variables in the model navigate around 1, which means that there is no multicollinearity in the model. On the other hand, as far as model 1b is concerned, the VIF Test is not suitable for checking the presence or absence of multicollinearity. This occurs because having inserted an interaction in the model, these values will be high, because in the model there will be a certain level of correlation between variables, due to the presence of our interaction. Therefore, the results that would be obtained by conducting the VIF test are not reliable in that sense. Next, the "Breusch-Pagan Test" (or "BP Test") is also conducted to check for Heteroscedasticity. The BP test compares the null hypothesis that the error variance is constant against the alternative hypothesis that the error variance is not constant (thus suggesting Heteroscedasticity). If the p-value of the test is less than $\alpha = 0.05$, the null hypothesis is rejected, and it can be concluded that the model is affected by Heteroscedasticity and vice versa.

Table 13 - Model 1a BP Test Results

BP Test Results
BP = 25.612, df = 18, p-value = 0.109

Table 14 - Model 1b BP Test Results

BP Test Results
BP = 35.815, df = 20, p-value = 0.9617

Source: Personal Elaboration

4.1.1 Output Model 1

Below we present the results of models 1a and 1b.

Table 15 - Model 1a and Model 1b Output

Table 1: Regression Results: HP 1

	Dependent variable:	
	ToT_Compensation	
	HP 1 a	HP 1 b
EPS	0.035***	0.465***
	(0.004)	(0.090)
CEO_Duality	0.040	0.029
	(0.122)	(0.118)
Ceo_Board_Member	0.042	0.181
	(0.360)	(0.350)
IndustryConsumer Discretionary	−0.056	0.020
	(0.342)	(0.332)
IndustryConsumer Staples	−0.174	−0.079
	(0.444)	(0.431)
IndustryEnergy	−0.229	−0.257
	(0.457)	(0.443)
IndustryFinancials	0.289	0.363
	(0.354)	(0.344)
IndustryHealth Care	0.006	0.088
	(0.345)	(0.335)
IndustryIndustrials	−0.150	−0.101
	(0.343)	(0.332)
IndustryInformation Technology	−0.051	0.020
	(0.354)	(0.343)
IndustryMaterials	−0.397	−0.039
	(0.380)	(0.376)
IndustryReal Estate	−0.295	−0.298
	(0.353)	(0.342)
IndustryUtilities	0.419	0.484
	(0.403)	(0.392)
Ind_Board_M_Score	−0.00004	0.0003
	(0.002)	(0.002)
Firm_Size	0.000	0.000
	(0.000)	(0.000)
Ind_poll		−0.635***
		(0.143)
EPS:Ind_poll		0.002***
		(0.001)
Firm_Perf_ROE	0.008	0.024
	(0.115)	(0.111)
Liquidity	0.000	0.000+
	(0.000)	(0.000)
Comp_Board_Comm	0.105	0.161
	(0.345)	(0.334)
Constant	7.714***	3.869***
	(0.625)	(0.951)
Observations	406	406
R^2	0.238	0.288
Adjusted R^2	0.202	0.252
Note:	+p<0.1; *p<0.05; **p<0.01; ***p<0.001	

Source: Personal Elaboration

As we can see from the table, in both models, we have an excellent R square, 0.238 and 0.288, respectively. The models also have an excellent Adjusted R of 0.202 and 0.252. The R square index assesses how much individual observations deviate from the regression line; this means that our independent variables are a good predictor of the value of our dependent variable. In addition, the p-value of EPS in model 1a is highly significant, $p < 0.001$ (4.42e-07) and is positively correlated with the dependent variable. The independent variable EPS is very well suited to explain the Executive Compensation values. It supports what was predicted in our hypothesis. In addition, the interaction of model 1b is positively correlated with our independent variable and has a p-value < of 0.001 (4.42e-07), which is highly significant. Furthermore, both model 1a and model 1b present an F-statistic test that further supports our conclusions. Indeed, the F-Statistic of model 1a has a p-value equal to 1.091e-14. The F-Statistic of model 1b has a p-value of < 2.2e-16. The F-statistic test for comparing two variances is a hypothesis test based on the Fisher-Snedecor F-distribution. It is intended to test the hypothesis that two populations following normal distributions have the same variance. Such a test tells us that our model is fit to explain our dependent variable and that the interactions are significant. It is also important to note that our intercept, which we call Constant, is positive and significant in both models, as the p-value is 5.77e-05 and < 2e-16, respectively. Thus, both HP1a and HP1b are satisfied.

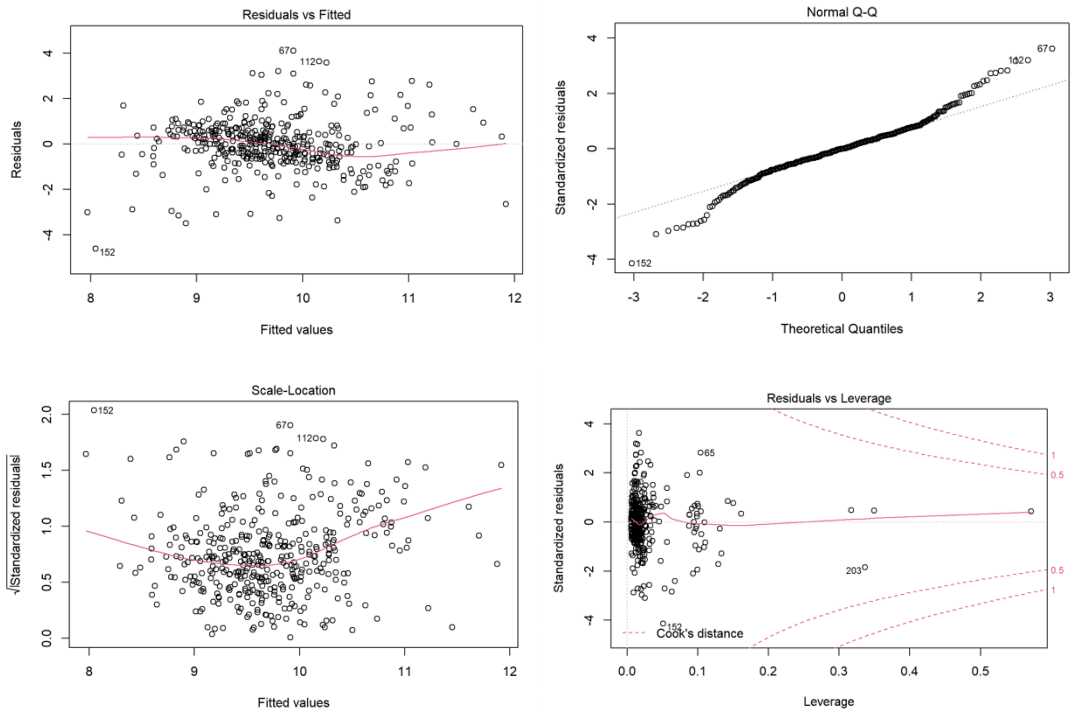
4.2 Model 2

We now present model two, which, as specified above, aims to investigate our hypothesis number 2. Specifically, the model seeks to understand whether the effect of environmental performance on total executive compensation a greater impact on those firms has that adopt pollution prevention mechanisms than on those that adopt pollution control mechanisms. Below we will illustrate the model by following the steps used to describe model one. The equation for model two is as follows:

$$\begin{aligned} \textit{Log Tot Compensation} = {} & \beta_0 + \beta_1 * \textit{EPS} + \beta_2 * \textit{CEO Duality} + \beta_3 * \textit{CEO Board Member} \\ & + \beta_4 * \textit{Industry} + \beta_5 * \textit{Independence Board Members Score} + \beta_6 * \textit{Firm Size} + \\ & \beta_7 * \textit{Firm Performance} + \beta_8 * \textit{Liquidity} + \beta_9 * \textit{Compensation Committee} + \\ & \beta_{10} * (\textit{Pollution Control Policy} * \textit{EPS}) + \varepsilon \end{aligned}$$

Before analyzing the output of Model 2, it is important, as we did for Model 1, to conduct some preliminary analysis to verify whether the model is suitable. Regarding the diagnostic graphs of Model 2, it appears that the main conditions of the MLR are met. Below we report the four charts as previously done for Model 1.

Figure 9 - Model 2 Diagnostic Plots



Analyzing the graphs, we notice that the model is correctly specified. Indeed, the plot of the residuals concerning the Fitted values is horizontally distributed. Moreover, the normal graph Q-Q (top right) shows that the condition of "normality" is respected because the residuals are distributed on a diagonal line. At the same time, the Scale-Location graph is approximately linear. It means that the variance of the residuals does not increase as one move to the right, suggesting that the "homoscedasticity" condition is not violated. Finally, in the Residuals vs Leverage plot, we can see that most of the data is clustered in the lower left part of the plot. Therefore, there are no outliers in our model. As already mentioned in the introduction to this chapter, for this model, we do not include the VIF Test because the interaction is present in the model. However, the moment an interaction is included in the model, these statistical tests lose validity. On the other hand, we present the results of the BP Test, that shows a p-value higher than 0,005.

Table 16 - Model 2 BP Test Results

BP Test Results
BP = 32.958, df = 20, p-value = 0.941

Source: Personal Elaboration

4.2.1 Output Model 2

We present our results now as we did in the previous section for model 1. A summary table of the regression results is included below.

Table 17 - Model 2 Output

Table 2: Regression Results: HP 2

	Dependent variable:
	ToT_Compensation
EPS	0.030***
	(0.005)
CEO_Duality	−0.012
	(0.123)
Ceo_Board_Member	0.106
	(0.361)
Ind_Board_M_Score	−0.0001
	(0.002)
IndustryConsumer Discretionary	−0.094
	(0.341)
IndustryConsumer Staples	−0.216
	(0.443)
IndustryEnergy	−0.227
	(0.455)
IndustryFinancials	0.265
	(0.352)
IndustryHealth Care	0.024
	(0.343)
IndustryIndustrials	−0.208
	(0.341)
IndustryInformation Technology	−0.064
	(0.352)
IndustryMaterials	−0.396
	(0.378)
IndustryReal Estate	−0.317
	(0.351)
IndustryUtilities	0.341
	(0.402)
Firm_Size	0.000
	(0.000)
Firm_Perf_ROE	−0.027
	(0.115)
Liquidity	0.000
	(0.000)
Comp_Board_Comm	0.040
	(0.344)
Poll_Contr_Policy	+0.502
	(0.407)
EPS:Poll_Contr_Policy	0.014*
	(0.007)
Constant	7.956***
	(0.658)
Observations	406
R^2	0.252
Adjusted R^2	0.213
Note:	+p<0.1; *p<0.05; **p<0.01; ***p<0.001

Source: Personal Elaboration

Looking at the model's output, we can see that the independent variables in the model explain about 25% (R-Square) of the value of executive compensation. Specifically, adjusting for the complexity of the model and the randomness of the real world, we obtain an R-Square of about 21%. At the same time, the F-Statistic with a p-value of < 2.2e-16, thus significantly less than $\alpha = 0.05$, suggests that there is a significant relationship between the response (Total Executive Compensation) and the set of independent variables that are included in the model. Thus, these values indicate that the model is significant overall. These measures of overall significance are to be considered satisfactory, given the randomness of the sample data. The results obtained show a positive relationship between executive compensation and firms' environmental performance. In addition, we also have a positive relationship with the presence of pollution control policies. This variable is also significant. Indeed, it presents a p-value less than 0.05. Our EPS*Pollution Control Policy interaction and intercept are also positively correlated and significant with a p-value of 0.0589 and < 2e-16, respectively. These results again confirm our hypothesis.

4.3 Model 3

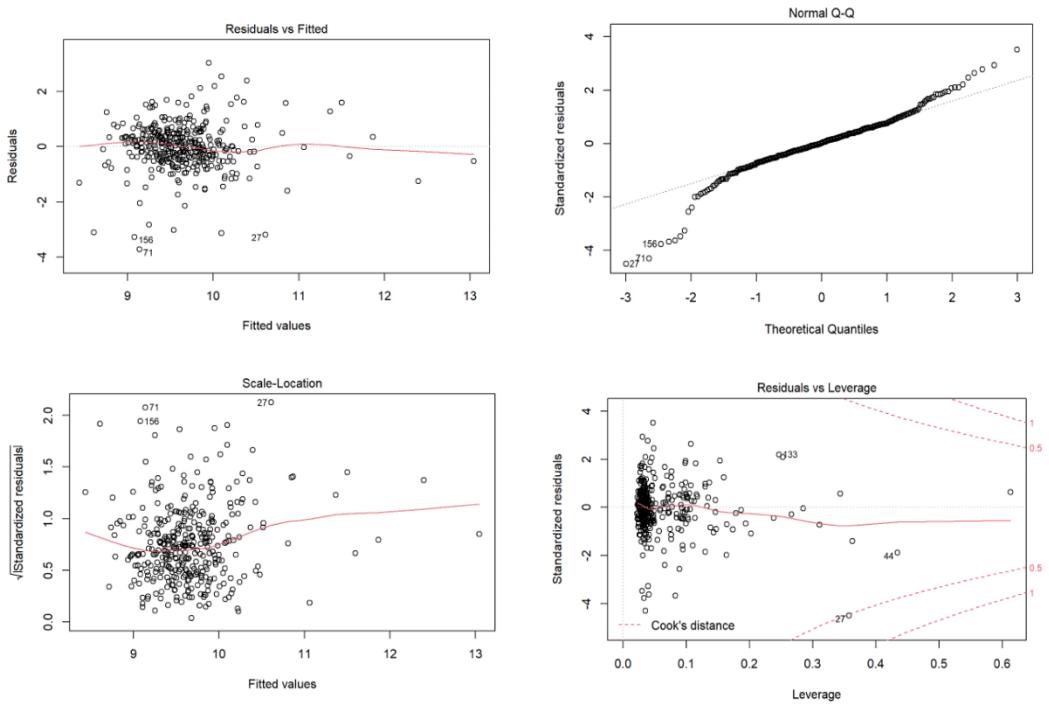
Model three provides an answer to our hypothesis that the presence of long-term compensation plans in the executive compensation package increases its impact on environmental performance and pollution prevention strategies. In presenting this model, we will follow the same structure used for the others. The equation of the model is as follows:

$$\begin{aligned} \textit{Log Tot Compensation} = {} & \beta_0 + \beta_1 * \textit{EPS} + \beta_2 * \textit{CEO Duality} + \beta_3 * \textit{CEO Board Member} \\ & + \beta_4 * \textit{Industry} + \beta_5 * \textit{Independence Board Members Score} + \beta_6 * \textit{Firm Size} + \\ & \beta_7 * \textit{Firm Performance} + \beta_8 * \textit{Liquidity} + \beta_9 * \textit{Compensation Committee} + \beta_{10} * \text{LTIPs} + \\ & + \beta_{11} * (\textit{LTIPs} * \textit{Pollution Control Policy}) + \varepsilon \end{aligned}$$

An interaction is also present in this model, specifically between the Long-Term Remuneration of Executives and the strategies adopted by firms in pollution management. In addition, we had to eliminate an additional 44 observations for this model because they were not significant enough for the regression. As for the previous models, we check the hypotheses, multicollinearity, and heteroscedasticity to verify that all regression conditions are met. We then report the four graphs for the hypothesis

check. Also in this case, since there is an interaction, we do not provide the results of the VIF test because they are not very significant.

Figure 10 - Model 3 Diagnostic Plots



The graphs as in the case of the previous models respect all the assumptions. The normal graph Q-Q shows that the residuals are distributed on an oriented diagonal line. The "normality" condition is therefore respected. At the same time, the Scale-Location graph shows a variance of the residuals that does not increase as one moves towards the right-hand side of the graph, suggesting that the "homoscedasticity" condition is not violated. Finally, looking at the Residuals vs Leverage graph (bottom right), we can see that most of the data is clustered in the bottom left of the graph. There are no particular problems in terms of influential observations, except for a few values that have therefore been eliminated as irrelevant. Moreover, we conduct again the BP Test, whose results are in the table below. Again, the p-value of the test is higher than 0,005.

Table 18 - Model 3 BP Test Results

BP Test Results
BP = 31.604, df = 21, p-value = 0.6418

Source: Personal Elaboration

4.3.1 Output Model 3

We also report for model number three a summary table of regression results.

Table 19 - Model 3 Output

Table 3: Regression Results: HP3

	Dependent variable:
	ToT_Compensation
EPS	0.018***
	(0.003)
CEO_Duality	−0.040
	(0.101)
Ceo_Board_Member	0.440
	(0.311)
IndustryConsumer Discretionary	−0.115
	(0.283)
IndustryConsumer Staples	−0.484
	(0.363)
IndustryEnergy	−0.174
	(0.363)
IndustryFinancials	0.299
	(0.289)
IndustryHealth Care	−0.038
	(0.283)
IndustryIndustrials	0.018
	(0.282)
IndustryInformation Technology	0.074
	(0.292)
IndustryMaterials	−0.155
	(0.327)
IndustryReal Estate	−0.186
	(0.291)
IndustryUtilities	−0.313
	(0.338)
Ind_Board_M_Score	−0.001
	(0.002)
Firm_Size	−0.000
	(0.000)
Firm_Perf_ROE	−0.011
	(0.111)
Liquidity	0.000**
	(0.000)
Comp_Board_Comm	0.102
	(0.269)
LTIPs	0.00000*
	(0.00000)
Poll_Contr_Policy	+0.061
	(0.104)
LTIPs:Poll_Contr_Policy	0.00000**
	(0.00000)
Constant	8.222***
	(0.521)
Observations	362
R^2	0.254
Adjusted R^2	0.207
Note:	+p<0.1; *p<0.05; **p<0.01; ***p<0.001

Source: Personal Elaboration

The Table shows the output of Model 3, which can now be analyzed after successfully verifying compliance with the main MLR assumptions and the absence of multicollinearity and heteroscedasticity. The model output indicates that approximately 25% (R-Squared) of the variability in the level of Total Executive Compensation is explained by the multiple linear regression model. Adjusting the complexity of the model in light of its many independent variables and the randomness of the real-world data, we obtain a slightly lower Adjusted R-Square of 20%. Furthermore, the F-Statistic's with a p-value equal to 1.222e-12, less than $\alpha = 0.05$, suggest a significant relationship between Total Compensation and the independent variables in the model. Therefore, these measures, especially the F-statistic p-value, indicate that the overall model is significant and has a good level of predictability and reliability. Moreover, we observe that the model results also support our hypothesis in this case. Indeed, EPS is always positively correlated with our dependent variable and has a high significance level, with a p-value of 4.69e-08. The LTIPs variable is also positively correlated with Total Compensation and is significant, with a p-value of 0.04150. Most importantly, we can see that our interaction is significant and positively correlated with the dependent variable in the model, with a p-value of 0.00985. The same is true for our intercept, which is significant and positively correlated, with a p-value equal to 2e-16.

4.4 Model 4

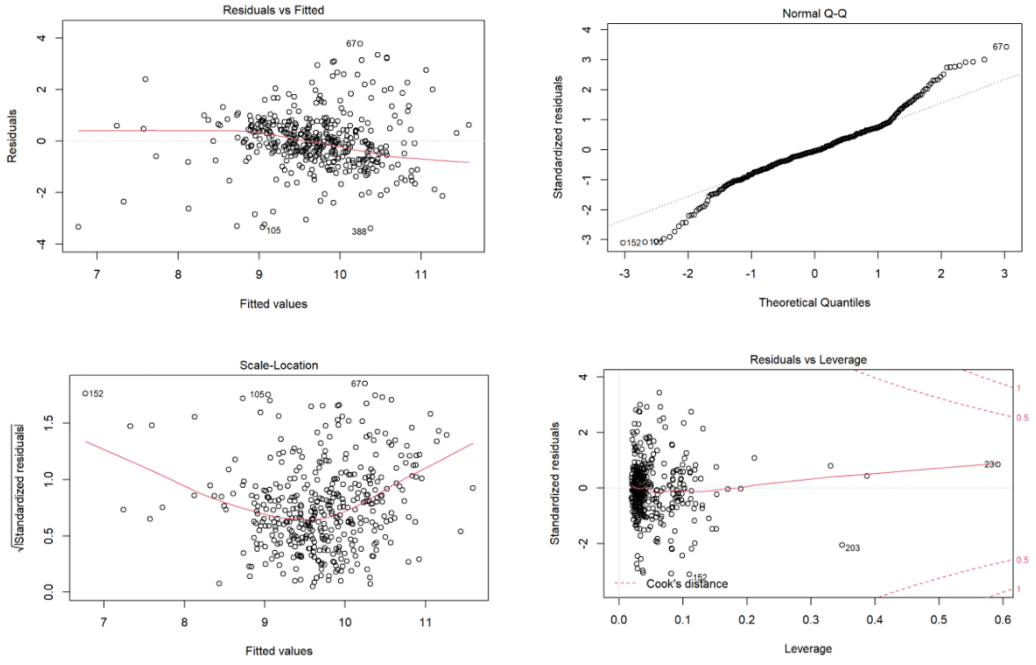
Model 4 allows us to analyze the role of environmental control mechanisms put in place by firms and whether they affect the relationship between total executive compensation and environmental performance. In this way, we can analyze whether companies with such mechanisms reward good environmental behavior more than those that do not. The equation of model four is as follows:

$$\begin{aligned} \textit{Log Tot Compensation} = {} & \beta_0 + \beta_1 * \textit{EPS} + \beta_2 * \textit{CEO Duality} + \beta_3 * \textit{CEO Board Member} \\ & + \beta_4 * \textit{Industry} + \beta_5 * \textit{Independence Board Members Score} + \beta_6 * \textit{Firm Size} + \\ & \beta_7 * \textit{Firm Performance} + \beta_8 * \textit{Liquidity} + \beta_9 * \textit{Compensation Committee} + \\ & \beta_{10} * (\textit{EPS} * \textit{Environmental Committee}) + \varepsilon \end{aligned}$$

As you can immediately see from the model equation, an interaction was included here as well. In particular, the interaction is between environmental performance and a binomial variable, called Environmental Committee, which assigns a score greater than

zero to those industries in our sample that has a special committee to deal with environmental issues. As with previous models, before presenting the regression, hypothesis testing was performed, and we verified that all regression conditions were indeed met. Below are the four graphs for the hypothesis check. Similar to the previous models, since there is an interaction, we do not provide the results of the VIF test and the BP Test because they are not significant.

Figure 11 - Model 4 Diagnostic Plots



From the study of the graphs, we can see that the model is correctly specified. First, the normal Q-Q plot (top right) shows that the "normality" condition is respected because the residuals are distributed on a diagonal line. At the same time, the Scale-Location graph does not have an excessively high degree of dispersion of the observations. This shows that the homoscedasticity condition is respected, and that the variance of the residuals does not increase going to the right of the graph. Finally, in the Residuals vs Leverage plot, we can see that most of the data are clustered in the lower left part of the graph. In this case, no outliers are present. Also, as we did for the previous ones, in this model, we do not include the VIF Test because there is an interaction in the model. Instead, the results of the BP test are reported in the table below.

Table 20 - Model 4 BP Test Results

BP Test Results
BP = 33.101, df = 20, p-value = 0.1027

Source: Personal Elaboration

4.4.1 Output Model 4

The regression conditions are all met, so we can proceed to present the model results.

Below is a summary table of the regression outputs.

Table 21 - Model 4 Output

Table 4: Regression Results: HP 4

	Dependent variable:
	ToT_Compensation
CEO_Duality	0.045
	(0.121)
Ceo_Board_Member	0.102
	(0.357)
Ind_Board_M_Score	0.00004
	(0.002)
IndustryConsumer Discretionary	−0.001
	(0.341)
IndustryConsumer Staples	−0.069
	(0.441)
IndustryEnergy	−0.236
	(0.454)
IndustryFinancials	0.342
	(0.352)
IndustryHealth Care	0.049
	(0.344)
IndustryIndustrials	−0.066
	(0.341)
IndustryInformation Technology	−0.063
	(0.351)
IndustryMaterials	−0.281
	(0.380)
IndustryReal Estate	−0.307
	(0.352)
IndustryUtilities	0.469
	(0.401)
Firm_Size	0.000
	(0.000)
Firm_Perf_ROE	0.019
	(0.114)
Liquidity	0.000
	(0.000)
Comp_Board_Comm	0.060
	(0.343)
Env_Comm	+1.217**
	(0.426)
EPS	0.028***
	(0.004)
Env_CommTRUE:EPS	0.024**
	(0.008)
Constant	8.061***
	(0.634)
Observations	406
R^2	0.254
Adjusted R^2	0.216
Note:	+p<0.1; *p<0.05; **p<0.01; ***p<0.001

Source: Personal Elaboration

The output, shown in the table below, reveals similar to previous models, that about 25% (R-Squared) of the variability in the level of Total Compensation is explained by the independent variables. Adjusting this value for the complexity of the real world, we obtain an Adjusted R-squared equal to 21%. The values of both are more than acceptable to make our model's results meaningful. In addition, the F-statistic Test with a p-value less than α = 0.05 of 1.858e-15 suggests a significant relationship between the dependent variable (Total Compensation) and the independent variables in the model. Therefore, similar to the other models in our study, these measures may indicate that the overall model is significant and has a good level of predictability and reliability. In detail, we can see that our hypothesis number four was met, and the predicted results were obtained. In fact, from the regression results, we see that EPS is always positive and very significant, with a p-value of 1.18e-09. The Environmental Committee variable is also positive and highly significant, having a p-value equal to 0.00453. It confirms our hypothesis number four. The fact that the CEO Duality variable is positively correlated with our independent variable further strengthens our conclusions. Most importantly, our interaction is positive and significant, with a p-value of 0.00348.

Chapter 5: Model Conclusions and Discussion

Chapter 5 analyzes and presents the main results from the models from a managerial and economic perspective, commenting on the study's hypothesis.

5.1 Conclusion Model 1: The Relationship between Company Environmental Performance and Total Executive Compensation. Cross-Industry Perspective

The first hypothesis regarding a positive relationship between Total Executive Compensation and firm Environmental Performance received support. The data also supported the second hypothesis that this relationship is more robust for pollution-intensive industries. Given the increasing public awareness of environmental issues and the growing belief that environmental strategies can become a crucial source of competitive advantage in polluting industries, understanding the relationships between CEO compensation and ecological performance is critical to successful corporate management. The results of model one suggests that corporate stakeholders now understand the importance of having policies in place to check that managers care about corporate environmental policies. We have found that environmental performance can be a critical non-financial determinant of CEO compensation in polluting industries. These results suggest that CEOs are rewarded for pursuing environmental strategies because the outcomes associated with these strategies can provide intangible benefits, such as social legitimacy, corporate reputation, stakeholder satisfaction, and others, that go beyond financial performance in the narrow sense. Previous results from studies linking executive compensation and social indicators (Russo and Harrison, 2005) are consistent with the so-called traditionalist view, in which a trade-off between environmental strategies and profitability is postulated (Jensen, 1983). In contrast, our results are consistent with the revisionist view that good environmental performance benefits firms (Hart, 1995). The setting of our study can help drop light on this apparent contradiction. We show that firms within polluting industries can gain legitimacy in their institutional domain by adopting environmentally friendly procedures, and their CEOs are rewarded accordingly. Indeed, we see how effective it is in terms of environmental outcomes to tie managers' compensation to such performance. It eliminates the conflict of interest between stakeholders, who want their firms to achieve legitimacy to enjoy all the benefits that come with it, and managers, who, on the other hand, have no direct interest in seeing that performance grow. Instead, this creates a

direct economic benefit for executives, who then have an incentive to undertake such environmental policies. It is an important outcome in terms of corporate governance and provides a guideline for anyone wishing to limit the agency problems associated with monitoring their company's environmental performance. From an institutional perspective, linking pay to environmental performance causes managers to comply with institutional demands (Oliver, 1991). From an agency perspective, our results are consistent with the "positivist" argument (Eisenhardt, 1989). This current of thought states that when the link between performance and action is uncertain, shareholders must use a control criterion over which agents have more influence (as with the controllability principle). This results in improved financial performance. Recently, agency theory has come under fire in the management literature for failing to address the influence of the social and institutional environment surrounding a principal-agent relationship (Lubatkin et al., 2007). Our study responds to these criticisms and expands agency theory by including insights from institutional theory, examining how a key institutional factor (i.e., legitimacy) is present in the agent-principal relationship. Our study agrees with Eisenhardt's (1989) recommendation to expand agency theory to richer and more complex contexts. In short, our study suggests that institutional theory can reinforce rather than negate the basic tenets of agency theory.

5.2 Conclusion Model 2: The Relationship between Company Environmental Performance and Total Executive Compensation is Stronger for Companies Adopting Pollution Prevention Policies.

Another important finding from our study relates to the fact that hypothesis two is supported. It suggests that industries that engage in pollution prevention strategies, compared to those that merely apply emission control strategies, have more advantages in terms of environmental performance. Thus, managers are likely to prefer control strategies and will be driven to avoid prevention policies because of their greater simplicity and lower riskiness. However, the link between compensation and environmental performance implies that managers are no longer inclined to avoid prevention policies that most benefit companies and are those that stakeholders would like to see implemented. Indeed, managers have a direct interest in improving the environmental performance of companies because, in this way, their remuneration will be more generous. They will be more inclined to adopt strategies that best increase

ecological performance. Managers are then rewarded for the greater risk taken, and they will no longer be driven to act solely by the pursuit of short-term interests. Therefore, in this way, a virtuous circle is established whereby shareholders see the long-term interests of their firm being pursued. The confirmation of our hypothesis two doors also to a second important conclusion. Indeed, our model results confirm that prevention policies are better in terms of environmental performance than control policies. This conclusion is not trivial. Indeed, not only managers might be reluctant towards prevention policies, which require large investments, changes, and new technical skills, but also shareholders. Such policies might be discarded in favor of safer and cheaper control policies. Shareholders themselves may decide to meet the minimum pollution thresholds set by public opinion and investors, thus losing the drive to do better than their competitors. Therefore, being confident that prevention policies are more effective than control policies, even if they are more costly and risky, could be sufficient to take the more significant risks arising from prevention strategies. Therefore, having confirmation that with the application of prevention policies, you have better results could incentivize the latter's adoption over the more "attractive" control policies.

5.3 Conclusion Model 3: The Relationship Between Long-term Incentive Pay Strategies and Environmental Performance, Especially on Future Results.

Another critical finding that emerges from our model number three is that firms' environmental performance is linked to the presence of long-term compensation plans. Indeed, as we saw in Chapter 2, the executive compensation package comprises several components, including LTIPs. These can have a greater or lesser weight in the total package. Our study suggests that this type of compensation should be preferred over others, and their percentage present in the total executives' compensation package should improve. Indeed, the models show that as the appearance of LTIPs increases, the environmental performance also increases. It also suggests that firms, where the pollution factor is more crucial to legitimacy, should seek to enhance the use of this control tool. However, managers, who are risk adverse by nature, tend to prefer safer forms of compensation whose results are available in the short term. Therefore, they may not take kindly to too significant an increase in the presence of LTIPs in their compensation package. Indeed, if there had not been this aversion on the part of executives to accept this form of compensation, the use of LTIPs would probably be

more widespread. The challenge, then, is to find the right balance in dosing all the components of the compensation package to ensure that the best outcomes for firms are achieved. Secondly, it must be considered that the effects of environmental policies cannot be measured in the short term. Indeed, they take longer to manifest. Logically, therefore, short-term performance measurement tools cannot be used to reward the success of environmental strategies whose effects can only be seen in the long term. This thinking is reflected in the results of our analysis that LTIPs are the best strategy for anchoring executive compensation to environmental policies. Third, the use of LTIPs reduces the tendency of managers to have a short-term horizon of action. LTIPs indirectly encourages them to look to the firm's future beyond their own personal gain and take even the riskiest decisions whose effects post-date their tenure. However, they will shift their strategic time horizon only if they are adequately remunerated for the increased risk undertaken. In this, LTIPs come into their own, as instruments of alignment between the interests of stakeholders and those of managers.

5.4 Conclusion Model 4: The Relationship Between Environmental Corporate Governance Mechanism and Total Executive Compensation

The corporate governance literature has largely neglected governance mechanisms related to environmental issues. Instead, our model suggests a relationship between firms' environmental performance and the presence of a specific governance mechanism implemented to monitor environmental performance. This relationship then obviously affects executive compensation since it is linked to environmental performance. The two, therefore, find themselves to be indirectly related. However, the variable that attests to whether a firm has environmental performance mechanisms is a variable with a significance level not too high. Therefore, our hypothesis is supported, but we obtained a partial result. This partial result indicates that these mechanisms still play too symbolic a role. Companies still tend to prefer exterior mechanisms, such as environmental initiatives and pro-environmental advertisements, rather than making the necessary investments to decrease or eliminate emissions. This result is consistent with the logic that specific governance mechanisms are a response to institutional requirements (Luoma and Goodstein, 1999). Another way to look at it is that environmental committees focus on 'addressing institutional pressures rather than applying complicated strategies to redesign facilities to reduce pollution.' Their efforts

are limited to merely achieving the minimum necessary to placate public opinion. Instead, our study suggests that if these mechanisms were improved and made more effective in practice rather than just formally, the environmental performance of companies would greatly benefit, and indirectly so would executives, who would be the first to verify the functioning of these control mechanisms.

Chapter 6: Managerial Implications

Our study supports research that provides empirical evidence that structuring executive compensation around environmental performance by anchoring the compensation package to specific indicators, brings several benefits to firms. First, it incentivizes executives to deploy effort and resources toward environmental initiatives because they are crucial for company survival and success and give organizations legitimacy. Second, executives are held accountable for their company's environmental performance, which improves. Third, improving environmental performance by increasing prestige and social recognition improves financial performance, makes it easier to raise resources, and gives organizations greater bargaining power than their competitors in the same industry. Research shows that this is most true for high-polluting industries. In fact, in this way, CEOs are spurred to monitor environmental behaviors even at lower levels of the organization, desired shareholder outcomes are produced, the direct benefit is provided to managers through direct increases in their pay, and welfare is also generated for society at large. Thus, the application of pro-environmental policies at the corporate level is no longer at the mercy of the social conscience of managers, but it is incentivized. However, these "multiple wins" seems possible only as long as all stakeholders recognize the future economic and social implications of environmental investments, which are absent in the short term. This study shows that achieving positive results from the execution of investments in pro-environmental policies takes time due to the intrinsic nature of these investments, which are often risky and difficult to quantify in terms of results. Therefore, pegging environmental performance to executives' pay creates an incentive for managers to invest green that they would not otherwise have. Unfortunately, linking pay to environmental performance is not always so easy. Even if a system is in place to monitor and avoid reporting failures, misrepresentation can still be possible. Our study, therefore, also shows that applying control policies is necessary for the above benefits to be created. However, our investigation indicates that the environmental governance mechanisms generally applied by companies are still often only symbolic and not sufficient. Environmental committees, as our analysis shows, still play too formal a role. Therefore, alternative control mechanisms such as external environmental audits and a better information control system are needed. Our results also suggest that what organizations and shareholders reward are pollution prevention strategies rather than control strategies. Thus, managers should take note that although pollution prevention

strategies are more challenging, costly, and risky, these are the ones that bring the most significant awards to the company and thus to themselves. Finally, our study shows that applying a compensation strategy that extensively uses a long-term compensation system is an essential incentive for pollution prevention and is most effective in those industries with high emissions intensity, which are those industries where monitoring and improving environmental performance is most needed. In contrast, in those sectors where pollutant emissions are of less concern, a compensation system based on long-term pay is less likely to affect pollution levels than in those sectors where environmental impacts are greater. However, regardless of the industry in which the firm operates, our study shows that it is essential for firms with poor environmental performance to increase the proportion of long-term pay in the executive compensation package in order to succeed in improving environmental performance. In making this point, however, it must be considered that in our study, we are referring to the entire compensation mix, and future studies should investigate how the relative proportions of various forms of compensation in the package may influence executives' decisions about environmental issues.

Chapter 7: Study Limitations and Future Research

Despite the quality of the analysis employed in this study, we can point out a few limitations that could be corrected by future research. First, we focused our analysis on CEOs of relatively large firms in the United States, and our results may not be generalizable to smaller firms or other geographic regions. Future research may extend the analysis to non-U.S. contexts, other managerial levels, or other organizational forms such as private organizations, cooperatives, nonprofit companies, and family businesses. Second, our measures considered only environmental data reported in the United States, but some firms locate their plants abroad and often do not fully disclose all information related to these issues. Unfortunately, reliable pollution data on a global scale is hard to come by and is not always reliable. Indeed, it is essential to consider that when environmental indicators are calculated, and rankings are created, numerical data are made available by the companies under investigation. Therefore, it is expected that they will always tend to provide the data in such a way as to minimize as much as possible the risk of getting a low environmental score and thus damaging their reputation with the public. Third, the environmental performance measures we have used may not necessarily be the ones that boards have used to internally assess a firm's environmental performance or structure the executive compensation package. Moreover, each company may have its own systems for calculating and evaluating environmental performance, which may differ significantly from the ESG indicator we used in this study and vary significantly from industry to industry. In addition, there is not much information on what sources board members and compensation board members use when making their considerations and evaluating the environmental performance of CEOs. In addition, one must also consider the varying composition of boards and how that composition, the level of independence and the professional experience relative to their job description and environmental issues specifically, may affect the company's environmental performance. Therefore, future studies could explore these issues that take a closer look at governance mechanisms and their specific characteristics. Indeed, it must be recognized that the measurements used in this study are proxy measures and may only partially capture the boards' evaluation processes. However, it would be challenging to fully exploit the cognitive process of each company's board of directors. This problem presents both a challenge and an opportunity for future research. To conclude, we need to consider how environmental performance impacts executives' compensation and how different incentives affect

subsequent environmental performance. In fact, it would be more appropriate to study these two aspects simultaneously. A limitation of our study, which leaves room for future research, is that given the structure of the dataset used, we considered fixed-effects variables and had to split the two aspects of the analysis even though they are closely related. A challenge for future research may be to study the complex interactions between these two dimensions, using more sophisticated analysis methods, such as structural equation models, to analyze them simultaneously.

Final observation

Good environmental behavior is critical for firms to achieve legitimacy, i.e., social recognition that generates profit and ensures the firm's survival. Companies should support environmental strategies by using environmental performance criteria to evaluate their CEOs. CEOs should be incentivized by pegging the value of their compensation to environmental performance indicators. In this way, managers can benefit personally and directly from improving the company's environmental performance they work for, creating a vicious circle. Such incentives help shareholders, managers, and the general public benefit from improved financial and environmental performance.

Summary

Introduction

This study aims to deepen our understanding of the link between companies' environmental performance and the level of CEO pay by analyzing how it varies according to the industry, mainly whether it is a high-polluting sector or not. In addition, this study aims to investigate the importance of pollution prevention versus control strategies on environmental performance. Finally, this research explores how long-term incentive plans and environmental corporate governance mechanisms impact on environmental performance. This research aims to fill a gap in the literature by empirically testing two research questions: 1) Is the company's environmental performance related to executive compensation? In which industry do these linkages is stronger?; and 2) To which extent do company environmental policies, environmental governance mechanisms and executive compensation strategies affect the relationship? In order to answer these questions, we analyze four hypotheses that we attempt to answer by constructing four linear regression models. Our results support all the hypotheses. Firstly, they confirm the existence of a positive relationship between environmental performance and managers' remuneration. They show that managers are more likely to undertake environmental policies when properly incentivized. Indeed, they should be rewarded with a premium commensurate with the greater risk involved in undertaking environmental strategies. Secondly, our results confirm that this relationship is stronger for those industries that operate in high-pollution sectors that are the industries for which legitimacy is most crucial. Furthermore, empirical results confirm that including long-term incentive plans in executives' compensation indirectly increases the environmental performance. This is because it encourages managers to make decisions with a longer time horizon than they would otherwise. Finally, the models show that environmental corporate governance mechanisms help stakeholders better monitor managers' environmental performance. However, the results also tell us that such mechanisms still play a too superficial role. The study advances the literature on understanding the link between these two important and seemingly unrelated components (environmental performance and the level of executives' remuneration). From a managerial perspective, the research finds out that executives become directly accountable for environmental performance, which improves environmental performance by raising the prestige and social recognition. As a consequence, this improves financial performance, because the greater social recognition makes easier to

raise resources and gives organizations greater bargaining power over their competitors in the same sector.

Literature Review and Hypothesis Development

To investigate the relationship between Environmental Performance and Executive Compensation we will examine what scholars have found about these topics, introducing the idea behind the hypothesized relationship.

Environmental Performance

The world has entered a new era of environmental concern and organizations are increasingly pay more attention to their environmental performance. Moreover, shareholders today have more frequently started to base their investment decisions on achieving good environmental results. Indeed, companies are increasingly required to be profitable and environmentally responsible at the same time. Hence, they require a quantitative approach for environmental performance indicators to evaluate their impact on the environment. Given the diversity of environmental problems, and the variety of contexts in which they arise, no "correct" set of indicators exists (Segnestam, 1999). Otherwise, today to measure environmental performance the MSCI ESG Index methods is the ones most recognized by organizations. The ESG Index measures is divided into three dimensions: Environmental, Social, and Governance (ESG). For the purpose of the study, we will focus on the ESG Index's environmental dimension. The ESG Index Environmental Dimension is measured by the Environmental Pillar Score Index. It is the weighted sum of the Resource Use, Emissions and Environmental Innovation category scores. It represents the environmental risks related to business operations and how the company manages them. Moreover, the Environmental Categories' weights vary across the industries so that the scores are comparable across sectors. As the general public pays more attention to companies' environmental performance, measurement issues are becoming increasingly important. For their intrinsic nature Environmental Performance measurement requires measurement of non-financial performance, which is under tremendous uncertainty. (Boffo and Patalano, 2020). Therefore, there are several complications regarding environmental performance measurements. Firstly, measurements are vulnerable to insufficient data. Indeed, organizations often do not grant book access to their sensitive data. In addition, the companies could provide inaccurate data because of the desire to obtain good scores to attract investors. Another weak point of environmental indicators, on which improvement should be made, is comparability. For their nature, the environmental performance indicators may be hard to compare country to country due to denominator

problems. Therefore, researchers and investors must be careful when interpreting such data, as many calculation and evaluation errors may have been made

Agency Theory

Agency theory is about solving agency problems, defined as agency conflicts arising from a divergence between agents' and principals' utility (Lan and Heracleus, 2010). The agent represents the principal, who delegates specific activities to the agent. Therefore, the principal, who establishes the rules that supervise the relationship and how to administer the remunerations, depends to a certain extent on the agent's behavior, because the agent carries out the activities delegated voluntarily adopting a course of action. Agency theory assumes that people are rational and maximize their own utility. In this view, agents are inclined to adopt opportunistic behaviors to pursue their interests at the principal's expense. Therefore, agency problems arise when the agent's action is not directly observable by the principal (information asymmetry) or when the outcome of the agent's action is influenced by events beyond human control (uncertainty) (Zattoni, 2020). An important factor in the survival of organizational forms is control of agency problems (Fama, and Jensen, 1983). Agency problems arise also because contracts are not costlessly written and thus generate costs. The contract structures limit the risks undertaken by most agents by specifying either fixed payoffs or incentive payoffs tied to specific measures of performance (Fama and Jensen, 1983). Moreover, several studies suggest that managers who own large blocks of stock receive corporate benefits disproportionate to their fractional ownership (Barclay and Holderness, 1989). This major benefit is called private benefits of control and arise because agents take decisions aimed at maximizing their own benefits, even if those decisions are not the best for the principal. Therefore, agents who control the organization enjoy the private benefit of control which is defined as the non-monetary (psychological) and the monetary (economic) benefits of controlling a company, that are not shared with shareholders and stakeholders (Zattoni, 2000). By their very nature, private benefits of control are difficult to observe and even more difficult to quantify in a reliable way. A controlling party can appropriate value for himself only when this value is not verifiable (e.g. provable in court).

Executive Compensation

A well-designed executive compensation system aims to attract, retain, and motivate CEOs (Conyon, 2006). Executive compensation is strictly linked to agency theory because executive compensation is one of the corporate governance mechanisms that companies use to attenuate or eliminate managerial opportunism (Zattoni, 2020).

Indeed, executive compensation is a way to align directors and executive interests, linking them together. Compensation packages for executive directors generally consist of four essential components (Murphy, 2003). First, executives gain a base salary, which is generally benchmarked against peer firms. Second, they receive an annual bonus plan, usually based on accounting performance measures. Third, they hold stock options, which represent a right but not the obligation to purchase shares in the future at some pre-specified exercise price. Lastly, pay includes additional compensation such as restricted stock, long-term incentive plans, short-term incentive plans, and retirement plans (Conyon, 2006). Short-term and long-term incentives differ because, on the one hand, short-term incentives may increase executives' convenience in achieving short-run (annual) improvements in profitability. However, this may also mean that top managers pursue short term objectives at the expense of long-term interests. For this reason, it is generally believed that longer-term incentives are more effective in aligning managerial interests. It helps avoid potential agency problems and, consequently, is now a critical part of compensation packages. Finally, executives received several other items such as company cars, jets, villas and tax benefits. (Zattoni, 2020). Moreover, compensation packages may include benefits for retirement and early termination in the contract as golden parachutes. The value of these additional components is usually unrelated to firm performances, and often they represent a notable amount of remuneration. Moreover, for principals is impossible to create a compensation system totally based on top managers' observed behavior. As information asymmetry persists, the more effective strategy for principals is to design an outcome-based compensation system. Incentives, then, and other compensation elements must become mechanisms for structuring the kind of "partnership" by creating a link between executive compensation and organization performances. Some scholars have shown that management compensation can influence firm performance when certain thresholds are exceeded. So, compensation strategy may influence the manager's decisions. Organizations strive to plan realistic and achievable goals for executives by setting thresholds that satisfy both shareholders and executives. Directors must find the right balance between financial and non-financial measures to assess managers performance. The choice of measures must be linked to factors such as corporate strategy, organizational objectives, and the competitive environment.

Hypothesis Development

By the findings emerging from the literature review described, I outline the following assumptions, presented in the table below.

N HP	HP Statement	Variables Involved	Expected Impact
1a	Company's environmental performance has an impact on Executive's compensation	Environmental Performance	+
1b	Company's environmental performance has a higher impact on Executive's compensation for high-pollution industries	Industry Industry Pollution Score	+/-
2	The positive effect of environmental performance on executive compensation is more significant in companies that adopt pollution prevention policies rather than for companies that adopt pollution control policies	Pollution Prevention/Control Policy Pollution Prevention Policy Score Pollution Control Score	+/-
3	Long-term pay has a positive effect on subsequent environmental performance and increases the success of pollution prevention strategies.	LTIPs Value	+
4	Environmental governance mechanisms strengthen the linkage between environmental performance and executive compensation.	Environmental Governance	+/-

Research Methods

This section is focused on describing the methodology applied in models. In doing so, we represent the data collection process, the distribution of our sample and we define the variables used in the models. In this study research data has been collected from two datasets: the BoardEx Core Reports by Euromoney Institutional Investor and the Refinitiv Eikon database by Thomas Reuters. As a result, I have obtained an initial population of over fifteen thousand companies. Then, the availability of data about has reduced the sample from the starting point to 406 industries. The 406 companies are the companies included in the economic sectors listed in the Global Industry Classification Standard (GICS). In this study, the Executive Total Compensation is the dependent variable calculated as follow: *Executive Total Compensation = Base Salary + Direct Compensation + Equity Linked Compensation*. We also include in the models several independent variables, control variables and interactions that are all summarized in the following table.

Variables	Variable Name in the Model	Type of Variable	Definition
Dependent Variable			
Executive Total Compensation	ToT_Compensation		It is the sum of Base Salary, Direct Compensation and Equity Linked Compensation
Independent Variables			
Industry	Industry		Global Industry Classification Standard (GICS)
LTIPs Value	LTIPs		It is the total sum of all long-term components of executive compensation
Environmental Performance	EPS		ESG Pillar Score
Environmental Committee	Env_CommTRUE	dummy	State 1 if the company has an environmental committee
Environmental Committee Score	Env_Comm		Assign a score from 0 to 100 assessing the quality of the environmental committee
Control Variables			
Firm Size	Firm_Size		Total Assets
Firm Performance	Firm_Perf_ROE		ROE
Liquidity	Liquidity		Liquidity Current Ratio
CEO Board Member	Ceo_Board_Member	dummy	Sate 1 if the CEO of the company is also a member of the board
Independence Board Members Score	Ind_BoardM_Score		It is measured as the percentage of independent members as reported by the company.
CEO Duality	CEO_Duality	dummy	State 1 if the CEO is also the Chair of the Board
Compensation Committee	Comp_Board_Comm	dummy	State 1 if the company has a compensation committee
Industry Pollution Position Index	Ind_poll		Ranking companies based on the emissions and the waste produced
Interactions			
Pollution Prevention/Pollution Control Policy	Poll_Contr_Policy	dummy	State 1 if the company has a pollution prevention policy otherwise 0

We then perform a normality test on the dependent variable, to check the data distribution and assess the need for a logarithmic transformation of the variables. The

multiple linear regression model is presented in this form: $y_i=\beta_0+ \beta_1 x_{i1}+\beta_2 x_{i2}+...+\beta_p x_{ip}+\varepsilon$. As mentioned at the beginning, we use a population collected randomly to avoid any bias in the analysis using the "least squares method". Therefore, the equation estimated is as follows: $E(y_i)= b_0 + b_1 \cdot x_1 + b_2 \cdot x_2 + \cdots + b_p \cdot x_p$. These values usually tend to differ from the actual observed values, and the difference between the actual and predicted values is represented by the so-called "residuals", which are defined as follows: $e = y - E(y_i)$. To conclude we present a table that includes the variable descriptive statistics.

Variables	Min	1st Quartile	Std Dev	Median	Mean	3rd Quartile	Maximum
Executive Total Compensation	3,43	9,12	1,28	9,63	9,71	10,12	14,02
Environmental Performance (EPS)	0,57	43,17	15,39	53,50	53,53	63,40	97,94
Independence Board Members Score	0,00	37,40	27,31	62,35	59,75	84,21	99,66
Firm Size	187497000,00	2328711750,00	103160441328,76	7258450000,00	33640037764,37	20619659500,00	1163028000000,00
Firm Performance	-2,94	0,06	0,51	0,12	0,17	0,22	6,12
Liquidituy	810351,08	13064589,84	660706395,31	39002627,91	191607239,81	122459180,92	9998565771,92
Industry Pollution Position Index	1,00	27,00	23,24	44,00	44,12	62,00	91,00
LTIPs Value	0,00	8464,00	572970,89	13707,50	129451,46	21682,25	4929983,00
Environmental Committee Score	0,00	0,00	41,82	83,97	48,37	83,97	87,37

Results and Analysis

This section presents the various models developed in the study and investigates the interactions between our variables and addresses the hypotheses we set. Specifically, we study how executive compensation affects firms' environmental performance and whether and how much the application of corporate governance mechanisms affects this relationship. The analysis is performed by testing four models. Each model aims to provide an answer to each of the four hypotheses. The display of the models have followed the following structure in terms of content. First, the model's output is analyzed (whose information will allow us to accept or reject the various hypotheses), a brief analysis is presented to demonstrate that the regression conditions are all respected and that there are no disturbing elements of reliability of the outputs. Then, the general equation of the model and the graphs to verify the respect of the main regression conditions (hypothesis testing) are exposed. To conclude, two different tests are illustrated to verify the absence of multicollinearity and heteroskedasticity. They are the VIF Test and the BP Test (Breusch-Pagan Test). Below we present a table that shows the results of each model:

Table 1: Regression Results: HP 1

	Dependent variable:	
	ToT.Compensation	
	HP 1 a	HP 1 b
EPS	0.035***	0.463***
	(0.004)	(0.090)
CEO.Duality	0.040	0.029
	(0.122)	(0.118)
Coo.Board.Member	0.042	0.181
	(0.360)	(0.350)
IndustryConsumer Discretionary	−0.056	0.020
	(0.342)	(0.332)
IndustryConsumer Staples	−0.174	−0.079
	(0.444)	(0.431)
IndustryEnergy	−0.229	−0.257
	(0.457)	(0.443)
IndustryFinancials	0.289	0.363
	(0.354)	(0.344)
IndustryHealth Care	0.006	0.088
	(0.345)	(0.335)
IndustryIndustrials	−0.150	−0.101
	(0.343)	(0.332)
IndustryInformation Technology	−0.051	0.020
	(0.354)	(0.343)
IndustryMaterials	−0.397	−0.039
	(0.380)	(0.376)
IndustryReal Estate	−0.295	−0.298
	(0.353)	(0.342)
IndustryUtilities	0.419	0.484
	(0.403)	(0.392)
Ind.Board.M.Score	−0.00004	0.0003
	(0.002)	(0.002)
Firm.Size	0.000	0.000
	(0.000)	(0.000)
Ind.poll		−0.635***
		(0.143)
EPS:Ind.poll		0.002***
		(0.001)
Firm.Perf.ROE	0.008	0.024
	(0.115)	(0.111)
Liquidity	0.000	0.000*
	(0.000)	(0.000)
Comp.Board.Comm	0.105	0.161
	(0.345)	(0.334)
Constant	7.714***	3.869***
	(0.625)	(0.951)
Observations	406	406
R^2	0.238	0.288
Adjusted R^2	0.202	0.252
Note:	+p<0.1; *p<0.05; **p<0.01; ***p<0.001	

Table 2: Regression Results: HP 2

	Dependent variable:
	ToT.Compensation
EPS	0.030***
	(0.005)
CEO.Duality	−0.012
	(0.123)
Coo.Board.Member	0.106
	(0.361)
Ind.Board.M.Score	−0.0001
	(0.002)
IndustryConsumer Discretionary	−0.094
	(0.341)
IndustryConsumer Staples	−0.216
	(0.443)
IndustryEnergy	−0.227
	(0.455)
IndustryFinancials	0.295
	(0.352)
IndustryHealth Care	0.024
	(0.343)
IndustryIndustrials	−0.208
	(0.341)
IndustryInformation Technology	−0.064
	(0.352)
IndustryMaterials	−0.206
	(0.378)
IndustryReal Estate	−0.317
	(0.351)
IndustryUtilities	0.341
	(0.402)
Firm.Size	0.000
	(0.000)
Firm.Perf.ROE	−0.027
	(0.115)
Liquidity	0.000
	(0.000)
Comp.Board.Comm	0.040
	(0.344)
Poll.Contr.Policy	+0.502
	(0.407)
EPS:Poll.Contr.Policy	0.014*
	(0.007)
Constant	7.956***
	(0.658)
Observations	406
R^2	0.252
Adjusted R^2	0.213
Note:	+p<0.1; *p<0.05; **p<0.01; ***p<0.001

Table 3: Regression Results: HP3

	Dependent variable:
	ToT.Compensation
EPS	0.018***
	(0.003)
CEO.Duality	−0.040
	(0.101)
Coo.Board.Member	0.440
	(0.311)
IndustryConsumer Discretionary	−0.115
	(0.283)
IndustryConsumer Staples	−0.484
	(0.363)
IndustryEnergy	−0.174
	(0.363)
IndustryFinancials	0.299
	(0.289)
IndustryHealth Care	−0.038
	(0.283)
IndustryIndustrials	0.018
	(0.282)
IndustryInformation Technology	0.074
	(0.292)
IndustryMaterials	−0.155
	(0.327)
IndustryReal Estate	−0.186
	(0.291)
IndustryUtilities	−0.313
	(0.338)
Ind.Board.M.Score	−0.001
	(0.002)
Firm.Size	−0.000
	(0.000)
Firm.Perf.ROE	−0.011
	(0.111)
Liquidity	0.000**
	(0.000)
Comp.Board.Comm	0.102
	(0.269)
LTIPs	0.00000*
	(0.00000)
Poll.Contr.Policy	+0.061
	(0.104)
LTIPs:Poll.Contr.Policy	0.00000**
	(0.00000)
Constant	8.222***
	(0.521)
Observations	362
R^2	0.254
Adjusted R^2	0.207
Note:	+p<0.1; *p<0.05; **p<0.01; ***p<0.001

Table 4: Regression Results: HP 4

	Dependent variable:
	ToT.Compensation
CEO.Duality	0.045
	(0.121)
Coo.Board.Member	0.102
	(0.357)
Ind.Board.M.Score	0.00004
	(0.002)
IndustryConsumer Discretionary	−0.001
	(0.341)
IndustryConsumer Staples	−0.069
	(0.441)
IndustryEnergy	−0.236
	(0.454)
IndustryFinancials	0.342
	(0.352)
IndustryHealth Care	0.049
	(0.344)
IndustryIndustrials	−0.066
	(0.341)
IndustryInformation Technology	−0.063
	(0.351)
IndustryMaterials	−0.281
	(0.380)
IndustryReal Estate	−0.307
	(0.352)
IndustryUtilities	0.469
	(0.401)
Firm.Size	0.000
	(0.000)
Firm.Perf.ROE	0.019
	(0.114)
Liquidity	0.000
	(0.000)
Comp.Board.Comm	0.060
	(0.343)
Env.Comm	+1.217**
	(0.426)
EPS	0.028***
	(0.004)
Env.CommTRUE:EPS	0.024**
	(0.008)
Constant	8.061***
	(0.634)
Observations	406
R^2	0.254
Adjusted R^2	0.216
Note:	+p<0.1; *p<0.05; **p<0.01; ***p<0.001

Model Conclusions and Discussion

Conclusion Model 1

The first hypothesis regarding a positive relationship between Total Executive Compensation and firm Environmental Performance received support. The data also supported the second hypothesis that this relationship is more robust for pollution-intensive industries. We have found that environmental performance can be a critical non-financial determinant of CEO compensation in polluting industries. These results suggest that CEOs are rewarded for pursuing environmental strategies because the outcomes associated with these strategies can provide intangible benefits. We show that firms within polluting industries can gain legitimacy in their institutional domain by adopting environmentally friendly procedures, and their CEOs are rewarded accordingly. It eliminates the conflict of interest between stakeholders, who want their firms to achieve legitimacy to enjoy all the benefits that come with it, and managers, who, on the other hand, have no direct interest in seeing that performance grow. Instead, this creates a direct economic benefit for executives, who then have an incentive to undertake such environmental policies. It is an important outcome in terms of corporate governance and provides a guideline for anyone wishing to limit the agency problems associated with monitoring their company's environmental performance.

Conclusion Model 2

Another important finding from our study relates to the fact that hypothesis two is supported. It suggests that industries that engage in pollution prevention strategies, compared to those that merely apply emission control strategies, have more advantages in terms of environmental performance. Thus, managers are likely to prefer control strategies and will be driven to avoid prevention policies because of their greater

simplicity and lower riskiness. Indeed, managers have a direct interest in improving the environmental performance of companies because, in this way, their remuneration will be more generous. They will be more inclined to adopt strategies that best increase ecological performance. Managers are then rewarded for the greater risk taken, and they will no longer be driven to act solely by the pursuit of short-term interests.

Conclusion Model 3

Another critical finding that emerges from model number three is that firms' environmental performance is linked to the presence of long-term compensation plans. Our study suggests that this type of compensation should be preferred over others, and their percentage present in the total executives' compensation package should improve. Indeed, the models show that as the appearance of LTIPs increases, the environmental performance also increases. It also suggests that firms, where the pollution factor is more crucial to legitimacy, should seek to enhance the use of this control tool. However, managers, who are risk adverse by nature, tend to prefer safer forms of compensation whose results are available in the short term. Therefore, they may not take kindly to too significant an increase in the presence of LTIPs in their compensation package. The challenge, then, is to find the right balance in dosing all the components of the compensation package to ensure that the best outcomes for firms are achieved. Secondly, the results of our analysis demonstrate that LTIPs are the best strategy for anchoring executive compensation to environmental policies. Thirdly, the use of LTIPs reduces the tendency of managers to have a short-term horizon of action. LTIPs indirectly encourages them to look to the firm's future beyond their own personal gain and take even the riskiest decisions whose effects post-date their tenure. However, they will shift their strategic time horizon only if they are adequately remunerated for the increased risk undertaken. In this, LTIPs come into their own, as instruments of alignment between the interests of stakeholders and those of managers.

Conclusion Model 4

Our model suggests a relationship between firms' environmental performance and the presence of a specific governance mechanism implemented to monitor environmental performance. This relationship then obviously affects executive compensation since it is linked to environmental performance. The two, therefore, find themselves to be indirectly related. Our hypothesis is supported, but we obtained a partial result. This partial result indicates that these mechanisms still play too symbolic a role. Companies still tend to prefer exterior mechanisms, such as environmental initiatives and pro-environmental advertisements, rather than making the necessary investments to

decrease emissions. This result is consistent with the logic that specific governance mechanisms are a response to institutional requirements (Luoma and Goodstein, 1999). Instead, our study suggests that if these mechanisms were improved and made more effective in practice rather than just formally, the environmental performance of companies would greatly benefit, and indirectly so would executives, who would be the first to verify the functioning of these control mechanisms.

Managerial Implications

Our study supports research that provides empirical evidence that structuring executive compensation around environmental performance by anchoring the compensation package to specific indicators, brings several benefits to firms. First, it incentivizes executives to deploy resources toward environmental initiatives. Second, executives are held accountable for their company's environmental performance, which improves. Third, improving environmental performance by increasing social recognition improves financial performance, and gives organizations greater bargaining power than their competitors in the same industry. Our research shows that this is most true for high-polluting industries. In fact, in this way, CEOs are spurred to monitor environmental behaviors even at lower levels of the organization, desired shareholder outcomes are produced, the direct benefit is provided to managers through direct increases in their pay, and welfare is also generated for society at large. Moreover, this study shows that pegging environmental performance to executives' pay creates an incentive for managers to invest green that they would not otherwise have. Our study also shows that applying control policies is necessary for the above benefits to be created. However, our investigation indicates that the environmental governance mechanisms generally applied by companies are still often only symbolic and not sufficient. Therefore, alternative control mechanisms such as external environmental audits and a better information control system are needed. Finally, our study shows that applying a compensation strategy that extensively uses a long-term compensation system is an essential incentive. Regardless of the industry in which the firm operates, our study shows that it is essential for firms with poor environmental performance to increase the proportion of long-term pay in the executive compensation package in order to succeed in improving environmental performance.

Final observation

Good environmental behavior is critical for firms to achieve legitimacy, i.e., social recognition that generates profit and ensures the firm's survival. Companies should

support environmental strategies by using environmental performance criteria to evaluate their CEOs. CEOs should be incentivized by pegging the value of their compensation to environmental performance indicators. In this way, managers can benefit personally and directly from improving the company's environmental performance they work for, creating a vicious circle. Such incentives help shareholders, managers, and the general public benefit from improved financial and environmental performance.

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