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**The Impact of ESG Factors on Private Equity Acquisition Decisions: An Empirical
Analysis**

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PREFACE AND ACKNOWLEDGEMENTS

The views stated in this thesis are those of the author and not necessarily those of the supervisor, second assessor, Erasmus School of Economics or Erasmus University Rotterdam.

ABSTRACT

This thesis examines the role Environmental, Social and Governance (ESG) factors play in the acquisition decisions of Private Equity (PE) firms. Utilizing a sample set of 260 firms, which consist of 142 acquired firms and 118 unacquired firms from 2009 until 2024, a logistic regression analyses was carried out to draw conclusions regarding the relationship between pre-acquisition ESG ratings and the acquisition likelihood by PE firms. The findings reveal that, while the combined ESG scores do not have a significant effect on the acquisition likelihood, individual ESG components exhibit significant distinct effects. Governance displays the most pronounced impact, showing a negative correlation with the probability of acquisition. Similarly, the environmental score shows an inverse significant relationship with the acquisition likelihood whereas social scores are positively correlated with the likelihood of acquisition. These findings suggest that PE firms adopt a differentiated targeting approach based on each ESG component rather than considering the overall ESG performance of potential target firms. This research contributes to the existing literature by highlighting the integration of non-financial metrics in PE investment decisions.

Keywords: Corporate Social Responsibility, Private Equity, Value Creation Strategies, ESG Ratings

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CHAPTER 1 Introduction

1.1 Research Question

In recent years there has been a fundamental shift in the way investors view corporate social responsibility (CSR), transitioning from being viewed as a mere expense to a strategic investment (Bosch-Badia, Montllor-Serrats, and Tarrazon, 2013). Many academic literatures have shed light on how CSR can influence a firm's corporate financial performance, one of which (Husted, 2005), underscores the notion that CSR, by mitigating social risk, can positively influence a firm's discounted profits thus serving primarily as a value creator. Moreover, Margolis et al. (2009) conclude that there exists a positive significant relationship between firms' CSR and financial performance. Building upon these claims, this study explores whether the prominence of corporate social responsibility has also integrated its way through private equity (PE) investment decisions, specifically investigating whether PE firms consider a company's ESG ratings when acquiring a new firm. The core question guiding this research paper will be:

How do environmental, social, and governance (ESG) factors impact the likelihood of acquisition by private equity firms?

1.2 Methodology Overview

This study employs a logistic regression model to analyze the relationship between pre-acquisition ESG ratings and the likelihood of a firm being acquired by a PE firm. Using a dataset of 260 firms including both acquired and unacquired entities, the research examines the effect of the combined ESG rating, its quantiles as well as the isolated components respectively on the acquisition likelihood. Financial metrics, that were proved to have a significant effect on acquisition likelihood in the paper by (Cohn, Hotchkin, & Tower, 2022), were used as control variables. The standard errors are clustered by the acquisition year announcement to address potential within-year correlations.

1.3 Findings

The findings of this paper suggest that, while the overall combined ESG scores do not significantly influence the likelihood of a firm being acquired by a PE firm, individual ESG components exhibit distinct effects. More precisely, governance and environmental scores are negatively correlated with the probability of acquisition, whereas the social score shows a positive correlation. These findings suggest that PE firms may target companies that lack governance and environmental practices, possibly aiming to improve them, while valuing social scores for their existing benefits.

1.4 Relevance

This study contributes significantly to the existing literature by empirically examining the role ESG factors play in the acquisition decisions of private equity (PE) firms. This relationship, to our knowledge, has never been empirically analyzed by previous research, as prior studies have relied solely on insights provided by PE investors (Crifo, Forget, & Teyssier, 2015). Additionally, by breaking down the individual effects of governance, social, and environmental scores, the study provides a fresh perspective on how each ESG factor is perceived by investors, highlighting the individual influence each component has on PE acquisition.

Furthermore, most of the existing literature has largely focused on the financial metrics of target firms' pre-acquisition (Cohn, Hotchkin, & Tower, 2022; Erel, Jang, & Weisbach, 2015), leaving the influence of ESG factors underexplored. This paper addresses this notable gap present by employing a methodological analysis to investigate whether pre-acquisition ESG ratings of target firms significantly affect the likelihood of acquisition. This contributes to a better understanding of how ESG considerations are integrated into investment strategies, highlighting the weight each component has.

Additionally, unlike previous literature that compared the pre-acquisition characteristics of acquired firms with a large pool of unacquired firms (Cohn, Hotchkin, & Tower, 2022; Erel, Jang, & Weisbach, 2015), this paper uses a sample of firms that were once targeted by private equity companies, where the deal was subsequently withdrawn, as the control sample. This approach is designed to mitigate the risk of sample selection bias that may have affected other academic studies.

The findings of this paper also have significant social relevance. By demonstrating that PE firms value high social scores in target firms, it encourages businesses to enhance their social responsibility effort. This could be manifested in several ways, such as better labor practices, a more enhanced community engagement as well as employee relations. Furthermore, highlighting the importance of ESG components in acquisition decisions could help shape the broader investment community to prioritize sustainability and social responsibility at large.

CHAPTER 2 Theoretical Background

2.1 Private Equity Overview

A private equity firm is a type of investment firm that acquires majority stake in an existing mature company using a substantial amount of debt and a smaller portion of equity (Kaplan & Strömberg, 2009). This type of transaction is known as leveraged buyout (LBO), a concept that gained prominence with the rise of private equity firms in the 1980s (Kaplan & Strömberg, 2009). These target companies can either be private or public but always become private post-acquisition (Kaplan & Strömberg, 2009). To fully comprehend the operations and primary functions of a private equity firm in acquiring target companies, it is essential to first understand the structure and role of the private equity fund.

PE firms raise most of their capital from the private equity fund. The private equity fund is organized as a limited partnership, comprising of Limited Partners (LPs) and General Partners (GPs) (Kaplan & Strömberg, 2009). The PE firm acts as the GP, with its role being to manage and oversee the fund (Cohn, Hotchkin, & Tower, 2022). More specifically, the PE firm makes the decisions regarding which target companies the fund should acquire, which value creation method should be implemented post-acquisition, as well as the timing and the method of exiting the portfolio companies (Kaplan & Strömberg, 2009).

LPs on the other hand, which typically consist of institutional investors such as corporate and public pension funds, endowments, insurance companies, and wealthy individuals, are the ones contributing most of the capital to the fund. Once they have invested, LPs have minimal control over how the GPs deploy the fund's capital, provided that the GPs adhere to the basic covenants outlined in the fund agreement. This structure allows LPs to invest in private equity while relying on the expertise and management of the GPs to generate returns (Cohn, Hotchkin, & Tower, 2022).

2.2 How LBOs Create Value

After the LBO transaction has taken place, PE firms aim to enhance the value of their portfolio companies using various value creation strategies, in order to maximize their return. This could be accomplished through multiple channels. Consequently, there exists a large pool of literature that investigates the various forms of value creation strategies post-LBO, and when particular types are more prevalent. For example, if some strategies are more commonly utilized for public-to-private transactions compared to private-to-private acquisitions. In this section, various value creation

strategies employed by PE firms are discussed, alongside an analysis of previous studies that either validate or refute the effectiveness of these strategies within specific contexts. Primarily, this subsection will focus on capital restructuring, operational performance, and financial constraints as the main value creation strategies employed. Subsequently, the focus will be shifted on ESG factors, and how they could be integrated into value creation strategies, thereby gradually addressing our research question.

Capital Restructuring

Capital Structuring, also referred to as financial engineering, involves acquired firms taking on more leverage post-LBO (Cohn, Hotchkin, & Tower, 2022). This practice gained significant attention during the emergence of private equity, where the “leverage effect” being the predominant source of value creation during the LBOs’ boom in the 1980s. However, in subsequent years, there has been a noticeable decline in the level of leverage taken on by acquired firms, although a reappearance has been witnessed ever since 2005 (Guo, Hotchkiss, & Song, 2011).

The reasoning behind why increasing leverage generates value partly lies in the tax shield benefit that debt holds for firms. Cohn, Mills, and Towery (2014) regarding explain how additional interest tax shields generated in PE buyouts of public firms result in target firms paying no corporate taxes for several years post-buyout. Even after factoring in the tax advantage, Guo, Hotchkiss, and Song (2011) find that compared to firms with lower debt, highly levered firm experience an improvement in their cash flows. This could be explained by the idea that increasing debt reduces agency costs (Cohn, Hotchkiss, and Towery, 2022). More precisely, when firms take on more debt, it serves as a tool to discipline managers, as they are more compelled to prioritize interest payments and minimize the risk of default than engaging in excessive investments or risky ventures (Kaplan, 1989).

Relief of Financial Constraint

Typically, target firms that experience some degree of financial constraint prior to acquisition, forgo positive NPV projects. This results in the inability to realize potential growth opportunities. Consequently, post-acquisition, PE firms inject portfolio companies with capital, making them tap into those unrealized prospects (Cohn, Hotchkiss, and Towery, 2022). Erel, Jang, and Weisbach (2015) investigate how acquisitions affect the financial constraints of target firms. Their study indicates that post-acquisition, target firms typically experience a reduction in financial constraints. This is apparent by managerial actions such as lowering cash holdings, reducing the sensitivity of cash holdings to cash flow, decreasing the sensitivity of investment to cash flow, and increasing the quantity of investments. These findings confirm that acquisitions can provide significant financial relief to target firms, allowing for more efficient resource allocation and enhanced investment activities.

Operational Performance

Positive improvements in operating performance post-acquisition are prevalent in various academic work (Kaplan, 1989; Kaplan & Strömberg, 2009). Cohn, Hotchkiss, and Towery (2022) report that PE acquirers target firms on the low end of the profitability distribution measured as lowest quantile in the pre-interest ROA. Subsequently, they find that post-acquisition these companies experience an increase in their profitability. Kaplan (1989) also reports an increase in the income to sales ratio of portfolio companies post-LBOs by 10 to 20 percent.

The enhancement in the financial performance of companies after they have been acquired could be linked to what is referred to as “operational engineering” (Kaplan & Strömberg, 2009). This concept highlights that, before acquisition, targeted firms often lack the necessary professional expertise. Consequently, PE firms now adopt an industry-focused approach, often hiring professionals that have an operational background and are familiar with the industry which they manage (Kaplan & Strömberg, 2009).

Another explanation behind the operational improvements post-acquisition could relate to what Kaplan and Strömberg (2009) called “governance engineering”. By controlling the board and being more susceptible to letting go of more poorly performing managers, PE firms improve the governance of their portfolio. Capital structuring, as mentioned earlier, could also be seen in a way an improvement in governance, as it mitigates the agency problem risks which is more prevalent in public companies (Cohn, Hotchkiss, & Towery, 2022). This concept serves as the building block of this paper. More specifically, considering the idea that non-financial metrics such as governance could generate value for target firms as mentioned above, drives us to question whether the same could be applied to corporate social responsibility measures. The following section will discuss this in detail.

2.3 Integrating Non-Financial variables in Value Creation

This section explores whether the growing emphasis on CSR can be extended to include environmental, governance, and social factors in PE investments, laying the foundation for addressing the research question.

2.3.1 History of Corporate Social Responsibility

In his essay "The Social Responsibility of Business Is to Increase Its Profits," Milton Friedman (1970) argues that the primary obligation of corporate executives is to maximize profits for their shareholders. He argues that any actions taken to address societal issues or enhance social welfare serve merely as a

distraction from the central goal of maximizing profits, claiming that executives that prioritize any other goal are acting disloyally to the interest of the business owners.

There has, however, been a significant shift in how the corporate world perceives corporate social responsibility, with investors now recognizing CSR as more of an investment than as an expense. (Bosch-Badia, Montllor-Serrats, and Tarrazon, 2013). The theme that has been the most prevalent when studying how CSR affects a firm's financial performance has been the relationship between CSR and risk. The intuitive argument in support of why CSR is inversely correlated to risk is that firms that adopt proactive CSR practices tend to reduce business risk through managerial activities such as environmental assessment and stakeholder management. These practices help firms anticipate and mitigate potential risks, including governmental regulations, labour unrest, and environmental damage (Wood, 1991).

Further exploring this relationship, Albuquerque et al. (2019) delve deeper by investigating the impact CSR has on the systematic risk of the firm, more specifically how it impacts the cost of equity, based on the premise that CSR is a product differentiation strategy. Utilizing the CAPM, they predict that firms that hold a higher CSR rating do experience a lower cost of equity. More specifically, one standard deviation increase in a firm's CSR score is associated with a firm beta that is 1% lower relative to beta's sample mean. In addition, they find out that the profits of companies with higher CSR have a weaker correlation with business cycles, in other words, lower systematic risk.

Husted (2005) took a more radical approach by viewing CSR through the lens of real options. Real options, rooted in financial option theory, enables firms to make investment decisions with the flexibility to adapt and make future decisions based on changing circumstances. This concept allows firms to delay, expand, or abandon investments, thereby managing risk and capturing potential opportunities (Myers, 1977; Dixit & Pindyck, 1994). Husted (2005) draws parallels between real options and CSR by suggesting that CSR can function as a strategic tool for mitigating downside business risks, while providing the option, rather than obligation, for calling upon stakeholders for resources that are needed. In essence, by embracing CSR, firms acquire the ability to navigate uncertainties while retaining the flexibility to leverage stakeholder support when advantageous.

Moreover, Lins, Servaes, and Tamayo (2017) find out that, at times where the trust for corporations is put into question, corporations with higher CSR ratings experience negative economic shocks less severely than those with lower CSR ratings. Specifically, they examine the stock returns of businesses with varying CSR ratings during the 2008 financial crisis. Their findings indicate that firms with higher CSR ratings had significantly higher stock returns, by approximately 4 percentage points, compared to those with lower CSR ratings.

2.3.2 Do PE firms Consider ESG ratings of Target Firms?

Although previous literature has explored the interplay between CSR and financial performance in-depth, as seen above, it is not immediately apparent when discussed regarding PE acquisitions. To further elaborate, given that CSR is typically a long-term investment, it is questionable whether PE firms would utilize it as a value creation method as their focus primarily is on short-term returns (Kaplan & Strömberg, 2009). That is because PE firms might exit their investments before the benefits of CSR fully materialize.

However, certain aspects of CSR such as governance are known to influence the return for PE firms (Kaplan & Strömberg, 2009). This is due agency conflicts and poor board performance potentially affecting the PE's return. Moreover, socially irresponsible practices increase a firm's exposure to systematic risk (Albuquerque et al., 2019), leading to an increase in volatility and uncertainty of the acquired firm's return and thus of the PE's (Ang et al., 2006).

There exists a significant gap in the literature when it comes to investigating the relationship between CSR and PE, with very few papers focusing on PE investor's consideration on ESG factors when valuing and acquiring a firm and their influence on ESG factors after acquisition. Among the scarce research in this area is the study by Crifo, Forget, and Teyssier (2015), where they investigate the effect of environmental, social and governance disclosures on PE financing. Through conducting a framed field experiment, they analysed 33 private equity investors' responses to good and bad ESG disclosures through their valuation and investment decisions of companies in case studies. Their main findings concluded that there exists an asymmetric effect of non-financial performance, where investors react more significantly to bad ESG than to good ESG practices.

Specifically, the disclosure of bad ESG practices led to a substantial decrease in firm valuation. Conversely, good ESG practices led to a modest increase in firm valuation, however this effect was less pronounced. In addition, the likelihood of PE investments is negatively impacted by bad ESG practices, with investor's willingness to invest reducing significantly. Governance issues were seen to have the greatest impact on investment decisions, consistent with previously discussed academic papers (Kaplan & Strömberg, 2009).

These findings suggest that there appears to be a discrepancy between acquired firms' pre-acquisition ESG ratings with unacquired firms. The significant adverse reactions to bad ESG practices imply that investors are acutely aware of the potential risks these issues pose, such as regulatory penalties, reputational harm, and operational disruptions, which can directly impact firm performance and financial returns (Ioannou & Serafeim, 2011). However, we must also consider that, while the paper

by Crifo, Forget, & Teyssier (2015), provide valuable insights into the effect of ESG disclosures on private equity investing, its methodology has notable limitations, susceptible to criticism. Essentially, the study relies heavily on a framed field experiment and descriptive statistics to arrive at its conclusions. Although this approach offers a controlled environment to observe investors' behaviours, it lacks the robustness that an econometric analysis could provide. In particular, the absence of a regression analysis fails to account for potential confounding variables that might influence valuation and investment decisions. Without controlling for these variables, the results might be biased or not fully reflective of underlying relationships. Additionally, the study's sample size of only 33 investors is notably small, raising concerns about the generalizability of the findings and the statistical power of the analysis.

This paper builds on the findings of Crifo, Forget, and Teyssier (2015), exploring how ESG ratings influence the likelihood of being acquired by a PE firm. Using a logit model analysis, the study aims to validate the significance of ESG ratings on acquisition likelihood and analyze the isolated effects of each ESG component. The question guiding our exploration would thus be: *How do environmental, social, and governance (ESG) factors impact the likelihood of acquisition by private equity firms*

2.4 Hypotheses

2.4.1 ESG Combined Score

If PE investors consider ESG ratings prior to the acquisition of a portfolio company (Crifo, Forget, & Teyssier, 2015), then when analyzing the factors that affect the likelihood of being acquired by a PE firm, ESG ratings should play a significant role. Hence, the first hypothesis is derived as follows:

H1: ESG ratings affects the likelihood of being acquired by a PE firm

Additionally, if PE investors place more emphasis on mitigating the risk associated with low ESG ratings than the benefits accompanied by high ESG ratings, it should be expected that the effect of falling under a low quantile ESG rating is more pronounced than the effect of a company being of a high quantile ESG rating. This would translate into a greater impact and significance of low ESG ratings, as indicated by a higher absolute coefficient as well as a higher significance for the low quantile ESG factor, compared to those of a higher quantile. The following hypothesis can be derived:

H2: Lower ESG ratings decrease the probability of being acquired by a private equity firm more significantly than the increase in likelihood associated with higher ESG ratings.

2.4.2 Governance

As previously discussed, governance is a critical factor emphasized by PE investors (Kaplan & Strömberg, 2009; Crifo, Forget, & Teyssier, 2015). PE firms often enhance the performance of their portfolio companies through governance engineering, such as increasing the frequency of board meetings and retaining managers based on performance (Kaplan & Strömberg, 2009). Consequently, this paper hypothesizes that the impact of governance on the likelihood of being acquired will be more significant than that of social and environmental factors. This perspective aligns with the findings of (Crifo, Forget, & Teyssier, 2015), though the direction of the governance effect in this paper differs.

While Crifo, Forget, and Teyssier (2015) argue that PE investors typically avoid companies with low governance standards, this paper presents a different perspective. Poorly governed companies are often undervalued due to inefficiencies, lack of strategic direction, and weak oversight (Shleifer & Vishny, 1997). Consequently, PE firms can capitalize on this by implementing robust governance practices, thereby driving operational improvements, and enhancing profitability and firm value (Kaplan & Strömberg, 2009). The findings of Cohn, Hotchkiss, and Towery (2022) suggest that PE firms often target companies with deficiencies in areas they believe can be improved. This forms the basis for our third hypothesis:

H3: Governance is anticipated to have a negative influence on the likelihood of acquisition by private equity firms, with this negative effect being more pronounced when compared to social and environmental factors.

CHAPTER 3 Data

In this section, we provide a description of our data sources, variable construction with a clear definition of each variable as well as characteristics of our sample. Two datasets were employed then later combined, to get data on the treatment and the control group. To assess the impact of ESG scores on the likelihood of acquisition, the treatment group consists of public companies acquired by PE firms, while the control group comprises companies that were targeted but ultimately not acquired by PE firms.

3.1 Data Sources:

Treatment Group

For the treatment group, we identified Private Equity acquisition deals using Orbis M&A. The selection criteria included deals where the deal structure was a public takeover by private equity firms. We further refined the data to ensure that the deals were both completed and confirmed, spanning over the years 2009 to 2023. Additionally, we filtered the data to focus exclusively on deals where the target firms' geographical location was the U.S. This geographical control was applied to both the treatment and control groups to eliminate geography as a confounding variable.

The final dataset from Orbis M&A consisted of 440 observations, which included target company's names, industries, acquisition dates, and ISIN codes. These ISIN codes enabled additional data on the target companies to be obtained using Refinitiv. Out of the 440 observations from Orbis M&A, 160 firms were successfully matched across both databases in at least one year. Each of these matched companies had available information regarding their ESG ratings. Using Refinitiv, data regarding target companies' financials, that was later employed as control variables, were also derived. The data was then structured in a way to match each firm to its financial and non-financial metrics at times (t), (t-1) and (t-2) respectively, with t being the year of acquisition. Of these 160 firms only 144 firms had data available at t-1 or t-2. This is essential for studying pre-acquisition characteristics in order to gain insight on the factors affecting likelihood of acquisition. While some firms lacked observations on t-1 year, almost most firms had available data at t-2, thus we look at t-2 year for the pre-acquisition characteristics. Although this may add a bias to our results, as some firms may have had an enhancement at the year before the acquisition, we believe it is still preferable than having a very small sample that would exhibit fewer representative qualities. Thus, for the final treatment group, the total number of observations was 142 firms.

Control Group

Unlike other academic papers, who used unacquired public firms as the control group for their analysis (Cohn, Hotchkiss, and Towery, 2022), this paper's control group encompasses companies that were

targeted by PE firms at one point however the PE firm later withdrew from the deal, and the deal was never completed. The reasoning behind this is to mitigate the risk of sample selection bias that could be present if we were to compare acquired firms with the general pool of unacquired firm. That is because it is more probable for the main difference between the treatment and control group in our case to be the completion of the acquisition deal rather than inherent differences in the firm's characteristics that might not all be accounted for in our analysis, thus reducing how representative the sample is.

Similar to the treatment group, using Orbis M&A, PE acquisition deals that have a deal structure of public takeover by private equity were identified, however with the last deal status being withdrawn between the period of 2009 and 2023. The acquisition date represents the date at which the deal was initially announced. As mentioned before, we also added a geographical filter, being the U.S for target firms. For this sample a total number of 345 observations were derived of which we matched 118 firms across Refintiv and had data on (t-2) year, with t being the deal announcement year.

The control and treatment groups were then combined to form one sample with a dummy variable (Acquired) that takes a value of 1 if the deal was completed and 0 if it was not. The final sample has a total of 260 observations of which 142 of the firms have been acquired and 118 are unacquired with the PE deal being withdrawn.

3.2 Variable Construction

Utilizing both Orbis M&A as well as Refintiv, we derive and construct the variables needed. Primarily, the variables derived from Orbis M&A are the announcement dates, as well as the targets' company industry. Orbis defines industry as the major sector in which the company operates in. Since the announcement dates were dispersed throughout the year, to extract the year, an adjustment was made for firms that have been acquired after May, to be reported as acquired the year after. This partially controls for firms being targeted at different months of the year. Furthermore, a dummy variable was constructed to give firms that were acquired a value of 1, and firms with withdrawn deals a value of 0, later serving as the dependent variable in the logit model.

Refintiv was then utilized to obtain a comprehensive set of variables for both acquired and unacquired firms. For the independent variables of all three hypothesis, ESG scores were required. For hypothesis 1, the ESG combined score of each firm was obtained. This variable was then divided, using Stata, into quantiles in order to later analyse the isolated effect each quantile has on the likelihood of being acquired. This is essential to test for the second hypothesis, being whether having lower ESG scores would have a more pronounced influence. Additionally, variables on each ESG component were then

derived, specifically the environmental, governance, and social scores available on Refinitiv, to test for the isolated effect of each ESG component, required for the third and last hypothesis.

Multiple control variables were accounted for using the findings of previous academic research. To control for the size of the firm, Total assets was used as a proxy (Dang, Li, & Yang, 2018). Moreover, as seen in the findings of Cohn, Hotchkiss, and Towery (2022) operating performance influences the likelihood of acquisition with PE firms targeting firms in both the highest and lowest performance quantiles. Consistent with Cohn, Hotchkiss, and Towery (2022), this present study defines operational performance as operating income to total revenues. Previous findings also show that PE firms may favour firms that exhibit potential growth opportunities as it is an indicator of the profitability that PE firm can capitalize on. We utilize Tobin's Q as a proxy for a firm's growth prospects and profitability. Tobin's Q is calculated by dividing the market value of assets by the book value of assets, where the market value of assets is the sum of the market value of equity and the book value of debt (Cohn, Hotchkiss, and Towery, 2022). Leverage is accounted for by dividing firms' total debt by their total assets. Finally, market capitalization was also considered, as it serves as a reflection of the firm's market value, thus influencing investors' perception thereby the likelihood of acquisition (Blonigen and Taylor, 2000).

CHAPTER 4 Method

This section provides a comprehensive overview of the methodological framework which this paper will follow. It begins by describing the quantitative approach, being the logit model, used to investigate the relationship between pre-acquisition ESG factors and the likelihood of a company being acquired by a PE firm, including the assumptions that the model holds. Consequently, the limitations of the model accompanied by areas of which it could be improved in future research will be mentioned.

4.1 The Logit Model

Following the methodological approach by Cohn, Hotchkiss, and Towery (2022), the logistic regression model is used to assess the likelihood of a company being acquired by a private equity firm based on the pre-acquisition ESG ratings and its components. For each hypothesis, a separate logistic regression will be carried out and analyzed. The dependent variable, however, will be consistent throughout all the hypotheses, being a dummy variable that takes a value of 1 if the company was acquired by a PE firm and 0 otherwise. Additionally, for each logit regression, the standard errors will be clustered by the variable Year, which signifies the year in which the acquisition deal was announced, regardless of whether it was completed or withdrawn. This enables us to address potential within year correlations, such as economic conditions or market trends, that could undermine the reliability of the statistical inference of this paper.

4.2 Hypotheses

4.2.1 Hypothesis 1

Hypothesis 1: ESG ratings affects the likelihood of being acquired by a PE firm

For the first hypothesis, ESG combined score will be used as the independent variable for the logistic regression. For the control variables, total assets, operating income to revenues, debt to assets ratio, market capitalization and Tobin's Q of each target company will all be considered.

Since one of the assumptions of the logit model is that the log-odds are a linear function of the independent variables, variables with highly skewed distributions can distort this relationship and thus should be transformed into their logarithmic form to normalize the distribution. Using Stata, the skewness degree of the control variables is derived, with total assets, market capitalization, debt to assets, operating performance ratios, and Tobin's Q showing high degrees of skewness. Consequently,

these variables are transformed into their logarithmic form. Moreover, as the direction of the effect is not assumed in the hypothesis, a two-tailed significance test will be carried out.

The full logarithmic equation for Hypothesis 1 is as follows:

$$\text{Logit}(P(\text{ACQ} = 1)) = \beta_0 + \beta_1 \text{ESG_Combined} + \beta_2 \text{Ln}(\text{Assets}) + \beta_3 \text{Ln}(\text{IncomeToRevenues}) + \beta_4 \text{Ln}(\text{DebtToAssets}) + \text{Ln}(\text{MarketCap}) + \text{Ln}(\text{TobinsQ}) + \epsilon$$

4.2.2 Hypothesis 2

H2: Lower ESG ratings decrease the probability of being acquired by a private equity firm more significantly than the increase in likelihood associated with higher ESG ratings.

For the second hypothesis, using Stata, the variable ESG combined score is divided into four quantiles in order to assess the isolated effect of having the highest and lowest ESG ratings on the likelihood of acquisition. Other than that, the full logit model remains the same as in the previous hypothesis test. The standard of errors will also be clustered by the announcement year. Moreover, since we hypothesize that lower ESG ratings have a more pronounced negative impact on the probability of being acquired by a private equity firm compared to the positive effect of higher ESG ratings, a one-tailed significance test will be used. This statistical approach is justified because we are specifically testing for a directional effect. The full logit regression equation is as follows.

$$\text{Logit}(P(\text{ACQ} = 1)) = \beta_0 + \beta_1 \text{ESG}_{Q2} + \beta_2 \text{ESG}_{Q3} + \beta_3 \text{ESG}_{Q4} + \beta_4 \text{Ln}(\text{Assets}) + \beta_5 \text{Ln}(\text{IncomeToRevenues}) + \beta_6 \text{Ln}(\text{DebtToAssets}) + \beta_7 \text{Ln}(\text{MarketCap}) + \beta_8 \text{Ln}(\text{TobinsQ}) + \epsilon$$

4.2.3 Hypothesis 3

H3: Governance is anticipated to have a negative influence on the likelihood of acquisition by private equity firms, with this negative effect being more pronounced when compared to social and environmental factors.

For the third and final hypothesis, we test for the isolated effect of governance, social and environmental scores on the likelihood of a company being acquired by PE firm, thus our independent variable will be governance, environmental, and social scores. Moreover, the logarithmic function of total assets, market capitalization, debt to assets, operating income to total revenue and Tobin's Q are added as control variables. Similar to the previous hypothesis, we also assume the direction of the effect in our hypothesis, with governance having a negative effect on the likelihood of acquisition thus

a one-tailed significance test will be used for this logit regression. The logistic regression equation is as follows:

$$\text{Logit}(P(ACQ = 1)) = \beta_0 + \beta_1 \text{Governance} + \beta_2 \text{Environmental} + \beta_3 \text{Social} + \beta_4 \text{Ln(Assets)} + \beta_5 \text{Ln(IncomeToRevenues)} + \beta_6 \text{Ln(DebtToAssets)} + \beta_7 \text{Ln(MarketCap)} + \beta_8 \text{Ln(TobinsQ)} + \epsilon$$

4.3 Limitations

Despite taking precautions to mitigate biases in our methodological approach, such as normalizing the distribution of variables, this study is not without its limitations, one of which is its small sample size. The relatively small sample size may limit the ability to draw statistically significant results, thus unable to have conclusive results. Moreover, the ESG scores utilized in our regression analysis are based on specific rating agencies' methodologies, which may themselves have inherent biases or limitations of their own. Future research could account for that by using multiple variables from different databases instead of relying on just one in order to have a more holistic approach. However, this in our case was not possible due to the limited accessibility to databases and the general scarcity of available data on ESG ratings. Lastly, since we are only looking at PE acquisition of public firms, the results may not be generalizable when it comes to private-to private acquisition. However, this again relates to the restricted availability of ESG ratings especially on private firms.

CHAPTER 5 Results

5.1 Hypothesis 1

In order to test hypothesis 1, specifically, the effect of firm's ESG-combined score on the likelihood of acquisition, five logit regressions were carried. In **(Table 1)**, a general-to-specific approach was employed to assess which model to use. Model 5 was chosen as the final model as it provides the highest R^2 , thus its independent and control variables are best to explain the variation in the dependent variable, offering the most robust and realistic factors affecting the acquisition of companies by PE firms, despite its slightly higher AIC compared with simpler models.

By analysing Model 5, it is seen that the ESG combined score has a negative coefficient, implying that the firms with lower overall ESG rating are more likely to be acquired by PE firms. However, the coefficient not statistically significant and that is the case across all models. Hence, the effect of ESG ratings on likelihood of acquisition remains inconclusive.

For the control variables, it is notable that operating income to total revenues has the largest influence on the likelihood of acquisition, with the coefficient being the highest in absolute terms as well as the most significant. Second comes assets, affecting the acquisition negatively with the coefficient being significant at a 5% level. This implies that PE firms are more drawn to acquiring firms of a smaller size. Market capitalization and Tobin's Q although insignificant, increase the explanatory power of the model when included. The lack of significance of the combined ESG rating prevents this paper from rejecting the null hypothesis that ESG ratings have no effect on the likelihood of a firm being acquired by a PE firm.

Table 1: Combined ESG Score on the Likelihood of PE Acquisition

Likelihood of Acquisition					
	(1)	(2)	(3)	(4)	(5)
ESG _{combined}	-0.0042 (-0.41)	-0.0044 (-0.42)	-0.0043 (-0.41)	-0.0062 (-0.53)	-0.00642 (-0.54)
Ln(Assets)	-0.391*** (-3.37)	0.484*** (-5.15)	-0.486*** (-4.99)	0.017*** (-3.90)	-0.814** (-2.38)
Ln(IncomeToRev)		3.64*** (2.68)	3.64*** (2.68)	3.747** (2.47)	3.611*** (2.87)
Ln(DebtsToAssets)			-0.019 (-0.28)		
Ln(MarketCap)				6.724 (0.95)	0.382 (1.10)
Ln(TobinsQ)					-0.592 (-0.57)
Constant	6.09*** (3.45)	2.025 (0.85)	2.078 (0.85)	1.055 (0.38)	1.968 (0.88)
Number of observations	260	260	260	260	260
R ²	5.5%	7.7%	7.7%	8.13%	8.28%
AIC	344.6	338.483	340	339.1106	340
Number of observations	260	260	260	260	260

Note: Table 1 presents the results from estimating a linear probability model of the likelihood of undergoing a PE acquisition. Asterisks *, **, and *** denote two-tailed statistical significance at 10%, 5%, and 1%, respectively. Standard errors are clustered by Year of Announcement. T-statistics are reported in parentheses

5.2 Hypothesis 2

To test whether there exist discrepancies on the likelihood of being acquired by PE firms, based on which quantile the firm's ESG combined score falls under, the variable ESG combined score is split into four quantiles. This isolates the effect of each quantile on the likelihood of acquisition. The same control variables from model 5 in **(Table 1)** are used, however the independent variables are now ESG_Q2, ESG_Q3, ESG_Q4, denoting ESG scores that fall under quantile 2, 3, and 4 respectively with Q1 being the lowest score group. ESG_Q1 is not included in the model as a variable in order to avoid omitted variable bias. Hence, the coefficients on ESG_Q2, ESG_Q3, and ESG_Q4 indicate the increase or decrease in the likelihood of acquisition compared to being in ESG_Q1.

From the positive sign on ESG_Q2 and ESG_Q3, shown in **(Table 2)**, we could infer that, compared to having an ESG score that falls under the lowest quantile (Q1), a firm having an overall ESG rating falling under quantile 2 or 3 increases the likelihood of acquisition. The negative sign on ESG_Q4, however, suggests that being into quantile 4 thus having a very high ESG combined score, compared to quantile 1, decreases the probability of acquisition. Again, however, these findings are not statistically significant thus there appears to not be enough evidence to validate that the effect of lower ESG ratings is more pronounced than high ESG ratings. Hence, we cannot reject the second null hypothesis.

Table 2: Combined ESG Score per Quantile on Likelihood of PE Acquisition

Likelihood of Acquisition	
ESG_Q2	0.253 (0.76)
ESG_Q3	0.080 (0.22)
ESG_Q4	-0.204 (-0.46)
Ln(Assets)	-0.794*** (2.64)
Ln(IncomeToRev)	4.092*** (2.75)
Ln(MarketCap)	0.3704 (1.38)
Ln(TobinsQ)	-0.516 (0.217)
Constant	0.777 (0.33)
R ²	8.71%
AIC	342
Number of observations	260

Note: Table 2 presents the results from estimating a linear probability model of the likelihood of undergoing a PE acquisition. Asterisks *, **, and *** denote one-tailed statistical significance at 10%, 5%, and 1%, respectively. Standard errors are clustered by Year of Announcement. T-statistics are reported in parentheses

5.3 Hypothesis 3

The logit model for the third hypothesis shows the isolated effect of governance, social and environmental scores on the likelihood of being acquired by a PE firm, instead of ESG as a combined score. Similar to the methodology used to test for hypothesis 1, a general-to-specific approach was utilized with Model 5 being the final model, as it has the highest R^2 . More precisely, the final model for hypothesis 3 consisted of governance, social, and environmental scores as the independent variables, as well as total assets, operating income to revenues, market capitalization, as well as Tobin's Q as controls in their logarithmic form.

As shown in **(Table 3)**, the coefficients of governance, social, and environmental scores are all statistically significant at a 5% significance level, however the direction of their effects differ. More specifically, governance and environmental scores have a negative coefficient, indicating a negative correlation with the likelihood of acquisition. This suggests that PE firms are less likely to acquire firms with higher governance or environmental ratings. Conversely, the social score shows a positive coefficient, suggesting that firms with higher social ratings are more attractive acquisition targets for private equity firms. Moreover, governance has the largest coefficient in absolute terms, compared to the coefficient on social and environmental scores, with the environmental score having the smallest coefficient. This is in line with our prediction in hypothesis 3, being that governance would have the most pronounced effect compared to environmental and scores.

To further elaborate, analysing the effect of governance, a one-unit increase in the governance score correlates to a 2.2% decrease in the odds of a company being acquired by a PE firm. Moreover, a one-unit increase in the environmental score is associated with a 1% decrease in the odds of being acquired, Meanwhile, a one unit increase in the social score is associated with a 1.8% increase in the odds of acquisition. Additionally, total assets and operating income to revenue variables remain to have a significant effect at a 5% significance level, with total assets being negatively correlated with the likelihood of acquisition while operating income to revenue exhibits a strong positive correlation. Market capitalization and Tobin's Q variables, despite increasing the explanatory power of the model, remain statistically insignificant.

Table 3: ESG Components' Scores on the Likelihood of PE Acquisition

Likelihood of Acquisition					
	(1)	(2)	(3)	(4)	(5)
Governance	-0.020*** (-2.68)	-0.022*** (-2.85)	-0.022*** (-2.91)	-0.022*** (-3.10)	-0.022*** (-3.26)
Environmental	-0.009** (-1.92)	-0.01** (-1.95)	-0.0096** (-1.90)	-0.001** (-1.99)	-0.01** (-1.94)
Social	0.015** (1.73)	0.017** (2.03)	0.0177** (2.00)	0.0163466** (1.82)	.0176** (2.00)
Ln(Assets)	-0.325*** (-2.62)	-0.435*** (-4.37)	-0.441*** (-4.22)	-0.481*** (-3.35)	-0.436*** (-3.41)
Ln(IncomeToRev)		4.914*** (2.48)	4.961*** (2.48)	4.932** (2.46)	4.912*** (2.56)
Ln(DebtsToAssets)			-0.038 (-0.63)		
Ln(MarketCap)				0.076 (0.43)	
Ln(TobinsQ)					-0.0037 (-0.01)
Constant	5.441** (3.08)	-0.307 (-0.10)	-0.236 (-0.08)	-0.738 (-0.24)	-0.293 (-0.10)
R ²	8.90%	11.62%	11.62%	11.69%	11.96%
AIC	336	328	330	330.35	330.6
Number of observations	260	260	260	260	260

Note: Table 3 presents the results from estimating a linear probability model of the likelihood of undergoing a PE acquisition given the ESG components. Asterisks *, **, and *** denote one-tailed statistical significance at 10%, 5%, and 1%, respectively. Standard errors are clustered by Year of Announcement. T-statistics are reported in parentheses

CHAPTER 6 Discussion and Conclusion

6.1 Discussion

The findings from our logistic regression analyses show that ESG as a combined score does not affect the likelihood of being acquired a PE firm. This implies that when targeting a potential portfolio company, PE firms do not consider the overall ESG score, suggesting that ESG scores do not play a detrimental role in the PE acquisition decisions. Furthermore, when divided into four quantiles, there does not appear to be a statistically significant difference between low and high combined ESG score on the likelihood of acquisition, thus companies with low ESG scores are as likely to be acquired by a PE firm compared to a high combined ESG scored companies, all other variables being equal. This result appears to contradict the findings of Crifo, Forget, & Teyssier (2015), who argue that PE firms do take ESG disclosures into account as they play a role in the valuation of the target companies as well as in the investment decision process. Moreover, according to their research, low ESG ratings should have a more pronounced negative effect on acquisition likelihood compared to the positive effect of high ESG ratings due to the asymmetric effect between bad and good ESG ratings. However, our analyses did not validate these assertions when testing for Hypotheses 1 and 2.

Interestingly, when we examined each ESG component separately (governance, environmental, and social), each had a significant effect on the likelihood of acquisition while controlling for the same variables. This indicates that PE investors do take ESG scores into account when targeting a new portfolio company which would be inconsistent with the findings of the combined ESG score. The statistical explanation for this discrepancy lies in the direction of each component's effect. To elaborate, from our logistic analyses' results shown in **Table (3)**, while all components have a significant effect on the acquisition likelihood, both governance and environmental scores are negatively correlated with probability of acquisition, meanwhile the social score is positively correlated with acquisition likelihood. Thus, the significant effects of individual ESG components are diluted when combined, leading to an insignificant effect of the overall ESG score.

These findings significantly contribute to the existing literature by suggesting that PE investors employ different targeting strategies regarding each ESG component. Specifically, PE firms prioritize companies with low governance and environmental scores while favouring those with higher social scores. These contrasting targeting criteria are indicative of the potential value creation strategies PE firms might employ post-acquisition. For example, PE firms may see potential value in improving governance and environmental practices post-acquisition, thus capitalizing on unrealized gain. Conversely, a high social score is already perceived as advantageous due to strong stakeholders'

relationships and high community engagement. These insights will be elaborated in the following subsection, focusing on governance as a value creation strategy.

6.1.2 Governance as Value Creation Strategy

Understanding the variables that influence the likelihood of acquisition helps us infer the criteria PE firms use to target new portfolio companies, which can be indicative of their value creation strategies post-acquisition. Cohn, Hotchkiss, and Towery (2022) concluded that PE firm's target criteria reflect the value creation strategies that would be put into place post-acquisition. For example, they found that acquired firms that had exhibited low operational performance pre-acquisition showed a significant degree of operational improvement compared to other acquired firms, suggesting a targeted value creation strategy.

Drawing parallels to governance, PE firms may target firms with low governance scores with the intention of enhancing their governance standards post-acquisition. Previous literature has already highlighted how post-acquisition, PE firms improve portfolio companies' governance by employing what Kaplan and Strömberg (2009) referred to as "governance engineering". This involves increasing board meetings, removing poorly performing board members, and reducing board size to enhance governance and consequently operation performance. However, Kaplan & Strömberg (2009) do not address whether firms with lower governance scores are more likely to be acquired by PE firms. Furthermore, to our knowledge, no studies have statistically analysed whether target firms experience greater alleviation in their governance practice post-acquisition compared to unacquired firms.

6.1.3 Limitations

This paper bears limitations that must be acknowledged as guidance for future research, particularly concerning the generalizability of the findings. Firstly, in this paper we focus solely on public-to-private acquisition deals. This is because of the limited accessibility of ESG ratings on private companies, making it difficult to gather pre-acquisition ESG data. As a result, the findings may not be generalizable in the context of private-to-private acquisition deals, where different confounding factors come at play. For example, private firms may have different governance structure, financial transparency level and stakeholder consideration (Gedajlovic & Shapiro, 1998), compared to public firms, which could influence PE firms' acquisition strategies in terms of targeting criteria as well as value creation strategies employed.

Moreover, as noted before, the relatively small sample size of 260 observations (142 acquired and 118 unacquired firms) limits the statistical power of our analysis, possibly affecting the reliability of the results. This makes it difficult to draw definitive conclusions as well as increases the risk of Type II errors, where true effects are not detected.

As previously mentioned, a problem that arises when analyzing ESG scores, is the potential bias that rating agencies' methodology could endure that would in turn bias our results as well. A way future research could attempt to mitigate this risk is by using multiple ESG rating sources rather than relying on one. This could provide a more holistic view on a firm's ESG performance.

6.1.4 Future Research

The findings of this paper present an opportunity for future research to delve into further investigation. More specifically, future studies could validate whether PE firms do in fact systematically target firms with lower governance as part of their value creation strategy and whether these target firms subsequently experience significant improvement in their governance practices post-acquisition. Although the findings of this paper do shed light on the potential use of governance and environmental practices enhancements as value creation tools, it does not test whether this holds or not. Future research could test this by establishing a causal relationship between governance as well as environmental improvements and the financial performance of the acquired firms, post-acquisition. To investigate this, a granger causality test could be employed. This test will enable future research to conclude whether changes in governance and environmental scores could predict subsequent enhancements in financial metrics post-acquisition of acquired firms, signifying whether PE firms do utilize these methods in their value creation strategies.

6.2 Conclusion

In this paper, the question of "How do environmental, social, and governance (ESG) factors impact the likelihood of acquisition by private equity (PE) firms" was investigated. By utilizing a sample of 260 firms, consisting of 142 acquired firms 118 firms unacquired, a logistic regression analyses were carried out in order to establish a relationship between pre-acquisition ESG scores, both as a combined score as well as isolated components, and the acquisition likelihood by PE firms. The acquisition deals (both completed and withdrawn) spanned from the year 2009 until 2024.

Firstly, the findings reveal that, as an overall score, ESG ratings do not play a significant role in acquisition likelihood. This implies that PE firms do not place substantial emphasis on the overall ESG

ratings when targeting new portfolio companies. Additionally, when the ESG scores were split into four quantiles, to see if there exist discrepancies between the influence of high and low ESG scores, the results remained insignificant, preventing us from concluding that PE prioritize mitigating the harm of bad ESG practices than the benefits associated with having good ESG practices.

Interestingly, when the impact of each individual component of the ESG rating on the acquisition likelihood was analyzed, each component, being governance, environmental and social scores, seemed to have a significant effect. More specifically, governance and environmental scores exhibit a negative correlation with the acquisition likelihood, while social scores show a positive correlation. The effect of governance was also shown to be more pronounced and significant compared to environmental and social scores, as predicted in this paper. Social scores have the second most prominent effect while environmental scores have the lowest impact on the acquisition likelihood in absolute terms.

These findings imply that PE firms employ differentiated strategies in their targeting criteria regarding each ESG component. The negative correlation between governance scores and acquisition likelihood arguably could be in the support of the notion that PE firms seek to enhance governance practices in their targeted firms as a means to drive operational performance and consequently create value for the acquired firm. Similarly, targeting firms with lower environmental scores might present opportunities for implementing sustainability initiatives, thereby creating additional value. The positive correlation with social scores underscores the value PE firms place on strong stakeholder relationships and community engagement.

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