UNIVERSITY OF GOTHENBURG

SCHOOL OF BUSINESS, ECONOMICS AND LAW

ESG and Deal Uncertainty: A Quantitative Study on Acquirer ESG Scores Effects on Arbitrage Spreads in M&A Transactions

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Ellioth Tilly & Teo Forss

Supervisor: Ylva Baeckström

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Graduate School, School of Business, Economics and Law, University of Gothenburg, Sweden

Abstract

Uncertainty in M&A transactions is a central concern for investors and other stakeholders, often reflected in the arbitrage spread between the offer price and the target firm's stock price. Given the growing emphasis on ESG factors in investment decisions, this study explores whether acquirers' ESG score influences arbitrage spreads, thereby affecting the market perceptions of deal completion risk. The analysis is based on a quantitative methodology using a dataset comprising 408 M&A transactions from the European and North American markets during the period 2014-2024. Multivariate OLS regressions are employed, supplemented by a sensitivity analysis to test the effects of acquirers aggregated and disaggregated ESG scores on arbitrage spread. The results show that ESG scores do not have a statistically significant effect on arbitrage spreads. Instead, other firm-specific variables such as ROA, bid premium, and deal value are found to significantly influence the arbitrage spread. This study contributes to the literature by highlighting that while ESG may offer long-term strategic value, its relevance for shaping short-term deal risk appears limited.

Keywords: Mergers and Acquisitions, Environmental Social and Governance, ESG, Arbitrage Spread, Deal Uncertainty.

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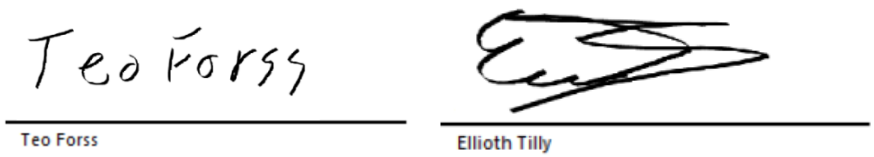

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1. Introduction

1.1 Background

Mergers and acquisitions (M&As) are common strategies for corporate growth and market expansion, enabling firms to achieve synergies, diversify operations, and increase competitiveness. They are widely acknowledged as one of the most dynamic and preferred strategic tools for firms seeking to enhance financial performance and respond to competitive pressures in both domestic and international markets (Datta et al., 2020). Despite their strategic significance, M&A transactions are inherently uncertain, with risks stemming from regulatory approvals, market reactions, and integration challenges that may affect all stakeholders (Arouri et al., 2019).

One metric that captures the market perceptions of these risks is the arbitrage spread, defined as the difference between the offer price in an M&A deal and the market price of the target company's shares. According to Arouri et al. (2019), the arbitrage spread serves as an indicator of the perceived likelihood of deal completion, where a wider spread indicates lower market confidence for the deals completion and a narrower spread suggests higher confidence. The likelihood of a deal's completion depends on numerous factors, including regulatory coherence, shareholder opposition, and broader market conditions. These considerations underscores the importance of meeting stakeholders' expectations and demands during the bidding process for acquiring firms in order to achieve a successful transaction, highlighted by Hossain (2021).

Some factors that have been recognised to affect these relations between a firm and its stakeholders are those related to environmental, social and governance (ESG) efforts. As Arouri et al. (2019) highlight, ESG has drawn more attention in the past decade due to the influence of corporate social responsibility (CSR). This is largely driven by growing regulatory demands, such as the EUs Corporate Sustainability Reporting Directive (European Commission, n.d), and by rising stakeholder expectations. While CSR acts as a broad concept that focuses on companies responsibility towards society, it lacks standardized metrics for measurement. Tampakoudis and Anagnostopoulou (2020) emphasize that ESG complements CSR and provides a quantifiable

framework for measuring the three components it consists of. The first component in ESG is the environment which looks at companies' impact on the planet, using measures such as CO2 emissions to investigate how companies perform within different production areas. The social factor evaluates how a firm treats their employees and workers involved in the value chain. It can be measured through for example satisfaction surveys from employers. The last component is corporate governance, which includes mechanisms designed to align the interests of management with the shareholders and ensure transparency towards their stakeholders.

Contributing to the increased interest in ESG among companies is the positive correlation it has with firms overall financial performance. In the context of M&As, several positive effects of integrating ESG into firms strategies have been seen. Tampakoudis & Anagnostopoulou (2020) demonstrate that the market value for the acquiring firm increases when a merger is conducted with a target that has a better ESG performance. This effect is even more pronounced when the acquiring firm already has an ESG commitment prior to the merger. Feng (2021) continues this discussion and adds that firms with high ESG score have a higher performing return on assets (ROA) post the M&A deal compared to companies with lower ESG score. Deng et al. (2013) adds that there is a positive relationship between CSR and the acquiring firm's value after the merger, where ESG data is used to measure this effect. Conclusively, firms that incorporate more ESG into their operations and strategy have higher chances of performing well post M&A transactions. Measures that have been in focus here are for example market value of the acquirer, ROA for acquirer, and higher premiums which can benefit the target firm. This increases the interests in ESG among stakeholders and makes it more relevant to engage with ESG for companies.

ESG and its individual components have also been shown to play a vital role in reducing risks and giving trust in M&A transactions. Effective governance can for instance ensure that the strategy of the acquirer aligns with regulatory bodies and stakeholders' expectations, as emphasized by Hussain and Loureiro (2022), who found that higher corporate governance quality enhances deal outcomes. Similarly, strong social performance by acquiring firms has emerged as a tool to align their strategy with stakeholder expectations, fostering trust and reducing opposition during M&A transactions. This is investigated by Deng et al. (2013), who

found that higher social performance by acquirers lead to faster and more successful deal completions. Furthermore, Arouri et al. (2019) showed a negative relationship between acquirers' ESG scores and M&A completion uncertainty. Their findings suggest that higher ESG scores signal reduced risks and increased market confidence in the likelihood of deal success, leading to narrower spreads.

1.2 Problem Area

The extent in which previous literature has examined the effects of ESG and each individual component that it includes is only briefly investigated. The literature examining ESG does so with different databases and with different variables, making it difficult to compare the results with each other. Some examples of literature investigating ESG or its components and its effect on companies performance is Aktas et al. (2011) and Harford et al. (2012), who emphasize the critical role of corporate governance in mitigating managerial overconfidence and agency risks during acquisitions. Similarly, Ferrell et al. (2016) and Servaes and Tamayo (2013) discuss how governance structures influence the effectiveness of CSR initiatives. Furthermore, firms that voluntarily invest in sustainability and how this affects performance is investigated by Eccles et al. (2014). They found that firms who voluntarily invest in sustainability outperforms in stock returns compared to firms with lower sustainable engagement. Lastly, studies done by Cellier and Chollet (2015) look at the social ratings and how this affects the stock performance. They find that when social performance announcements are published by a company, the stock performance is generally positive regardless if the announcement itself is positive or negative.

Despite the individual contributions of ESG factors in reducing risks, the combined impact of each individual component along with the aggregated ESG score remains limited in the context of M&A bids. While ESG has been shown to mitigate risks and improve financial outcomes, understanding how individual environmental, social, and corporate governance scores amplifies or moderates this effect is critical. Problems also emerge when trying to compare each research due to a lack of reporting standards. This often leaves it to the individual company to subjectively estimate how to report ESG to external stakeholders. Extending the problem area for arbitrage spread by applying an environmental, social, and a governance perspective can

therefore enhance the understanding of why some transactions fail or succeed and what companies can do to mitigate uncertainty surrounding them (Arouri et al., 2019; Aktas et al., 2011; Harford et al., 2012).

1.3 Purpose

While previous research has studied the significant relations between ESG and M&A performance, little attention has been given to how the ESG factors collectively and separately influence uncertainties within these deals. This study aims to address this by analysing the distinct effects of acquirers aggregated and disaggregated ESG scores on arbitrage spread, which serve as a market-based proxy for deal uncertainty.

1.4 Research Question

Based on the purpose of this study, the following research question have been proposed:

- How does the acquiring firm's ESG scores influence arbitrage spreads in M&A transactions?

2. Literature Review and Theoretical Framework

2.1 M&A and Arbitrage Spread

M&A deals are strategies aimed to increase company performance through synergies, market share, risk diversification and get access to new resources demonstrated by Hossain (2021) in his review of published papers on M&A activities. Despite these potential benefits are M&A transactions are inherently complex and full of risks. According to Hossain (2021), regulatory barriers, financing uncertainties, cultural integration challenges, and market reactions all contribute to the uncertainty surrounding deal success. This uncertainty can be observed in the financial markets as arbitrage spreads, which serves as a proxy for the perceived likelihood of deal completion and associated risks. The arbitrage spread is defined as the difference between the offer price and the current market stock price of the target firm. As noted by Arouri et al. (2019), announcement of an acquisition bid often leads to a decline in the acquirer's stock price due to concerns about financing or overpayment. At the same time, the target firm's stock price rises but rarely reaches the full offer price due to perceived uncertainties about deal completion. If the target stock trades at a discount towards the bid offered by the acquirer then the arbitrage spread occurs, which is the difference between the current market stock price and the bid price. A wider spread indicates higher perceived risk of deal failure, while a narrower spread reflects higher confidence for deal completion according to Baker & Savasoglu (2002).

The determinants of this spread are many, Branch and Wang (2008) suggest that the main factor behind the spread is risks and stakeholder expectations regarding the deal. This includes the likelihood that the deal goes through and possible future price revisions. Similarly, Arouri et al. (2019) mention that completion risk, the risk that the deal will not be finalized, is a major factor behind the spread. Other determinants include firm size, bid characteristics and transaction structure. For example, Jetley and Ji (2010) suggest in their study conducted on US M&A transactions between 1990 and 2007 that all cash offers are associated with a narrower spread compared to stock based offers, due to cash transactions offering less uncertainty regarding valuation and post-merger performance.

2.2 Environmental, Social and Governance

ESG scores have become an integrated part of corporate evaluations. Eccles et al. (2014) show that firms who voluntarily invest in sustainability outperforms in stock returns compared to firms with lower sustainable engagement. This suggests that sustainability initiatives not only contribute to corporate responsibility but also enhance shareholder value. In a related study, Cellier and Chollet (2015), examined the impact of ESG scores on stock performance and analyzed the relationship between social ratings and market reactions. Their findings indicate that when firms publish social performance announcements, stock prices generally respond positively regardless of whether the announcements convey favorable or unfavorable information. This underscores the growing investor sensitivity to ESG scores and the broader implications of social responsibility on corporate valuation. Additionally, Manrique and Marti-Ballester (2017), who studied the role of environmental performance across developed and developing countries on financial performance, also found that environmental performance has a positive effect on financial performance for firms. Moreover, they found this relationship to be especially significant during periods of global financial crisis, where uncertainty and risk aversion are heightened. These results support the notion that environmental initiatives can act as risk-mitigating tools that improve investor confidence and financial stability, particularly when market conditions are adverse.

The significance of ESG considerations has also expanded within the context of M&A as stakeholders are increasingly considering how companies manage environmental impacts, social responsibilities, and governance structures. This growing emphasis on ESG has led to a change of traditional valuation metrics and the recognition of ESG scores that may reduce risks associated with M&A deals. Deng et al. (2013), in a study on M&A deals in the US, found that deals taken by acquirers with high social scores have a higher likelihood to succeed and take less time. They also observed that high ESG scores can improve the long term post-merger performance for the acquirer. Similarly, Tampakoudis and Anagnostopoulou (2020) showed in a study in Europe that acquirers' market value and ESG score increased after merging a target with a strong ESG score. Feng (2021) further supports these findings, showing that acquirors with

high ESG score have a higher performing ROA post the M&A deal compared to those with lower ESG score.

Whereas these studies emphasize performance, Arouri et al. (2019) studied the risks in M&A transactions. Their study focused on M&A deals worldwide from 2004 to 2016 and found that arbitrage spread approximately decreased by 1.1 percentage points for each unit increase of standard deviation in the acquirers CSR score. Implying that the likelihood of deal completion increased for firms engaged in more ESG activities. The governance score, which refers to the principles and processes by which companies are directed and controlled by, has been found to play a crucial role in mitigating risks during M&A transactions and to affect deal outcomes. Hussain and Loureiro (2022) examined portability of firms corporate governance in M&A and found that bidders cumulative abnormal returns (CAR) were higher in acquisitions where the bidders corporate governance quality exceeded that of the target. This finding emphasizes the importance of good governance, where the acquirer's governance standards positively impact the post-acquisition integration and performance.

Conversely, the effects of poor corporate governance has been emphasized by Harford et al. (2012), which demonstrated how entrenched managers can use acquisitions to pursue personal objectives and thus minimizes shareholder value. Aktas et al. (2011) similarly highlighted how managerial overconfidence in combination with weak governance structures, leads to repeated value destroying acquisitions. These findings underline the importance of robust governance mechanisms to prevent inefficiencies or self-serving managerial behaviour in M&A transactions. Additionally, Hussain and Loureiro (2022) mentioned that agency problems can result in inefficient decision making in the context of M&As. Internal governance mechanisms such as supervision of the board, compensation packages and monitoring by large shareholders could be a way to mitigate conflicts. These mechanisms have been found to ensure that M&A decisions are aligned with the firm's stakeholders interests and reduce the likelihood of managerial opportunism, thereby enhancing the value created by the transaction.

Additional research from Ferrell et al. (2016) discussed how well governed firms are more likely to be socially responsible. They highlighted a positive relationship between well governed firms, with less cash abundance, positive pay-for-performance, strong minority protection, and more

CSR engagement. Different views on how a firm should be governed could however pose potential agency challenges which can increase the risk in the arbitrage spread. Harford et al. (2012), presented indications on the negative correlation between bad governance and firm performance, where acquisitions are negatively affected when managers are entrenched in the firm. Aktas et al. (2011) adds that a relationship between rational managers and CAR, where managers who have more hubris and are more engaged in the company, will lead to lower CAR from deal to deal. Servaes and Tamayo (2013), looked at the relationship between the awareness of customers and how this affects the extent that the company engages in CSR activities. Their findings suggest that aware customers reduce the risk of opposition from stakeholders which is important when conducting a M&A transaction. The combined results from all these articles points to the fact that ESG and its components affect multiple aspects ranging from involvement with CSR, to reduced efficiencies when it comes to M&A transactions. This makes it relevant to further investigate its impact on arbitrage spread along with the other ESG components.

To capture and measure how a company performs when it comes to ESG, different measures can be used where some are more developed and standardized than others. Examples of measures that have been used in relevant literature to capture the ESG scores is the Thomson Reuters ASSET4 ESG Research Data, used by Arouri et al. (2019) and by Gomes and Marsat (2018). It measures the aggregated ESG score which provides an overlooking picture of the ESG progress among firms. The index can be broken down into the separate components that focus individually on the environmental, social, and governance aspects. Research focusing on whether the existing measures are good enough to produce consistent findings is something that is discussed by Tsang et al. (2020). Lacking standards surrounding measures for CSR and ESG could lead to problems when benchmarking firms to each other. It could also pose a problem when stakeholder interests do not align with shareholder interests, leading to differences in the use of these measures. However, changes are being made shown in recent reports from PwC (2025), where more standards gradually will be applied to a wide range of companies up until 2026. This will introduce more harmonized and detailed ESG reporting requirements, significantly reducing the variation in disclosure practices and potentially improving the comparability and reliability of ESG data across firms.

2.3 Distinction Between ESG and CSR

CSR refers to a firm's policies and behaviors toward its stakeholders, encompassing environmental, social, and governance considerations (Arouri et al., 2019). Stakeholders include shareholders, customers, employees, governments, NGOs, and communities that are directly or indirectly affected by the company's operations. In recent years, CSR has gained prominence as more companies integrate socially responsible practices into their corporate strategies. By adopting a CSR perspective in corporate disclosures, firms aim to build trust, enhance their reputation, and align business operations with broader social and environmental objectives.

The distinction between CSR and ESG considerations is often unclear, as many studies use ESG data to assess corporate sustainability or CSR performance. Tampakoudis and Anagnostopoulou (2020) mentioned that CSR is a broader concept reflecting a company's voluntary commitment to social and environmental responsibility, while ESG provides a measurable and standardized performance indicator that investors and analysts use for decision-making. Starks (2023) provided further insights into the differences by distinguishing between "value" and "values" in sustainable finance. She argued that investors and managers often have different motivations when incorporating ESG scores in their financial decisions. "Value" refers to the financial impact that ESG scores have, such as risk mitigation and return, while "values" motivations are driven by ethical or social preferences. This distinction helps clarify why ESG scores are increasingly used as a quantitative tool in financial markets, while CSR remains a more qualitative and strategic approach.

The link between CSR and ESG is evident in financial research, where ESG scores are often used as proxies for CSR performance. Arouri et al. (2019) used ESG scores to analyze the effects of CSR on arbitrage spreads, assuming a strong correlation between the two. Similarly, Gomes and Marsat (2018) and Krishnamutri et al. (2019) used ASSET4 ESG score to study the impact of CSR on bid premiums, demonstrating that firms with stronger CSR engagement tend to command higher acquisition premiums due to lower perceived risk and stronger stakeholder trust. Given this close relationship between CSR and ESG, prior research conducted on CSR remains highly relevant for this study's theoretical framework.

2.4 Underlying Mechanisms of the Relationship Between ESG and Arbitrage Spread

2.4.1 Information Asymmetry and Efficient Market Hypothesis

Akerlof (1970) introduced the concept of information asymmetry in his work "The Market for Lemons", in which he illustrates how hidden information can lead to adverse selection and distort market efficiencies. He examined the market for used cars and argued that because sellers possess more information than the buyers, this information asymmetry leads to a lack of trust and bad decision making. This ultimately increases the risk, which will be evident in the price. In M&A transactions, acquirers, targets, and investors may have differing levels of insight into the transaction's risk, expected synergies, or financial health of the target, which causes a widening of the arbitrage spread.

The efficient market hypothesis (EMH), formulated by Fama (1970), provides another perspective on how information is incorporated into stock prices. EMH suggests that financial markets are informationally efficient, meaning that all available information is already reflected in stock prices. In an efficient market, new information regarding an M&A deal should be immediately priced into the target firm's stock. However, due to the information asymmetry, mispricing prevents arbitrage spread from fully reflecting all deal-related risks. Research on arbitrage spreads supports the link between information asymmetry and deal uncertainty. Branch and Wang (2008) argued that arbitrage spreads reflect market expectations regarding deal completion probability, bid revisions, and regulatory hurdles. Similarly, Baker and Savoglu (2002), Jetley and Ji (2010), and Arouri et al. (2019) found that arbitrage spreads serve as a premium for assuming deal-specific risks, meaning that increased uncertainty widens the spread.

Lu and Chueh (2015) analyzed the effects of CSR on information asymmetry through companies that were included in the Dow Jones Sustainability North America Indexon on the North American market. Their findings indicate a negative relationship between CSR engagement and bid-ask spreads, suggesting that firms with strong ESG commitments provided greater transparency, reduced uncertainty, and lowered arbitrage spreads in M&A transactions. Similarly,

Cui et al. (2018) conducted a study examining the relationship between CSR and information asymmetry in the U.S. public equity market. Their results demonstrate that firms with higher CSR involvement tend to have lower levels of information asymmetry. They attribute this effect to stakeholder perspective, arguing that strong CSR engagement enhances corporate reputation, fosters trust, and reduces uncertainty in financial markets, thereby decreasing arbitrage spreads. These findings align with the semi-strong form of EMH, where publicly available ESG information is incorporated into asset prices, leading to more efficient pricing and reduced deal uncertainty.

2.4.2 Stakeholder vs Shareholder Perspective

The discussion surrounding the use of CSR adoption is often viewed through two different theories called the shareholder perspective and the stakeholder perspective. The shareholder perspective is formulated by Friedman (1970) and argues that a firm's primary responsibility is to maximize shareholder value. According to this view, corporate resources should be directed toward profit generating activities. In contrast, the stakeholder perspective, introduced by Freeman (1984), posits that firms should consider the interests of all stakeholders. According to Arouri et al. (2019), the shareholder perspective suggests that CSR related activities cause resource-waste and decrease the shareholder value, while the stakeholder perspective argues that CSR is a way for companies to build trust and commitment towards their stakeholders.

Arouri et al. (2019) found that when the CSR score increases for the acquiring company, the arbitrage spread is reduced as a result of less uncertainty surrounding the deal. This supports the stakeholder perspective as companies with strong CSR practices may attract more institutional investors or ESG-focused funds, leading to increased liquidity and smaller arbitrage spreads. While poor CSR performance may disorientate stakeholders and increase litigation or reputational risk, resulting in larger arbitrage spreads due to higher perceived risk. Similarly, Tampakoudis and Anagnostopoulou (2020) examined ESG score in M&A transactions and found that acquirers that merge with targets with superior ESG score tend to experience an increase in post-merger market value, reinforcing the idea that stakeholder oriented ESG engagement is financially beneficial.

2.4.3 Agency Theory

Agency theory, as introduced by Jensen and Meckling (1976), explains the relationship between managers (the principal), who delegates decisions for the company and other parties (agents). The theory focuses on conflicts that can erupt when interests between the principal and the agents are misaligned. Agency problems can occur when managers act in their own interests rather than those of shareholders, which may lead to decisions that are not optimal from a firm value perspective. Such misalignments can be due to several factors such as misleading executive compensation plans that causes CEO's to apply resources to an area that do not align with the company's overall strategy. To mitigate these issues, Jensen and Meckling (1976) mentioned that different monitoring mechanisms could be implemented. Examples to better align the interests between principles and agents could be external auditors, performance-based compensations and other sorts of internal controls to keep track of the agent's performance. However, implementing such mechanisms introduces agency costs which are expenses incurred to reduce or monitor opportunistic managerial behavior.

Agency theory has also been discussed in association with firm performance and the attitude towards ESG. Huang et al. (2024) found that when boards of directors commit to ESG activities it results in a positive effect on the firm's ESG score. By increasing transparency and reducing information asymmetry, a more aligned view between managers and stakeholders is possible which reduces the risk for agency problems and costs that derive from it. Agency problems are particularly relevant in the context of M&A transactions, where managerial motivations can significantly influence deal decisions. Harford et al. (2012) showed evidence that entrenched managers are more likely to pursue acquisitions that can destroy shareholder value, often as a means for personal gains. Their findings highlight how weak governance and limited oversight can increase agency costs in M&As, emphasizing the importance of strong governance structures to ensure that acquisitions strategies are aligned with shareholder interests.

2.4.4 Signaling Theory

Spence (1973) introduced signaling theory, which explains how information asymmetry between parties can be mitigated through signals. The theory, originally applied to job markets, demonstrated how individuals or firms with superior qualities can use costly signals to distinguish themselves from others in an uncertain market. The concept of signaling is particularly relevant in the context of M&As, where information asymmetry between acquirers, targets and investors plays a significant role in deal valuation and execution.

A key signaling mechanism in M&A transactions is the mode of payment, which can serve as an indicator of the acquirer's confidence in the deal. Branch and Yang (2003) who investigate payment methods and success rate within M&A transactions find that different types of payment methods may create signals regarding financial uncertainty for both the target and the acquirer. They conclude that cash deals have a higher probability of success than other deals, likely because cash offers signal stronger financial strength and valuation confidence. In contrast, stock-financed deals may signal overvaluation, prompting market skepticism and regulatory scrutiny. Supporting this, Jetley and Ji (2010), show that cash offers are linked to narrower arbitrage spreads, while stock deals are associated with wider spreads due to increased uncertainty.

There is also evidence that CSR and ESG reporting can serve as a signal in M&A transactions. Arouri et al. (2019) find that strong CSR commitments experience lower arbitrage spreads and reduced deal uncertainty. The authors argue that socially responsible behavior signals lower firm-specific risk, leading to greater stakeholder trust and smoother acquisition processes. Tampakoudis and Anagnostopoulou (2020) similarly found that firms with strong ESG performance prior to acquisition are perceived as lower-risk targets, leading to favorable valuation outcomes and smoother regulatory approvals. These findings suggest that ESG related disclosures are not merely compliance measures but a strategic tool that enhance deal credibility.

2.5 Hypotheses

ESG has become an integral part of corporate strategies, influencing financial markets, investment decisions, and regulatory frameworks. While prior research highlights the role of ESG in enhancing firm valuation, reducing risks, and improving post-merger performance (Deng et al., 2013; Tampakoudis & Anagnostopoulou, 2020; Feng, 2021), its direct impact on arbitrage along with its separate components, environment, social, and governance, remains under explored.

Empirical research, such as Arouri et al. (2019) and Deng et al. (2013), has shown that ESG engagement is associated with narrower arbitrage spreads, as the market perceives these firms as less risky during M&A transactions. Arouri et al (2019) exemplifies this by showing that when acquirors ESG score increased by one unit, the arbitrage spread approximately decreased with 0.046 percentage units. Firms that increase ESG score could therefore be expected to increase stakeholder trust, reduce information asymmetry and mitigate deal uncertainty leading to reduced arbitrage spread. These attributes reassure investors and reduce perceived risks in M&A transactions. The following hypotheses are formulated for this study in order to explore the relationship between ESG and arbitrage spread in M&A transactions:

Hypothesis 1: *Higher aggregated ESG scores for the acquirer firm is negatively correlated with arbitrage spread and consequently reduces deal uncertainty.*

Firms with strong environmental commitments may be viewed as lower-risk investments, as they are better prepared to meet regulatory expectations and adapt to evolving market conditions. Tampakoudis and Anagnostopoulou (2020) found that acquirers' market value increased after merging with targets that had high ESG scores, suggesting that strong environmental practices contribute to market confidence. A positive correlation between environmental practice and corporate financial performance is also noted by Manrique and Marti-Ballester (2017). Based on these findings, the following hypothesis is proposed:

Hypothesis 2: *Higher environmental score for the acquirer firm is negatively correlated with arbitrage spread and consequently reduces deal uncertainty.*

Firms with strong social scores are more likely to align with stakeholder expectations, reducing resistance from employees, regulators, and the broader market. Deng et al. (2013) found that M&A deals led by acquirers with high social scores were more likely to succeed and take less time to complete. This suggests that a firm's social score can foster trust and collaboration with stakeholders, leading to smoother deal processes. Additionally, Servaes and Tamayo (2013) demonstrated that customer awareness of CSR activities reduces stakeholder opposition, which is important for M&A transactions. Therefore, the following hypothesis is formulated:

Hypothesis 3: *Higher social score for the acquirer firm is negatively correlated with arbitrage spread and consequently reduces deal uncertainty.*

Strong governance scores enhance investor confidence, reduce information asymmetry, and mitigate agency problems, leading to smoother transaction processes according to Hussain & Loureiro (2022). The importance of governance quality in M&A success is further emphasized by Ferrell et al. (2016), who found that well-governed firms are more likely to engage in socially responsible activities. Moreover, research by Harford et al. (2012) and Aktas et al. (2011) highlights the risks associated with poor governance, where managerial overconfidence and self-serving behavior can result in value-destroying acquisitions. Given the critical role of governance in ensuring efficient decision-making and reducing managerial opportunism, the final hypothesis is proposed:

Hypothesis 4: *Higher governance score for the acquirer firm is negatively correlated with arbitrage spread and consequently reduces deal uncertainty.*

3. Methodology

3.1 Data Collection and Sample Selection

The M&A transaction data needed for this study is taken mainly from the LSEG database. Collected data includes Thomson Reuters ASSET4 ESG score as a base for acquirers firms ESG score. This specific ESG score is chosen since it is commonly used when measuring ESG and is widely used in previous research from for example Arouri et al. (2019) and Gomes and Marsat (2018). Furthermore, specific sample selection criteria were incorporated to increase the robustness and quality of the included companies. The criterias are shown in Table 1 in the data overview. To start with, the sample consists of 408 observations, collected for the time period between the years 2014 to 2024, a period that allows for an analysis of both historical and recent trends. Thirteen different industries are represented, and only deals that have been fully completed were considered for this research. Additional requirements include: the deal value needed to be higher than $1 million, the acquirers needed to be public, the acquiring firm needed to own more than 50% of the target's stock after the deal, and that the payment needed to be either in 100% cash or 100% stock. The data is on deals in Europe and North America and is not restricted to any industries. These criteria were chosen to match the sample selection in Arouri et al. (2019), and hence make it more comparable.

Table 1: Data Overview.

Data Overview	
Observations	408
Time Period	2014-2024
Countries	Europe and North America
Industries	13
Deal Status	Completed Deals
Deal Value	> $ 1 000 000
Ownership	Public
Acquiring Limit	When the acquirer gets the majority (>50%) of the shares outstanding
Payment	100 % Cash or 100 % Stock

Note: Table 1 provides information of the criteria that the data needed to have to be included in the research.

From LSEG, all ESG data was collected and most of the arbitrage spread data. However, some of the arbitrage spread data and control variable data had to be complemented due to limited access in LSEG. The missing variables were closing prices for both targets and acquirers, age for both targets and acquirers, and the Volatility Index (VIX) which was retrieved from Capital IQ. Risks associated with the data collection could stem from mismatch problems when merging the data from the two databases or inflated ESG scores that cause uneven results. This is further discussed in section 3.4.

After retrieving all the necessary data, it was merged using STATA by the specific company tickers. For companies that have completed several deals during the specified time period, a match was also done on the dates that were included in each observation. After merging the data, it was cleaned by removing missing values and outliers that were present. Looking at Table 2, a brief overview is illustrated over the exclusion process.

Table 2: Criteria for Exclusion.

Criteria for Exclusion	Removed	Sum
Intial Data Set	nil	728
Acquiring Less Than 50% of the Target	138	590
Missing ESG Variables Data	56	534
Missing Arbitrage Spread Data	36	498
Missing Control Variable Data	51	447
Triming of Continous Variables	39	408

Note: Table 2 shows where in the data management process that missing values exist and therefore reduces the dataset. The total number of excluded observations from the initial dataset is 320.

Additional information on the final dataset is provided in Table 5 in Appendix A, which reports the number of observations in each industry based on LSEG classifications. This classification allows for comparisons between different industries and makes it possible to identify which deals have been made across industries or within the same industry.

3.2 Variables

3.2.1 Dependent variable

The dependent variable included in this study is the arbitrage spread, which serves as a measure of the markets perception of deal uncertainty. The calculations vary depending on the type of deal and the time frame chosen for measurement. Prior research has employed different approaches to capture this metric. For example, Branch and Wang (2008) calculated the spread two days after the offer announcement, while Jetley and Ji (2010) and Arouri et al. (2019) used a shorter time frame, calculating the spread one day after the announcement. To align with recent studies, this study will calculate the arbitrage spread one day after the announcement of the bid was made (t+1). This ensures that information leaks prior to the announcement are excluded and do not distort the measurement of the spread, as noted by Arouri et al. (2019). By doing so, fluctuations in share price caused by insider information can be avoided, allowing for the market to react and making the arbitrage spread a more reliable measure that highlights the difference between the bid and the target's stock price (Jetley & Ji, 2010; Baker & Savasoglu, 2002). For transactions financed entirely in cash is the arbitrage spread calculated using this formula:

$$Arbitrage\ Spread_{cash,\ t+1}\ (\%) \ = \ \frac{P_{offer} - P_{target,\ t+1}}{P_{target,\ t+1}} * \ 100$$

Where Arbitrage $Spread_{cash,\ t+1}$ is the arbitrage spread in percent for cash deals on trading day t+1. $P_{offer,\ t+1}$ is the price per share offered by the acquiring firm on each of the target's common stocks, while $P_{target,\ t+1}$ is the closing price of the target company's common stock on the first trading day after the bid. This formula reflects the percentage difference between the offer price and the target firm's current stock price. For transactions financed entirely in stock will the arbitrage spread be computed as follows:

$$Arbitrage\ Spread_{stock,\ t+1}\ (\%) \ = \ \frac{ER * P_{acquirer,\ t+1} - P_{target,\ t+1}}{P_{target,\ t+1}} * \ 100$$

Where Arbitrage $Spread_{stock,\ t+1}$ is the arbitrage spread in percent for stock deals on trading day t+1. ER is the exchange ratio calculated as the number of acquirer common stock offered per target share common stock. $P_{target,\ t+1}$ is the closing price of the target company's common stock on the first trading day after the bid, while $P_{acquirer,\ t+1}$ is the closing price of the acquiring firm's common stock one trading day after the bid. This formula accounts for the variability in the acquirer's stock price, which introduces additional uncertainty into stock-financed deals compared to cash deals. Due to limited data availability for offer price per share and exchange ratio, these were calculated with the implied deal value of the transaction, the target's fully diluted shares outstanding at the time of the announcement, and with the stock price of the acquirers one day after the announcement. Offer price per share and the exchange ratio that is used in the arbitrage spread calculation has been computed with the following formulas:

$$Offer\ Price\ per\ Share\ (P_{offer}) = \frac{Implied\ Deal\ Value}{Target's\ Fully\ Diluted\ Shares\ Outstanding}$$

$$Exchange\ Ratio\ (ER) = \frac{Implied\ Deal\ Value}{Acquirer's\ Stock\ Price_{t+1} * Target's\ Fully\ Diluted\ Shares\ Outstanding}$$

3.2.2 Independent Variables

The independent variables for this study will be the acquirers firm's total aggregated ESG score and the disaggregated scores within ESG, environmental, social and governance. ESG data, more specifically, Thomson Reuters ASSET4 ESG Research Data, is taken from the LSEG database. ASSET4 is widely recognised as a reliable and comprehensive source for ESG data, providing standardized information on over 5,000 publicly listed companies worldwide (Stellner et al., 2015). The ESG score is derived from approximately 700 individual data points which are consolidated into around 250 key performance indicators (KPIs). These KPIs are grouped into four primary dimensions including, economic, environmental, social, and governance, which are then given an equally weighted overall ESG score. The score is then ranged between 0 and 100, with higher values representing stronger ESG performance (LSEG, 2024).

Consistent with prior research by Arouri et al. (2019) and Stellner et al. (2015), this study will use each firm's aggregated ESG score by averaging its individual environmental, social, and

governance scores. For each M&A deal, the most recent available ESG score before the announcement date will be used, ensuring that the ESG score is reflected at appropriate levels. This approach effectively proxy for firms' ESG engagement and evaluate its role in influencing arbitrage spreads and market perceptions in M&A transactions.

3.2.3 Control Variables

In order to isolate the effects of ESG and its components on arbitrage spreads in M&A transactions, it is essential to incorporate control variables that account for other factors influencing these spreads. These variables have been identified in prior research and will include firm and deal specific variables as well as market factors. The firm's specific will include the size of the acquirer as the natural logarithm of the firm's market value, similarly to the studies by Arouri et al. (2019) and Harfold et al. (2012). As larger firms usually have better access to resources, stronger market position and more experience in handling acquisitions, which can lead to lower arbitrage spread. Additionally, in line with research by Arouri et al. (2019) and Ferrell et al. (2016), financial variables such as ROA and leverage are included for the acquiring firm. ROA is calculated as net income divided by total assets and serves both as an indicator for profitability and for financial stability. Conversely, leverage was calculated as the ratio of total debt to total assets, reflecting the firm's financial risk exposure. Similarly to Ozdemir et al. (2022) this study includes the acquirers market-to-book (MTB) ratio, reflecting the relationship between a firm's market valuation and its book valuation. The age of both firms, acquirer and target, will also be controlled, as done by Arouri et al. (2019), to capture potential maturity differences.

Deal-specific variables include a dummy variable for payment methods, distinguishing between cash and stock financed deals. Jetley and Ji (2010) has shown that cash-financed deals generally exhibit lower arbitrage spreads compared to stock-based transactions, as cash payments eliminate valuation uncertainties associated with stock fluctuations. Additional controls include dummy variables for cross-border and cross-industry transactions, and multiple bids. Deal size, measured as the natural logarithm of the total value of the transaction, will also be controlled for, as larger deals tend to attract increased regulatory scrutiny, potentially widening spreads according to

Harford et al. (2012). Furthermore, bid premium, defined as the percentage difference between the offer price and the stock price 42 days before the announcement, will be included as a control variable, following the methodology of Ozdemir et al. (2022). Higher bid premiums can signal overvaluation concerns, leading to increased market skepticism and wider arbitrage spreads (Harford et al., 2012). To account for broader market conditions that may influence arbitrage spreads, this study will incorporate the VIX index, a widely used measure of market volatility. High market volatility during deal announcements is associated with increased uncertainty, leading to wider arbitrage spreads as investors demand higher risk premiums (Arouri et al., 2019).

3.3 Econometric Models

3.3.1 Overview

The research in this paper will be centered around an event study where multivariate OLS regressions will be conducted using information from companies that have completed M&A deals. Given the stated purpose and the use of cross-sectional data, a quantitative approach was deemed most appropriate, in line with methodology frameworks provided by Patel and Davidsson (2020). The econometric models in this research are chosen with regards to previous research and what they have used. Some of the studies used as inspiration are Arouri et al. (2019), Deng et al. (2013), and Harford et al. (2012), which also have investigated the relationship between M&A and ESG. In these previous studies, the authors have incorporated a multivariate approach, and in some cases added a panel regression, to capture differences over time. Since arbitrage spread is a single time period event, this study will use a multivariate regression to examine similarities and differences for several entities at one point in time. To test the hypothesis that ESG score influences arbitrage spreads, a set of regression models designed to evaluate both the aggregated ESG score and its individual components environmental, social, and governance scores is constructed. This segmentation allows for further isolation of the distinct effects of each ESG score on M&A uncertainty. In total, five sets of regressions are made, starting with a set of OLS regressions before examining the effects of ESG through four sets of sensitivity analyses based on conditions that could have a significant effect on our result.

The goal with these tests is to provide an in depth understanding of how the different components in ESG effects arbitrage spread. OLS regressions were used due to their suitability for analyzing cross-sectional data where the dependent variable is continuous. Moreover, this approach enables the inclusion of multiple firm and deal-specific control variables, helping to isolate the effect of ESG scores on arbitrage spread. This approach also maintains consistency with prior empirical studies, such as Arouri et al. (2019), making the findings more comparable.

The first models implemented are OLS regressions where the relationship between the acquiring firm's total ESG score and arbitrage spread is examined, aligning with the methodology used by Arouri et al. (2019). The subsequent models extend this framework by disaggregating ESG into its three different components to determine whether any individual dimension has a stronger influence on arbitrage spreads than the aggregate measure. Following are all the mentioned OLS regressions:

$$Arbitrage\ Spread_{t+1} = \beta_0 + \beta_1 ESG_{Acquirer,\,i} + \beta_k Controls_i + \epsilon_i$$

$$Arbitrage\ Spread_{t+1} = \beta_0 + \beta_1 ENV_{Acquirer,\,i} + \beta_k Controls_i + \epsilon_i$$

$$Arbitrage\ Spread_{t+1} = \beta_0 + \beta_1 SOC_{Acquirer,\,i} + \beta_k Controls_i + \epsilon_i$$

$$Arbitrage\ Spread_{t+1} = \beta_0 + \beta_1 GOV_{Acquirer,\,i} + \beta_k Controls_i + \epsilon_i$$

Where Arbitrage Spread $_{t+1}$ is the dependent variable with $ESG_{Acquirier,\,i}$, $ENV_{Acquirer,\,i}$, $SOC_{Aquirier,\,i}$ and $GOV_{Aquirier,\,i}$ being the independent variables for each individual regression including $Controls_i$ representing all the control variables.

To mitigate potential endogeneity issues, control variables are used which in previous literature have been identified as significant determinants of arbitrage spreads. The collected data is processed and analyzed using STATA, where robustness checks are applied, including heteroscedasticity-consistent standard errors and multicollinearity diagnostics, to ensure the validity of the findings.

3.3.2 Robustness Test

In order to assess the results and enhance the robustness of the tests, a set of sensitivity analyses are made. The sensitivity analysis aims to reduce the impact of sample selection bias, outlier behavior, or time-specific anomalies. A set of different scenarios are used to investigate the impact on the different ESG variables and, in turn, their effect on arbitrage spread. The same method is used by Arouri et al. (2019), but solely including the changes in the aggregated ESG for acquirers. Each individual score will be examined through four sets of sensitivity analyses where each scenario is tested. The sensitivity tests include the exclusion of deals conducted during the COVID-19 pandemic period (2020–2021), the removal of observations with negative arbitrage spreads, and the exclusion of cross-industry deals to account for industry heterogeneity and variations in ESG disclosure practices. Additionally, regional analyses were performed by splitting the sample into European and North American firms to explore potential differences stemming from regulatory environments and market maturity. Each of these subsample regressions was re-estimated using the same control variables and model specifications applied in the main regressions.

According to Lins et al. (2017), who measured the performance of non-financial US firms during the financial crisis 2008 to 2009, financial effects of ESG engagement may be more salient during periods of increased uncertainty as firms with strong stakeholder engagement are better positioned to navigate crisis environments. Similarly, Manrique and Marti-Ballester (2017) also find that environmental performance positively impacts financial outcomes during crises. It is therefore possible that our results could be biased by particular behaviors characterizing periods of economic distress. To control for the potential distortion of results due to pandemic related activities, all observations from the years 2020 and 2021 are excluded and the model is re-estimated on the remaining sample. Furthermore, to be consistent with Arouri et al. (2019) is negative arbitrage spread excluded from the sample in order to isolate the effect of ESG on perceived deal risk more accurately. This is done because negative arbitrage spreads may be less intuitive to understand. In fact, they may arise from market speculation regarding possible bid revisions or expectations of competing offers, rather than reflecting genuine assessments of deal

completion risk. As such, they introduce an additional layer of noise that may obscure the underlying relationship between ESG score and arbitrage spread.

Moreover, may ESG-related financial outcomes vary by geographic region due to differing regulatory frameworks, market maturity as well as stakeholder expectations. Prior research suggests that ESG scores tend to have a stronger financial impact in developed markets, where regulatory structures and investor awareness of ESG issues are more established (Naeem et al., 2022). In order to explore these variations, the sample was divided into European and North American subsamples. This is also done to avoid getting affected by any sample bias, as the sample consists of a majority of North American firms (317 out of 408) which makes the baseline regression results heavily influenced by these markets, also shown in Table 7 in Appendix A. Lastly, the cross-industry deals were removed, as these deals involve firms with different reporting policies and may be subject to different regulations.

3.3.3 Conditions and Assumptions

For all conducted tests, a significance level at 5% is used to address whether the results are statistically reliable or not. To enhance the validity of the research and make the sample data suitable for the regression models, a couple of data adjustments and checks will be incorporated. Starting with the potential problem of outliers that could be included among the collected observations. These are important to handle since they could skew the result of the regressions. Outliers were mitigated by trimming all continuous variables. The reason why trimming is used instead of winsorizing, which is applied by for example Feng (2021), is that for this study it better addresses the potential influence of outliers that may represent noise, data irregularities, or non-representative market behavior. This is evident by comparing the OLS regression in Table 4 with the regression in Table 8 in Appendix B. The first one is where trimming is used shows a better adjusted R2 signaling a better fit then the regression with winsorized data supporting the choice to trim the data. This way, a more reliable relationship between ESG score and deal uncertainty can be researched.

OLS regressions rely on several assumptions in order to produce unbiased and efficient estimators according to Brooks (2019). These include, the errors have a mean of zero, the variance of the error term is constant i.e. the data is homoscedastic, the error terms are linearly independent of one another, and that there is no endogeneity. In order to make sure the data follows these assumptions and ensure the reliability of the results a series of tests were performed. Firstly, the residuals were checked for normality using kernel density plots and visually inspecting them. Following this, the data was checked for multicollinearity between the independent variables. This was assessed using a Variance Inflation Factor (VIF) test and by constructing a correlation heat map (Figure 3 in Appendix D). As shown in Table 15 in Appendix D, all VIF values were below three across all four regressions. This indicates that multicollinearity is not a concern, as none approached the threshold of ten used by Ozdemir et al. (2022). The correlation heat map further supports this, as no pairwise correlation did show any problematic correlations. Based on these tests, none of the chosen variables were excluded.

Moreover, the data was checked for heteroskedasticity and endogeneity. Heteroskedasticity was assessed through visual inspections of residuals plotted against independent variables, as well as conducting the Breusch-Pagan test to formally identify heteroskedasticity. The test resulted in p-values greater than 0.05, indicating no evidence of heteroscedasticity in the residuals. However, to ensure conservative inference and account for potential model misspecification, robust standard errors were applied for all OLS regressions. Endogeneity was addressed using a Two-Stage Least Squares (2SLS) regression model. The instruments used in the 2SLS regression are the mean industry ESG and mean nation ESG. This choice is based on the methodology of Ioannou and Serafeim (2012), which concluded that a firm's CSR is impacted by other firms' CSR performance within the same industry and country. Similar instruments are also used by both Cheng et al. (2014) and Gomes and Marsat (2018) in their respective methodology. These instruments are chosen under the assumption that firms operating within the same industry or national context are likely to share ESG characteristics due to common regulatory, cultural, and competitive environments, while these broader contextual variables are unlikely to be directly correlated with deal-specific arbitrage spread.

3.4 Method Discussion and Limitations

This study centers solely on acquirers' ESG score and does not include ESG characteristics for target firms. By not incorporating target firms' ESG score, this study may overlook critical factors affecting arbitrage spreads and deal success. Feng (2021) highlighted the importance of the target's ESG scores and how it can affect the post M&A ROA of the acquirer. High ESG targets for example have little effect on high ESG acquirers but may worsen outcomes for acquirers with lower ESG scores. The study underscores ESG compatibility between firms as a performance driver although it does not have any statistically significant effect on stock price changes. Related to this comes measurement inconsistencies in ESG data and disclosure standards over time. The continued changes in regulatory framework have been consistently enforced throughout the examined period (2014–2024), affecting the way companies report ESG and could have had an effect on the result. ESG scores from earlier years may not be directly comparable to more recent scores, even when derived from the same data provider. For instance, increased reporting obligations in later years may lead to a decrease in ESG scores despite actual improvements in sustainability practices, purely due to more rigorous assessment frameworks.

Limitations can also occur when using arbitrage spread as the only proxy for deal uncertainty. Even if Arouri et al. (2019) used arbitrage spread and found that ESG can lower perceived transaction risk, these effects are not entirely reflected in arbitrage spreads. Other factors, such as integration challenges, cultural mismatches, and regulatory approvals can play significant roles in deal completion but are not accounted for solely through arbitrage spreads. Thus, this study may miss broader sources of deal uncertainty by not incorporating the correct dependent variable or contributing control variables. Furthermore, the OLS regression can only confirm the included variables correlation, hence making it difficult to define these variables correctly. Although diagnostic tests and robustness checks are applied to address these concerns, the method remains sensitive to omitted variable bias and measurement error that could impose a risk. Lastly, OLS assumes that the impact of ESG is homogeneous across all firms, which may oversimplify the reality of heterogeneous effects across industries or deal types.

3.5 Use of Generative Artificial Intelligence

Generative artificial intelligence (AI) was used as a support resource throughout the thesis process. The AI tool that was used was ChatGPT, which was utilized to assist with construction of code in STATA and to provide suggestions regarding structure and academic formality. In line with the academic guidelines, AI was not used for any empirical analyses or to generate text. All data analysis, interpretations, and written material were produced solely by the authors.

4. Results and Findings

4.1 Descriptive Statistics

The descriptive statistics will start by providing an initial overview of the dependent, independent, and control variables that are included in this research. Four different tables will provide this initial overview before moving on to the results from the regressions. Starting with Table 3 below, where the total number of observations in the sample, after the conducted robustness tests, are 408. The arbitrage spread exhibits both positive values ranging from 0.56, -0.64. The mean equals to 0.08 meaning that the sample is slightly positively skewed. The standard deviation is at 0.12. The spread's range provides a useful indication of perceived transaction risk and supports the variable's use as a proxy for deal uncertainty.

Moving on to the different ESG scores, the aggregated ESG score has a mean equal to 56.57, a minimum value at 5.94 and a max value at 93.27. The standard deviation is 21.36 which is the lowest out of the different ESG scores. Compared to the environmental score where the mean is at 51.29, and the min and max values are 1.24 respectively 97.71, it is shown that there is a wider range of observations with the highest standard deviation at 26.97. The social score has a min at 5.77, a max at 97.73 providing a mean equal to 59.63 and a standard deviation at 24.54. Lastly, the governance score has a min at 1.18 and a max at 96.56. The mean equals 58.1 and the standard deviation is 22.41. The social and governance scores appear more evenly distributed, whereas environmental scores show a higher standard deviation as well as a lower mean.

Looking at the firm-specific control variables, the natural logarithm of market cap for the acquirer shows a mean at 9.47 with a standard deviation at 1.84. The acquirers included are therefore generally large-cap firms. The variation in size reflects a mix of established multinationals and mid-sized firms. Moving on to ROA with a min at -0.07, a max at 0.2, and a mean at 0.06 meaning that the ROA is generally positive among the acquiring firms. However, the standard deviation at 0.05 highlights that some firms are operating at slim or negative margins, pointing to varying levels of financial health.

Moreover the deal-specific control variables, the natural logarithm of deal value has a min at 2.44, a max at 10.48, and a mean at 6.87. This implies that targets included in this sample are generally valued lower than acquirers. Taking a look at the cross-country and cross-industry dummies, both have a mean lower than 0.5 implying that most deal announcements are between firms in the same industry and in the same country. The only market specific variable VIX has a min at 9.34, a max at 75.47, a mean at 17.8 and a standard deviation at 6.47. This wider range indicates that there have been times of turbulence along with times of more certainty.

Table 3: Descriptive Statistics of Included Variables.

Variable	Mean	Sd	Min	Max	Count
Arbitrage Spread	0,08	0,12	-0,64	0,56	408
ESG	56,57	21,36	5,94	93,27	408
Environmental	51,29	26,97	1,24	97,71	408
Social	59,63	24,54	5,77	97,73	408
Governance	58,1	22,41	1,18	96,56	408
Market Cap	9,47	1,84	5,26	14,74	408
Leverage	0,41	0,19	0,01	0,98	408
Deal Value	6,87	1,71	2,44	10,48	408
ROA	0,06	0,05	-0,07	0,2	408
Acquirer Age	86,53	73,26	4	660	408
Target Age	43,25	39,42	1	219	408
MTB	4,2	6,31	0,42	60,65	408
VIX	17,8	6,47	9,34	75,47	408
Bid Premium	0,54	0,53	-0,51	3,38	408
Cross Country	0,3	0,46	0	1	408
Cross Industry	0,19	0,39	0	1	408
Stock Deal	0,33	0,47	0	1	408
Multi Bid	0,05	0,21	0	1	408

Note: Table 3 displays descriptive statistics for the variables used in the analysis. The descriptive statistics consist of the mean, standard deviation, min, max and count for each specific variable.

For Table 6 in Appendix A, the number of deal announcements during the specified period are examined along with the average arbitrage spread and the separate ESG scores. Starting with the number of deal announcements which vary during the examined time period. The peak occurs in 2021 at 56 deals and in 2023 at 47 deals, along with dips during 2015 and 2020. The 2020 drop could potentially reflect the uncertainty introduced by the COVID-19 pandemic. This fluctuation during 2020 and 2021 is also reflected in Figure 1 below. After 2021, the fluctuations reduce, which could indicate some sort of regained market confidence post-pandemic. The average arbitrage spread also shows variation over the period, with the highest spreads recorded in 2020 at 0.42, and the lowest in 2015 at 0.07.

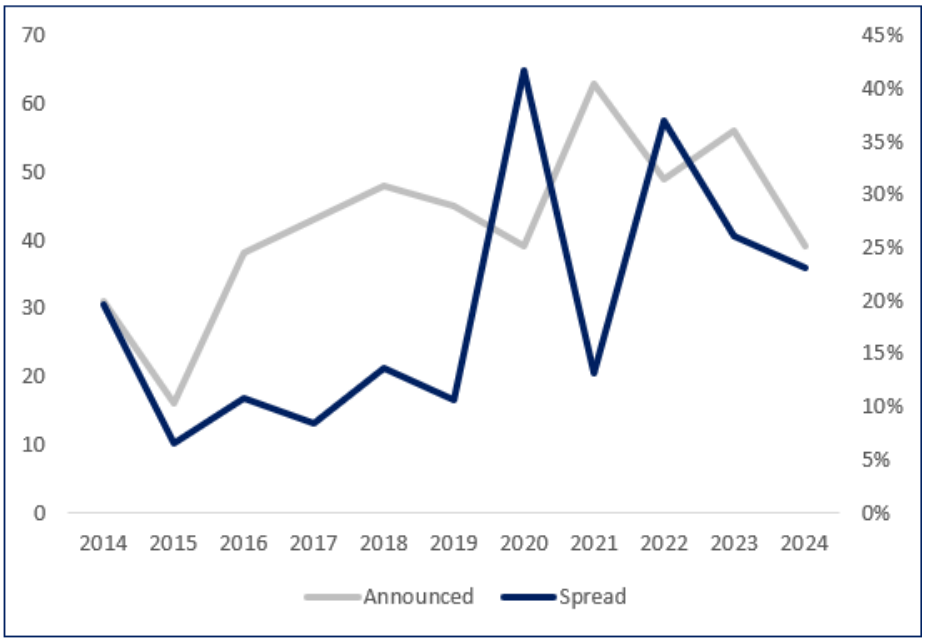

Figure 1: Number of Deals per Year and the Average Arbitrage Spread per Year.

Note: Figure 1 visualises the fluctuations of number of deals and the average arbitrage spread for the deals for each of the years in the dataset (2014-2024).

From 2014 to 2024, all the included ESG scores have slightly decreased illustrated in Figure 2, which highlights the evolution of ESG scores with each independent variable over the examined period. The social score remains the highest throughout which could reflect consistent corporate attention to social factors. In contrast, environmental scores show the most volatility and lowest overall. The aggregated ESG score and the governance score also fluctuate during the period, with noticeable changes during 2020 and 2021.

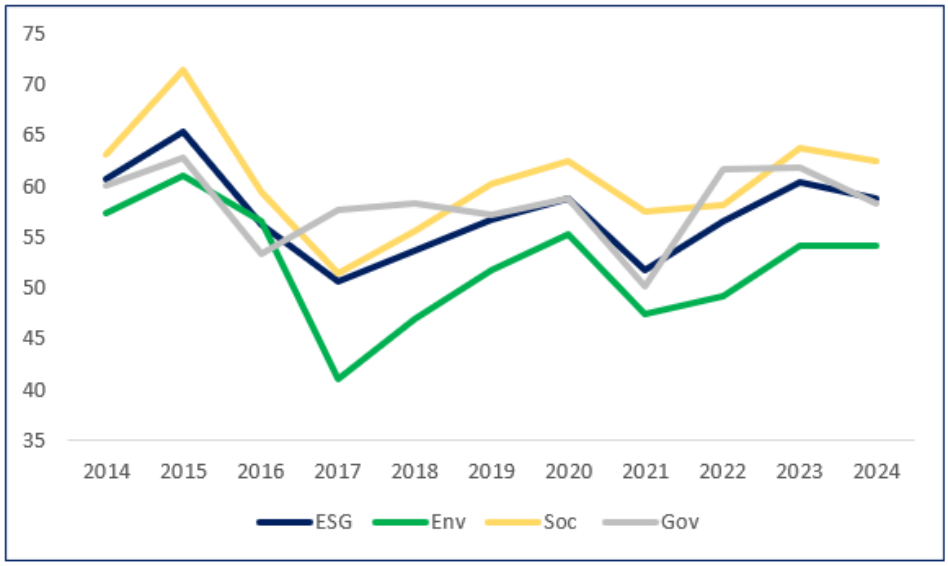

Figure 2: Overview of Each ESG Score During Examined Period.

Note: Figure 2 shows a graph of the average ESG, environmental, social and governance score each year for the acquirers in the dataset.

4.2 Multivariate Analysis

4.2.1 OLS Regression

The impact that the ESG scores on arbitrage spread will be analysed through five sets of regressions. Starting with Table 4 which presents the results from the OLS regressions where the dependent variable is arbitrage spread calculated one day after the announcement day of the bid. Regression (1) is using the aggregated ESG score as the main dependent variable and indicates no robust relationship between ESG score and arbitrage spread, with a negative non-significant coefficient (-0.00005). Similarly, in regression (2), the environmental score showed a negative coefficient (-0.00020), while the social score in regression (3) also exhibited a small negative coefficient (-0.00009). Both are statistically insignificant. In contrast, the governance score in regression (4) is positively correlated (0.00020) but not statistically significant. All four regressions gained an adjusted R2 of around 0.153 to 0.154, meaning that the included explanatory variables collectively explain approximately 15.3% to 15.4% of the variation in arbitrage spreads.

Among the control variables does ROA stand out as consistently negative and statistically significant at the 5% level across all four regressions. Indicating that more profitable acquiring firms are linked to a narrower arbitrage spread. Similarly, deal value is positively associated with arbitrage spread and reaches significance at the 5% level in each regression. The last variable that gained a significant coefficient was bid premium which shows a positive relationship with arbitrage spread at the 1% level in all regressions.

Table 4: OLS Regression on Arbitrage Spread as Dependent Variable.

	(1) ESG	(2) ENV	(3) SOC	(4) GOV
ESG	-0.00005			
	(0.00034)			
Environmental		-0.00020		
		(0.00026)		
Social			-0.00009	
			(0.00030)	
Governance				0.00020
				(0.00027)
Market Cap	-0.00107	0.00006	-0.00074	-0.00223
	(0.00512)	(0.00501)	(0.00509)	(0.00481)
MTB	0.00119	0.00115	0.00120	0.00127
	(0.00098)	(0.00098)	(0.00098)	(0.00098)
Leverage	0.00447	0.00411	0.00435	0.00905
	(0.03265)	(0.03241)	(0.03248)	(0.03284)
ROA	-0.34030**	-0.34941**	-0.33992**	-0.34008**
	(0.14327)	(0.14366)	(0.14322)	(0.14313)
Acquirer Age	0.00009	0.00010	0.00009	0.00008
	(0.00008)	(0.00008)	(0.00008)	(0.00008)
Target Age	0.00005	0.00004	0.00005	0.00004
	(0.00015)	(0.00015)	(0.00015)	(0.00015)
VIX	0.00048	0.00048	0.00048	0.00048
	(0.00087)	(0.00087)	(0.00087)	(0.00087)
Bid Premium	0.00093***	0.00094***	0.00093***	0.00093***
	(0.00011)	(0.00011)	(0.00011)	(0.00011)
Multi Bid	-0.00998	-0.00971	-0.01027	-0.01181
	(0.02665)	(0.02663)	(0.02665)	(0.02673)
Cross Country	-0.01360	-0.01199	-0.01345	-0.01449
	(0.01335)	(0.01340)	(0.01326)	(0.01320)
Cross Industry	-0.02624*	-0.02648*	-0.02636*	-0.02527*
	(0.01467)	(0.01463)	(0.01466)	(0.01466)
Deal Value	0.00935**	0.00969**	0.00943**	0.00936**
	(0.00437)	(0.00438)	(0.00437)	(0.00435)
Stock Deal	0.00452	0.00426	0.00416	0.00497
	(0.01489)	(0.01483)	(0.01494)	(0.01483)
Constant	-0.02042	-0.02633	-0.02144	-0.02561
	(0.03957)	(0.04030)	(0.03975)	(0.04016)
Observations	408	408	408	408
R^2	0.182	0.183	0.182	0.183
Adjusted R^2	0.153	0.154	0.153	0.154

Note: Table 4 presents OLS regressions with arbitrage spread as the dependent variable. This table presents the coefficients and robust standard errors from four independent regressions. (1) represents the regression with the aggregated ESG score as the independent variables along with control variables. Regression (2), (3) and (4) has environmental, governance and social scores as the independent variables respectively and the same control variables. The standard errors are presented in parentheses under the coefficients. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

4.2.2 Sensitivity Analysis

In order to validate the findings from the OLS regressions a series of sensitivity analyses has been conducted by excluding specific subset of data that may introduce bias or affect the stability of the results. These include the exclusion of deals announced during the COVID-19 period (2020 to 2021), transactions with negative arbitrage spreads, cross-industry transactions, and geographic splits between Europe and North America. Each regression is re-estimated across the four ESG scores. The output from the re-estimate is presented in Table 9-12 in Appendix B.

Comparing the baseline (1), to the no COVID sample (2), the results remain stable. The coefficients on the ESG scores and control variables show minimal variation with the same variables showing significance. This indicates that the pandemic period did not significantly distort the relationship between ESG and arbitrage spreads. However, the regression fit slightly improves, with R2 increasing from approximately 0.18 to 0.24 across all four ESG regressions. The exclusion of negative arbitrage spreads (3) also does not affect the direction or significance of the ESG score. The stock deal variable became significant at the 1% level with a positive coefficient in all regressions for scenario (3) and (5), meaning that arbitrage spread increases when the deal is a stock deal compared to cash deals. The explanatory power of the regression declines slightly compared to the no COVID sample, which is expected given the reduced variation in the dependent variable.

The no cross-industry regression (4) also supports the robustness of the findings. The exclusion of cross-industry deals does not alter the insignificance of ESG scores. Control variables such as bid premium and deal value remain consistently significant and directionally stable. Notably, ROA loses its significance compared to the baseline in all four regressions. Moving on and comparing regional subsamples, some notable differences emerge. In the North American sample (6), ROA becomes strongly significant at the 1% level across all ESG regressions, suggesting that firm profitability plays a more pronounced role in this market. Additionally, the governance score, while still insignificant, is slightly more negative in North America than in Europe, where it remains close to zero. The European sample (5) maintains consistency with the baseline in

terms of coefficient direction and significance, with bid premium and deal value continuing to explain much of the variation in arbitrage spread.

4.2.3 2SLS

To address the potential endogeneity of the ESG scores in the OLS regression, a 2SLS regression has been deployed. This method allows for more consistent estimation by using instrumental variables that are correlated with the endogenous regressors, ESG scores, but uncorrelated with the error term in the second stage regression. In the first stage, the mean industry and country level ESG were used as instruments.

The results from the 2SLS are presented in Table 13 in Appendix B and show that all instruments are strongly correlated with their respective endogenous variables. Across regressions (1), (3), (5), and (7), the coefficients are positive and statistically significant at the 1% level for the national mean score for ESG, environmental, social, and the industry governance mean score. While the variable for the mean industry environmental score and mean industry governance score is significant at the 5% level. This confirms the relevance of the instruments and validates their strength in predicting the ESG components at the firm level. In the second stage regressions (2), (4), (6) and (8), none of the instrumented ESG variables were significant in their effect on arbitrage spread. This aligns with the findings from the OLS regressions and further supports the results that ESG performance, whether measured in aggregate or through individual components, does not exhibit a robust relationship with arbitrage spread in M&A transactions. This result provides no evidence that endogeneity is biasing the OLS estimates in the baseline regressions.

5. Discussion

5.1 Result Discussion

Linking back to the beginning of the report, the intended aim of this study was to investigate the distinct effects of acquirers' overall ESG score, along with the effects of each individual score, on arbitrage spreads in M&A announcements. The research questions guiding the research proposal were “How does the acquiring firm's ESG scores influence arbitrage spreads in M&A transactions?”. From the sample selection and the conducted statistical tests, several observations can be made which are discussed below.

Starting with the results from the first OLS regression, neither the aggregated ESG score or the individual components showed any significant impact on arbitrage spread. Meaning that no statistical pattern could be observed, as a result the study fails to reject all four null hypotheses suggesting that aggregated ESG scores, as well as environmental, social, and governance scores individually, are not significantly related to arbitrage spreads in M&A transactions. This contradicts previous research that has shown a significant relationship between arbitrage spread and the different ESG variables. The result is further reinforced by the 2SLS regressions where the ESG variables stayed insignificant, even though the instruments gained significance in the first stage confirming their relevance in predicting ESG scores. These results suggest that while ESG may have long-term strategic value, it was not perceived by markets to mitigate short-term risks associated in M&A transactions, as mentioned by Deng et al. (2013) and Tampakoudis and Anagnostopoulou (2020). The lack of a significant second stage relationship in the 2SLS could also indicate that the instruments, while relevant, may not fully capture firm level ESG effects that drive uncertainty in M&A transactions.

From a theoretical perspective, the results challenge previous literature from Arouri et al. (2019), who presented a significant relation between ESG and arbitrage spread. The contrasting results could be partly explained by the stakeholder vs shareholder perspective presented by Freeman (1984). Previous literature better align with the stakeholder perspective suggesting that better stakeholder relations, in this case a higher ESG score could potentially reduce uncertainty and

thereby narrowing arbitrage spreads. Instead, the results presented in this study may be more consistent with the shareholder perspective, where ESG efforts are viewed as non-essential costs for the company unless they clearly add value in some way. Adding to this discussion is Starks' (2023) perspective on different motivations behind ESG reporting, where some companies see it as "value" enhancing which focuses on the financial impact it can have. While other companies focus on the "values", meaning the ethical effects ESG can produce. In this scenario, the "value" focus could be dominant among the sample selection, making the ESG variables insignificant.

Another explanation could be the timing between ESG disclosures and deal announcements. While ESG improvements often lead to long-term reputational and operational benefits as shown by Eccles et al. (2014), arbitrage spread could be more influenced by short-term market perceptions and deal-specific risks. These short-term factors may overshadow the long-term value creation of ESG. This is supported by the EMH presented by Fama (1970), which explains that information is asymmetrically distributed, thus preventing the arbitrage spread to depict the true risks associated with it. Another final aspect that could explain the lack of significant results is the lack of standardized ESG measures within firms. This could motivate managers in acquiring firms to make arbitrary judgements to influence the companies performance, something that both Aktas et al. (2009) and Ferral et al. (2016) also discussed.

Moving on to the control variables where some showed significant results including ROA, bid premium and deal value. This could suggest that firm, market, and deal-specific variables continue to play a dominant role in explaining arbitrage spreads, potentially outweighing the influence of non-financial conditions such as ESG scores in the short-term context of M&A announcements. Higher ROA could in this case signal strong operational efficiency and financial stability that could lower the perceived risk of deal failure and hence reduce the arbitrage spread. The importance of firm-specific factors is consistent with the findings of Jetley and Ji (2010) and Branch and Wang (2008) who both highlight market reactions to financial variables within companies.

Deal value is another variable that becomes significant in the OLS regression with a positive coefficient, meaning that it increases the arbitrage spread. Branch and Wang (2008) got contrasting results and emphasized that larger deals generally attract more investor scrutiny and

therefore potentially reducing the information asymmetry. Reasons why deal value is positive could stem from managers in the target firm that try to increase the deal value discussed by Ferrel (2016). This selfish act could potentially increase the uncertainty surrounding the deal and therefore increase the arbitrage spread during M&A announcements.

Looking at bid premiums, reflecting the acquiring firm's willingness to pay above market value for the target, often interpreted as a signal of deal confidence or competition. This variable became positive, suggesting that arbitrage spread increases due to it. Prior study by Branch and Wang (2008), found that deals with high bid premiums tend to exhibit narrower spreads due to perceived certainty and bidder commitment, therefore contrasting the results in this research. This could be explained by the signaling theory presented by Spence (1973), since higher bid premiums could in this case signal more competition, causing the uncertainty to increase which widens the gap of the arbitrage spread.

The sensitivity analysis was conducted to test the robustness of the OLS regression and aims to examine whether the core relationship between companies ESG scores and arbitrage spread remains consistent under different conditions. The exclusion of deals occurring during the COVID-19 pandemic was done to control for potential distortions caused by economic distress. According to Lins et al. (2017), ESG engagement can have a more pronounced financial effect during times of heightened uncertainty. This financial effect is further supported by Manrique and Marti-Ballester (2017) findings where they showed that environmental performance has a particularly positive effect on financial outcomes during financial crises. All the coefficients for the ESG variables increased in magnitude following the exclusion, although remaining statistically insignificant. Meaning that the ESG scores effects on arbitrage spread appeared not to be influenced by the COVID-19 crisis. This contradicts the findings of Lins et al. (2017) and Manrique and Marti-Ballester (2017) who found significant relationships when comparing times of crisis with normal conditions. The divergence could be because they focus on stock returns, capturing broader investment sentiment, while this study examines arbitrage spread which is more deal-specific and short-term. Differences in short-term and long-term effects makes it relevant to add that time horizons could play an important role. The significance of this factor is highlighted through research by Deng et al. (2013), who found that ESG could improve long

term performance for acquirors after M&A deals. However, the re-estimated result stayed consistent with the main findings, suggesting that pandemic induced market dynamics did not have any significant effect on ESG scores relationship with arbitrage spread.

Similarly, transactions with negative arbitrage spread were excluded to isolate the effects of ESG on perceived deal risks. This is because negative spreads may occur from market speculation regarding bid revisions or competing offers rather than actual assessment of deal completion risk, according to Arouri et al. (2019). Upon re-estimation, the ESG variables remained insignificant which reinforces the main OLS regression results. Notably, the variable for stock deal gained significance at the 1% level with a positive coefficient across all four regressions when no negative spreads were included and for observations in Europe. These results are similar to the results by Jetley and Ji, (2010), who found that cash deals are associated with less arbitrage spread as they are seen as more stable. The result also aligns with results from Branch and Yang (2003) who found that cash deals can signal higher acquirer confidence. Using cash as a positive signal further connects with the signaling theory by Spence (1973), suggesting that credible signals reduce information asymmetry between parties and could lower uncertainty. In this context, offering cash may serve as a strong signal of deal certainty and thus contributing to a narrower arbitrage spread.

Geographical sensitivity was explored by splitting the sample into European and North American subsamples to account for differences in regulatory frameworks, market maturity and stakeholder expectations. Prior research, such as Naeem et al. (2022), suggest that ESG impacts could be stronger in more developed markets, meaning that the ESG scores effects might differ depending on the country the acquirer or target operates in. Despite this, the ESG scores remained insignificant across both regions. The sample separation revealed that ROA became strongly significant at the 1% level across all four regressions for the North American subsample with a negative coefficient while being non significant in the European sample. This highlights that profitability has a stronger effect on arbitrage spread in North America than in Europe and that the main findings are influenced by the North American observations. This persistence of ROAs significance but insignificance of the ESG scores can be linked with the shareholder perspective

by Friedman (1970), where he mentions that financial fundamentals, ROA in this case, outweigh broader non financial stakeholder considerations, such as ESG measures.

The sensitivity analysis can be understood through theories like stakeholder perspective and signaling theory that help explain some market behaviors particularly regarding control variables like stock deals and ROA, but do not find empirical support for ESG's role in reducing deal risk. Despite literature suggesting that ESG can lower information asymmetry (Lu & Chueh, 2015; Cui et al., 2018) and serve as a positive signal (Arouri et al., 2019; Tampakoudis & Anagnostopoulou, 2020), the results consistently show ESG factors were not significantly priced into M&A deal risk during the sample period. Other factors such as market skepticism about the impact of ESG, inconsistent reporting standards, and varying investor priorities could explain why the ESG scores did not show significant effects. Overall, the sensitivity analysis reinforced the initial results of the OLS regression that ESG scores are not a key determinant of arbitrage spreads in M&A transactions during the examined period between 2014 and 2024.

5.2 Academical and Practical Implications

Given the purpose which was to investigate the distinct effects of acquirers aggregated and disaggregated ESG scores on arbitrage spread, this study extends prior research by explicitly separating the effects of the environmental, social, and governance scores and by employing robustness checks, including 2SLS estimation to address potential endogeneity concerns. For an academic viewpoint, this provides a more nuanced understanding of areas within ESG that could affect arbitrage spread and market uncertainties. It also complements findings from Arouri et al. (2019) by distinguishing the different implications the ESG scores have had in recent years through a subset of scenarios in the sensitivity analysis. Certain academic implications from the results is the distinction between short-term market reactions and long-term value when researching the different ESG and their impact on firm performance, something that Eccles et al. (2014) also highlights.

This mismatch between short-term and long-term market reactions could also become more relevant for practitioners in the coming years. As ESG reporting is becoming more standardized and mandatory in the future, emphasized in reports from PwC (2025), companies could be forced

to put more resources into this sort of reporting and thus increasing its impact on the overall performance of the company. Considering the research question from this report focusing on how acquiring firm's ESG scores influence arbitrage spreads in M&A transactions, along with earlier findings from Arouri et al. (2019) where the ESG score had an significant impact on arbitrage spread, companies could therefore apply a more forward looking strategy when it comes to ESG performance. This would make it easier to align with future regulatory changes that can have an effect on a company's performance.

5.3 Limitations and Future Research

Looking at the different limitations that this study could have encountered, one is the different measurement constraints. Given that none of the conducted regressions showed a significant relationship between arbitrage spread and the ESG scores, the lack of standardized measures could be the explanation. Similar results are presented by Tsang et al. (2020), who emphasize the choice of ESG measures when investigating the effects of ESG performance on firm value. ESG reporting is largely voluntary and can vary in both scope and depth, depending on how much information each firm chooses to disclose. This raises concerns about reporting bias and the risk of greenwashing, which may distort the reliability of ESG scores. This study relies on Thomson Reuters ASSET4 ESG Research Data to estimate companies ESG scores and even though it is widely recognized as reliable, inconsistent measurement risks cannot completely be mitigated. Adding to the measure inconsistencies is information asymmetry, which can affect the reliability of different measures and hence reduce the robustness. If some firms disclose less ESG information or report selectively, it can affect the comparability and consistency of the data. This concern is also noted by Arouri et al. (2019), who emphasised that limited transparency in ESG disclosures can make benchmarking between the samples less reliable.

Another limitation is that Market-based variables such as the arbitrage spread may also be inherently noisy and potentially influenced by management behavior. Agency problems could be one of the risks that could influence these variables, as discussed by Jensen and Meckling (1976), where managers may act in their own interests rather than those of shareholders. In the context of ESG, Ferrell et al. (2016) emphasize that CSR efforts can sometimes be driven by

managerial entrenchment, where executives pursue ESG initiatives not to create value, but to build personal reputation or hide underperformance in the core business. Aktas et al. (2011) compliments this view by highlighting that overconfident managers are more likely to engage in serial acquisitions and ESG signaling as a way to justify expansion strategies which may increase perceived risk rather than reduce it. In such cases, arbitrage spreads may widen despite strong ESG scores, making the results from the regressions in this study less robust and more difficult to interpret.

While the findings of this study are limited in statistical strength, they align with a body of literature that emphasizes the methodological complexity of capturing the ESG scores' financial effects. As discussed in Section 3.3.4, one important limitation is the study's exclusive focus on acquirers' ESG scores, leaving out the target firms' ESG score. Prior research from Feng (2021), shows that ESG compatibility between acquirer and target plays a crucial role in post-M&A performance. Similarly, found Tampakoudis and Anagnostopoulou (2020) that acquirers that merge with targets with superior ESG score tend to experience an increase in post-merger market value. Given this evidence, could future research expand on this study by including target ESG scores to offer deeper understanding of ESGs role in deal uncertainty and completion likelihood. By investigating the interaction between acquirer and target ESG scores, arbitrage spreads could further clarify how ESG scores affect the uncertainty within M&A deals.

With the introduction of more extensive ESG reporting regulation, such as the EUs corporate sustainability reporting directive (PwC, 2025), it will become increasingly important for firms to report ESG in a standardized and transparent way. Consequently, future research can focus on comparing periods before and after the implementation of mandatory ESG reporting in order to investigate whether the relationship between ESG scores and arbitrage spread changes. This would provide more insight into whether the market begins to price ESG scores more efficiently once reporting standards are harmonized between firms and industries.

6. Conclusion

This study has examined whether an acquiring firm's ESG score, both in its aggregated form and disaggregated into environmental, social, and governance components, has an impact on arbitrage spreads in M&A announcements. Drawing on previous research, the study aimed to explore if stronger ESG scores could reduce arbitrage spreads and thereby signal lower uncertainty surrounding the deal. This was assessed through four hypotheses, one testing the aggregated ESG score, stating that "*Higher aggregated ESG scores for the acquirer firm is negatively correlated with arbitrage spread and consequently reduces deal uncertainty"* and three testing the individual ESG components.

The multivariate regression analysis did not provide statistically significant support for the hypothesis that ESG scores, either aggregated or disaggregated, have a significant measurable effect on arbitrage spread. As a result, none of the four null hypotheses can be rejected. Several explanations may account for the absence of significant results. These include a potential mismatch in time horizons, the lack of standardization in ESG measurement, the omission of target firms' ESG scores, and that arbitrage spread only captures a portion of total deal risk. However, several control variables were found to significantly influence arbitrage spreads, including ROA, bid premium, deal value, and cross-industry deals. This suggests that firm-specific and deal-specific financial factors play a dominant role in shaping market perceptions of M&A deal success.

In conclusion, while ESG score may have theoretical appeal and long-term strategic relevance in M&A contexts, this study finds limited empirical support for its immediate impact on arbitrage spreads, highlighting the difficulties to capture the financial impact of ESG score. These findings reinforce the conclusion that traditional financial indicators are more relevant than non-financial ESG scores in determining short-term deal uncertainty captured by arbitrage spread.

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Appendix

Appendix A: Descriptive Statistics

Table 5: Number of Companies in each Industry.

Industry Name	Number of Companies
Materials	41
Healthcare	84
Financials	80
Media and Entertainment	5
High Technology	43
Energy and Power	40
Industrials	40
Retail	20
Consumer Products and Services	14
Consumer Staples	10
Real Estate	22
Telecommunications	9

Note: Table 5 highlights how many companies there are in each industry for the initial dataset before trimming.

Table 6: Number of Deals per Year and Averages.

Year	Number of Deal Announced	Average Arbitrage Spread	ESG	Env	Soc	Gov
2014	27	0,20	60,6	57,3	63,1	60,0
2015	16	0,07	65,3	61,0	71,5	62,8
2016	34	0,11	56,2	56,6	59,4	53,3
2017	38	0,08	50,5	41,1	51,4	57,6
2018	40	0,14	53,6	46,9	55,6	58,3
2019	41	0,11	56,7	51,7	60,2	57,1
2020	36	0,42	58,8	55,2	62,3	58,7
2021	56	0,13	51,7	47,3	57,4	50,2
2022	42	0,37	56,5	49,2	58,2	61,7
2023	47	0,26	60,4	54,1	63,7	61,7
2024	31	0,23	58,7	54,1	62,5	58,2

Note: Table 6 consists of the number of deals for each specific year between 2014 and 2024. Besides the number of deals are the averages of arbitrage spread, aggregated ESG score and disaggregated components displayed for each year.

Table 7: Distribution of Deals by Country.

Acquirer Nation	Freq.	Percent	Cum.
Austria	1	0,21	0,21
Belgium	2	0,43	0,64
Canada	58	12,42	13,06
Denmark	4	0,86	13,92
Faroe Islands	1	0,21	14,13
Finland	2	0,43	14,56
France	19	4,07	18,63
Germany	14	3	21,63
Guernsey	1	0,21	21,84
Ireland	4	0,86	22,7
Italy	2	0,43	23,13
Netherlands	7	1,5	24,63
Norway	2	0,43	25,06
Poland	1	0,21	25,27
Spain	4	0,86	26,13
Sweden	8	1,71	27,84
Switzerland	10	2,14	29,98
United Kingdom	23	4,93	34,91
United States	304	65,1	100

Note: Table 7 shows the distribution of deals made in each country.

Appendix B: Regressions

Table 8: OLS Regression on Arbitrage Spread with Winsorization.

	(1) ESG	(2) ENV	(3) SOC	(4) GOV
ESG	-0.00124			
	(0.00183)			
Environmental		-0.00087		
		(0.00144)		
Social			-0.00129	
			(0.00162)	
Governance				-0.00093
				(0.00143)
Market Cap	0.00836	0.00725	0.00921	0.00506
	(0.02532)	(0.02510)	(0.02519)	(0.02395)
MTB	-0.00193	-0.00188	-0.00184	-0.00201
	(0.00371)	(0.00371)	(0.00371)	(0.00373)
Leverage	-0.14783	-0.14147	-0.14528	-0.15062
	(0.15338)	(0.15322)	(0.15320)	(0.15368)
ROA	0.42117	0.39069	0.42370	0.42816
	(0.66170)	(0.66059)	(0.66142)	(0.66259)
Acquirer Age	0.00018	0.00019	0.00018	0.00015
	(0.00046)	(0.00046)	(0.00046)	(0.00046)
Target Age	0.00106	0.00105	0.00104	0.00110
	(0.00082)	(0.00082)	(0.00082)	(0.00082)
VIX	0.00021	0.00028	0.00029	0.00013
	(0.00484)	(0.00485)	(0.00484)	(0.00484)
Bid Premium	0.00278***	0.00279***	0.00279***	0.00277***
	(0.00042)	(0.00042)	(0.00042)	(0.00042)
Multi Bid	-0.11525	-0.11522	-0.12096	-0.10929
	(0.14984)	(0.14985)	(0.14993)	(0.15020)
Cross Country	-0.05052	-0.05068	-0.05125	-0.05559
	(0.07276)	(0.07301)	(0.07232)	(0.07187)
Cross Industry	0.17088**	0.17344**	0.16994**	0.17152**
	(0.07652)	(0.07633)	(0.07652)	(0.07647)
Deal Value	0.02950	0.02975	0.03015	0.02799
	(0.02228)	(0.02235)	(0.02233)	(0.02221)
Stock Deal	0.21402***	0.21649***	0.21027***	0.21784***
	(0.07953)	(0.07940)	(0.07986)	(0.07939)
Constant	-0.30640	-0.32769	-0.31259	-0.27694
	(0.20336)	(0.20731)	(0.20360)	(0.20731)
Observations	467	467	467	467
R^2	0.123	0.123	0.124	0.123
Adjusted R^2	0.096	0.096	0.097	0.096

Note: OLS regression with arbitrage spread as the dependent variable with winsorized continuous variables. This table presents the coefficients and robust standard errors from four independent regressions. (1) represents the regression with the aggregated ESG score as the independent variables along with control variables. Regression (2), (3) and (4) has environmental, governance and social scores as the independent variables respectively and the same control variables. The standard errors are presented in parentheses under the coefficients. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 9: OLS Sensitivity Analysis: ESG and Arbitrage Spread.

	(1) Baseline	(2) No COVID	(3) No Neg Spread	(4) No Cross-Ind.	(5) Europe	(6) North America
ESG	-0.00005	0.00012	-0.00004	-0.00047	0.00012	-0.00011
	(0.00034)	(0.00034)	(0.00030)	(0.00043)	(0.00097)	(0.00038)
Market Cap	-0.00107	-0.00589	0.00043	-0.00005	-0.00311	-0.00128
	(0.00512)	(0.00487)	(0.00440)	(0.00602)	(0.01524)	(0.00567)
MTB	0.00119	0.00065	0.00124	0.00097	0.00194	0.00159
	(0.00098)	(0.00122)	(0.00081)	(0.00104)	(0.00263)	(0.00110)
Leverage	0.00447	0.01996	-0.00432	-0.01277	0.04624	-0.00086
	(0.03265)	(0.03456)	(0.02793)	(0.03798)	(0.08847)	(0.03580)
ROA	-0.34030**	-0.29565**	-0.24549**	-0.33019**	0.16207	-0.49674***
	(0.14327)	(0.14864)	(0.12406)	(0.16586)	(0.33511)	(0.16157)
Acquirer Age	0.00009	0.00006	0.00004	0.00013	-0.00005	0.00015
	(0.00008)	(0.00008)	(0.00007)	(0.00011)	(0.00013)	(0.00013)
Target Age	0.00005	-0.00003	0.00005	-0.00000	-0.00012	0.00009
	(0.00015)	(0.00015)	(0.00014)	(0.00017)	(0.00034)	(0.00018)
VIX	0.00048	0.00027	0.00065	0.00021	0.00057	0.00058
	(0.00087)	(0.00107)	(0.00074)	(0.00099)	(0.00251)	(0.00093)
Bid Premium	0.00093***	0.00097***	0.00063***	0.00093***	0.00100***	0.00092***
	(0.00011)	(0.00011)	(0.00010)	(0.00012)	(0.00032)	(0.00012)
Multi Bid	-0.00998	-0.02177	-0.00110	-0.01610	0.06797	-0.02167
	(0.02665)	(0.02451)	(0.02355)	(0.03067)	(0.07779)	(0.02846)
Cross Country	-0.01360	-0.02322*	-0.00474	-0.01113	0.07540	-0.02331
	(0.01335)	(0.01332)	(0.01164)	(0.01590)	(0.04648)	(0.01767)
Cross Industry	-0.02624*	-0.02825*	-0.02480**		0.00519	-0.03327*
	(0.01467)	(0.01442)	(0.01258)		(0.03481)	(0.01703)
Deal Value	0.00935**	0.01104***	0.00633*	0.01190**	0.02061*	0.00754
	(0.00437)	(0.00418)	(0.00377)	(0.00494)	(0.01160)	(0.00487)
Stock Deal	0.00452	-0.01202	0.03474***	0.00079	0.13847***	-0.01575
	(0.01489)	(0.01497)	(0.01313)	(0.01654)	(0.04808)	(0.01613)
Constant	-0.02042	0.01076	0.00736	-0.01151	-0.22544**	0.00986
	(0.03957)	(0.04210)	(0.03399)	(0.04484)	(0.10865)	(0.04395)
R-squared	0.18177	0.24574	0.16248	0.17538	0.26539	0.21272
Observations	408	316	362	331	90	317

Note: This table presents coefficients and robust standard errors (in parentheses) from six different regressions, where arbitrage spread is the dependent variable and ESG is the key explanatory variable of interest. Regression (1) presents the baseline regression with all control variables included. Regression (2) excludes deals announced during the COVID period. Regression (3) excludes transactions with negative arbitrage spreads. Regression (4) removes cross-industry deals to test for industry specific effects. Regression (5) focuses solely on deals in Europe. Regression (6) is restricted to deals in North America. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 10: OLS Sensitivity Analysis: Environmental and Arbitrage Spread.

	(1) Baseline	(2) No COVID	(3) No Neg Spread	(4) No Cross-Ind.	(5) Europe	(6) North America
Environmental	-0.00020	-0.00012	-0.00004	-0.00045	-0.00046	-0.00012
	(0.00026)	(0.00026)	(0.00024)	(0.00032)	(0.00087)	(0.00029)
Market Cap	0.00006	-0.00448	0.00045	0.00014	0.00118	-0.00108
	(0.00501)	(0.00477)	(0.00430)	(0.00581)	(0.01456)	(0.00555)
MTB	0.00115	0.00070	0.00124	0.00092	0.00194	0.00159
	(0.00098)	(0.00121)	(0.00081)	(0.00104)	(0.00259)	(0.00110)
Leverage	0.00411	0.01589	-0.00407	-0.00856	0.06173	-0.00022
	(0.03241)	(0.03427)	(0.02768)	(0.03777)	(0.09179)	(0.03561)
ROA	-0.34941**	-0.30871**	-0.24691**	-0.34543**	0.13057	-0.50249***
	(0.14366)	(0.14942)	(0.12449)	(0.16609)	(0.33486)	(0.16184)
Acquirer Age	0.00010	0.00007	0.00004	0.00014	-0.00005	0.00015
	(0.00008)	(0.00008)	(0.00008)	(0.00011)	(0.00013)	(0.00013)
Target Age	0.00004	-0.00004	0.00005	-0.00001	-0.00014	0.00009
	(0.00015)	(0.00015)	(0.00014)	(0.00017)	(0.00034)	(0.00018)
VIX	0.00048	0.00029	0.00065	0.00019	0.00048	0.00060
	(0.00087)	(0.00107)	(0.00074)	(0.00099)	(0.00251)	(0.00093)
Bid Premium	0.00094***	0.00098***	0.00063***	0.00094***	0.00100***	0.00092***
	(0.00011)	(0.00011)	(0.00010)	(0.00012)	(0.00032)	(0.00012)
Multi Bid	-0.00971	-0.02110	-0.00112	-0.01692	0.06986	-0.02163
	(0.02663)	(0.02450)	(0.02355)	(0.03061)	(0.07768)	(0.02845)
Cross Country	-0.01199	-0.02106	-0.00465	-0.00932	0.06855	-0.02300
	(0.01340)	(0.01335)	(0.01167)	(0.01597)	(0.04773)	(0.01769)
Cross Industry	-0.02648*	-0.02885**	-0.02474**		0.00878	-0.03316*
	(0.01463)	(0.01441)	(0.01258)		(0.03466)	(0.01697)
Deal Value	0.00969**	0.01141***	0.00637*	0.01238**	0.02115*	0.00767
	(0.00438)	(0.00419)	(0.00379)	(0.00496)	(0.01160)	(0.00489)
Stock Deal	0.00426	-0.01292	0.03476***	0.00197	0.13290***	-0.01554
	(0.01483)	(0.01491)	(0.01309)	(0.01644)	(0.04873)	(0.01610)
Constant	-0.02633	0.00846	0.00651	-0.02242	-0.22721**	0.00626
	(0.04030)	(0.04243)	(0.03472)	(0.04587)	(0.10819)	(0.04522)
R-squared	0.18297	0.24597	0.16250	0.17754	0.26800	0.21296
Observations	408	316	362	331	90	317

Note: This table presents coefficients and robust standard errors (in parentheses) from six different regressions, where arbitrage spread is the dependent variable and environmental score as the key explanatory variable of interest. Regression (1) presents the baseline regression with all control variables included. Regression (2) excludes deals announced during the COVID period. Regression (3) excludes transactions with negative arbitrage spreads. Regression (4) removes cross-industry deals to test for industry specific effects. Regression (5) focuses solely on deals in Europe. Regression (6) is restricted to deals in North America. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 11: OLS Sensitivity Analysis: Social and Arbitrage Spread.

	(1) Baseline	(2) No COVID	(3) No Neg Spread	(4) No Cross-Ind.	(5) Europe	(6) North America
Social	-0.00009	-0.00005	-0.00009	-0.00032	-0.00006	-0.00013
	(0.00030)	(0.00029)	(0.00026)	(0.00037)	(0.00095)	(0.00034)
Market Cap	-0.00074	-0.00491	0.00081	-0.00082	-0.00159	-0.00105
	(0.00509)	(0.00483)	(0.00436)	(0.00599)	(0.01588)	(0.00565)
MTB	0.00120	0.00071	0.00125	0.00106	0.00203	0.00160
	(0.00098)	(0.00122)	(0.00081)	(0.00104)	(0.00268)	(0.00110)
Leverage	0.00435	0.01694	-0.00457	-0.01084	0.04811	-0.00019
	(0.03248)	(0.03438)	(0.02772)	(0.03792)	(0.08850)	(0.03561)
ROA	-0.33992**	-0.30057**	-0.24425**	-0.32913**	0.15373	-0.49483***
	(0.14322)	(0.14830)	(0.12407)	(0.16599)	(0.33451)	(0.16169)
Acquirer Age	0.00009	0.00007	0.00004	0.00013	-0.00005	0.00015
	(0.00008)	(0.00008)	(0.00007)	(0.00011)	(0.00013)	(0.00013)
Target Age	0.00005	-0.00004	0.00005	-0.00001	-0.00012	0.00009
	(0.00015)	(0.00015)	(0.00014)	(0.00017)	(0.00034)	(0.00018)
VIX	0.00048	0.00028	0.00065	0.00019	0.00059	0.00059
	(0.00087)	(0.00107)	(0.00074)	(0.00099)	(0.00251)	(0.00093)
Bid Premium	0.00093***	0.00097***	0.00063***	0.00093***	0.00099***	0.00092***
	(0.00011)	(0.00011)	(0.00010)	(0.00012)	(0.00033)	(0.00012)
Multi Bid	-0.01027	-0.02152	-0.00135	-0.01753	0.06835	-0.02209
	(0.02665)	(0.02450)	(0.02355)	(0.03068)	(0.07777)	(0.02845)
Cross Country	-0.01345	-0.02198*	-0.00449	-0.01287	0.07456	-0.02376
	(0.01326)	(0.01321)	(0.01159)	(0.01573)	(0.04655)	(0.01766)
Cross Industry	-0.02636*	-0.02873**	-0.02490**		0.00618	-0.03334*
	(0.01466)	(0.01443)	(0.01258)		(0.03455)	(0.01701)
Deal Value	0.00943**	0.01125***	0.00644*	0.01195**	0.02066*	0.00759
	(0.00437)	(0.00419)	(0.00378)	(0.00495)	(0.01159)	(0.00487)
Stock Deal	0.00416	-0.01289	0.03438***	0.00071	0.13780***	-0.01606
	(0.01494)	(0.01501)	(0.01314)	(0.01662)	(0.04793)	(0.01617)
Constant	-0.02144	0.01067	0.00615	-0.01250	-0.22712**	0.00839
	(0.03975)	(0.04213)	(0.03418)	(0.04517)	(0.10897)	(0.04427)
R-squared	0.18192	0.24550	0.16274	0.17405	0.26530	0.21290
Observations	408	316	362	331	90	317

Note: This table presents coefficients and robust standard errors (in parentheses) from six different regressions, where arbitrage spread is the dependent variable and social score as the key explanatory variable of interest. Regression (1) presents the baseline regression with all control variables included. Regression (2) excludes deals announced during the COVID period. Regression (3) excludes transactions with negative arbitrage spreads. Regression (4) removes cross-industry deals to test for industry specific effects. Regression (5) focuses solely on deals in Europe. Regression (6) is restricted to deals in North America. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 12: OLS Sensitivity Analysis: Governance and Arbitrage Spread.

	(1) Baseline	(2) No COVID	(3) No Neg Spread	(4) No Cross-Ind.	(5) Europe	(6) North America
Governance	0.00020	0.00039	0.00002	-0.00017	0.00048	0.00007
	(0.00027)	(0.00026)	(0.00024)	(0.00032)	(0.00063)	(0.00030)
Market Cap	-0.00223	-0.00688	0.00010	-0.00231	-0.00548	-0.00229
	(0.00481)	(0.00462)	(0.00414)	(0.00558)	(0.01376)	(0.00526)
MTB	0.00127	0.00066	0.00126	0.00099	0.00176	0.00166
	(0.00098)	(0.00121)	(0.00081)	(0.00104)	(0.00260)	(0.00111)
Leverage	0.00905	0.02585	-0.00332	-0.01134	0.04946	0.00169
	(0.03284)	(0.03434)	(0.02809)	(0.03818)	(0.08761)	(0.03615)
ROA	-0.34008**	-0.28662*	-0.24529**	-0.32604*	0.18533	-0.49997***
	(0.14313)	(0.14795)	(0.12405)	(0.16613)	(0.33272)	(0.16175)
Acquirer Age	0.00008	0.00007	0.00004	0.00012	-0.00003	0.00014
	(0.00008)	(0.00008)	(0.00007)	(0.00011)	(0.00013)	(0.00013)
Target Age	0.00004	-0.00005	0.00005	0.00000	-0.00011	0.00009
	(0.00015)	(0.00015)	(0.00014)	(0.00017)	(0.00034)	(0.00018)
VIX	0.00048	0.00022	0.00065	0.00016	0.00041	0.00059
	(0.00087)	(0.00106)	(0.00074)	(0.00099)	(0.00251)	(0.00093)
Bid Premium	0.00093***	0.00098***	0.00063***	0.00092***	0.00100***	0.00092***
	(0.00011)	(0.00011)	(0.00010)	(0.00012)	(0.00032)	(0.00012)
Multi Bid	-0.01181	-0.02520	-0.00125	-0.01582	0.06529	-0.02246
	(0.02673)	(0.02454)	(0.02359)	(0.03081)	(0.07756)	(0.02855)
Cross Country	-0.01449	-0.02389*	-0.00497	-0.01490	0.07488	-0.02367
	(0.01320)	(0.01307)	(0.01153)	(0.01547)	(0.04611)	(0.01766)
Cross Industry	-0.02527*	-0.02769*	-0.02470*		0.00325	-0.03250*
	(0.01466)	(0.01436)	(0.01258)		(0.03434)	(0.01700)
Deal Value	0.00936**	0.01137***	0.00629*	0.01148**	0.02016*	0.00749
	(0.00435)	(0.00415)	(0.00375)	(0.00494)	(0.01156)	(0.00486)
Stock Deal	0.00497	-0.01172	0.03492***	0.00241	0.14013***	-0.01547
	(0.01483)	(0.01485)	(0.01307)	(0.01649)	(0.04778)	(0.01610)
Constant	-0.02561	-0.00055	0.00698	-0.00305	-0.22171**	0.00922
	(0.04016)	(0.04266)	(0.03446)	(0.04532)	(0.10813)	(0.04451)
R-squared	0.18290	0.25092	0.16248	0.17285	0.27098	0.21263
Observations	408	316	362	331	90	317

Note: This table presents coefficients and robust standard errors (in parentheses) from six different regressions, where arbitrage spread is the dependent variable and governance score the key explanatory variable of interest. Regression (1) presents the baseline regression with all control variables included. Regression (2) excludes deals announced during the COVID period. Regression (3) excludes transactions with negative arbitrage spreads. Regression (4) removes cross-industry deals to test for industry specific effects. Regression (5) focuses solely on deals in Europe. Regression (6) is restricted to deals in North America. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Table 13: 2SLS Regressions - ESG Dimensions and Arbitrage Spreads.

	(1) First stage	(2) Second stage	(3) First stage	(4) Second stage	(5) First stage	(6) Second stage	(7) First stage	(8) Second stage
Mean Industry ESG	0.35342***							
	(0.11289)							
Mean Nation ESG	0.55801***							
	(0.12938)							
ESG		0.00031						
		(0.00125)						
Mean Industry Environmental			0.29165**					
			(0.13837)					
Mean Nation Environmental			0.69199***					
			(0.12286)					
Environmental				0.00015				
				(0.00088)				
Mean Industry Social					0.29609***			
					(0.10706)			
Mean Nation Social					0.63038***			
					(0.12062)			
Social						0.00033		
						(0.00101)		
Mean Industry Governance							0.65083***	
							(0.19411)	
Mean Nation Governance							0.62726**	
							(0.26596)	
Governance								0.00075
								(0.00127)
Constant	-47.56553***	-0.01266	-71.56120***	-0.00953	-58.06185***	-0.00953	-38.10107**	-0.03641
	(9.39914)	(0.03970)	(10.30958)	(0.04740)	(9.50357)	(0.04171)	(18.17051)	(0.05481)
R-squared	0.48177	0.16339	0.45495	0.16317	0.50746	0.16236	0.19936	0.15686
Observations	408	408	408	408	408	408	408	408

Note: Table 13 presents the results of the 2SLS regression with instruments, Mean ESG, Environmental, Social, and Governance score by acquirer industry and acquirer nation. Controls are included but not reported in the regression. The standard errors are presented in parentheses under the coefficients. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$.

Appendix C: Variable Definitions

Table 14: List of variables.

Variable	Definition
Arbitrage Spread	Arbitrage spread is calculated for both stock and cash deals ± 1 day from announcement.
ESG	A firms overall ESG score sourced from Thomson Reuters ASSET4, ranging from 0 -100 where higher score indicate stronger ESG performance.
Environmental Score	Measures one firms environmental impact.
Social Score	Illustrates a firm's social policies, labour relations, and human capital management.
Governance Score	Evaluates a firm's goverenance, including board structure, executive bonuses, and shareholder rights.
Market Cap	Calculated as shares outstanding times the price per share for acquiror.
Leverage	Calculated as debt divided with total assets.
ROA	Calculated as net income divided by total assets.
Target/Acquirer Age	Defines how old both target and acquiror is.
MTB	Measured as a companies price per share divided by book value per share.
Deal Value	Measures the total monetary value of the transaction the acquirer pays the target.
VIX	Mesures the market volatility. Higher VIX indicates higher uncertainty.
Bid Premium	Calculates how over- or undervalued the target is by comparung the bid and the price of the target 42 days prior the announcement.
Cross Country	Dummy that defines when the acquirer and target is from different countries.
Cross Industry	Dummy that defines when the acquirer and target is working in different industries.
Deal Type	Dummy that defines when the payment method is in stock or cash.
Industry Classification	Dummies that define which industry the acquirer and target operates in.
Mean Industry ESG	The mean ESG score for the acquirer industry
Mean Nation ESG	The mean ESG score for the acquirer nation
Mean Industry Environmental	The mean environmental score for the acquirer industry
Mean Nation Environmental	The mean environmental score for the acquirer nation
Mean Industry Social	The mean social score for the acquirer industry
Mean Nation Social	The mean social score for the acquirer nation
Mean Industry Governance	The mean governance score for the acquirer industry
Mean Nation Governance	The mean governance score for the acquirer nation

Note: Variable definitions of all included variables.

Appendix D: Correlation and VIF Tests

Table 15: VIF Test.

Variable	VIF	1/VIF
Market Cap	**2,98**	**0,34**
Deal Value	**1,83**	**0,55**
ESG	**1,75**	**0,57**
ROA	**1,73**	**0,58**
Stock Deal	**1,59**	**0,63**
Leverage	**1,26**	**0,79**
MTB	**1,24**	**0,81**
Bid Premium	**1,22**	**0,82**
Cross Country	**1,20**	**0,83**
Acquirer Age	**1,18**	**0,85**
Target Age	**1,18**	**0,85**
Cross Industry	**1,07**	**0,93**
VIX	**1,04**	**0,96**
Multi Bid	**1,03**	**0,97**
Mean VIF	**1,45**	

Variable	VIF	1/VIF
Market Cap	**2,86**	**0,35**
Deal Value	**1,84**	**0,54**
ROA	**1,74**	**0,57**
Environmental	**1,66**	**0,60**
Stock Deal	**1,58**	**0,63**
MTB	**1,24**	**0,81**
Leverage	**1,24**	**0,81**
Bid Premium	**1,23**	**0,81**
Cross Country	**1,21**	**0,83**
Acquirer Age	**1,20**	**0,83**
Target Age	**1,18**	**0,85**
Cross Industry	**1,07**	**0,93**
VIX	**1,04**	**0,96**
Multi Bid	**1,02**	**0,98**
Mean VIF	**1,44**	

Variable	VIF	1/VIF
Market Cap	**2,95**	**0,34**
Deal Value	**1,83**	**0,55**
Social	**1,80**	**0,56**
ROA	**1,72**	**0,58**
Stock Deal	**1,61**	**0,62**
Leverage	**1,24**	**0,81**
MTB	**1,23**	**0,81**
Bid Premium	**1,22**	**0,82**
MTB	**1,19**	**0,84**
Cross Country	**1,18**	**0,85**
Acquirer Age	**1,18**	**0,85**
Target Age	**1,07**	**0,93**
VIX	**1,04**	**0,96**
Multi Bid	**1,03**	**0,97**
Mean VIF	**1,45**	

Variable	VIF	1/VIF
Market Cap	**2,64**	**0,38**
Deal Value	**1,82**	**0,55**
Stock Deal	**1,72**	**0,58**
ROA	**1,58**	**0,63**
Leverage	**1,27**	**0,79**
MTB	**1,25**	**0,80**
Bid Premium	**1,22**	**0,82**
Governance	**1,19**	**0,84**
Target Age	**1,18**	**0,85**
Cross Country	**1,18**	**0,85**
Acquirer Age	**1,17**	**0,85**
Cross Industry	**1,07**	**0,93**
VIX	**1,04**	**0,96**
Multi Bid	**1,03**	**0,97**
Mean VIF	**1,38**	

Note: Table 15 presents the VIF test for all four OLS regressions with ESG, Environmental, Social and Governance as the independent variable and arbitrage spread as the dependent variable including all the control variables.

	Multi Bid	Arbitrage Spread	ESG	Environmental	Social	Governance	Market Cap	Leverage	ROA	Acquirer Age	Target Age	MTB	VIX	Bid Premium	Cross Country	Cross Industry	Stock Deal	Cash Deal	Deal Value
Multi Bid	1																		
Arbitrage Spread	-0,021	1																	
ESG	0,008	0,059	1																
Environmental	0,008	0,058	0,860	1															
Social	-0,030	0,068	0,927	0,792	1														
Governance	0,068	0,031	0,714	0,411	0,477	1													
Market Cap	-0,036	0,108	0,613	0,571	0,640	0,300	1												
Leverage	0,017	0,065	-0,023	0,050	0,050	-0,164	0,191	1											
ROA	-0,023	0,001	0,308	0,203	0,349	0,167	0,489	0,038	1										
Acquirer Age	-0,009	0,032	0,216	0,260	0,194	0,094	0,146	-0,011	-0,011	1									
Target Age	-0,002	-0,020	-0,089	-0,087	-0,111	-0,002	-0,207	-0,078	-0,127	0,233	1								
MTB	-0,029	0,023	0,107	0,109	0,063	0,127	0,179	-0,145	-0,083	0,214	0,081	1							
VIX	-0,079	0,041	-0,032	-0,023	-0,015	-0,025	-0,029	-0,032	-0,007	-0,055	0,099	0,089	1						
Bid Premium	0,000	0,350	0,191	0,206	0,212	0,048	0,287	0,062	0,291	-0,027	-0,173	0,023	0,027	1					
Cross Country	0,035	-0,038	0,248	0,254	0,216	0,120	0,136	-0,094	0,073	0,184	-0,054	0,040	-0,002	0,070	1				
Cross Industry	0,011	-0,096	-0,040	-0,012	-0,038	-0,062	-0,045	-0,027	0,069	0,070	-0,004	0,056	0,047	0,033	0,176	1			
Stock Deal	-0,058	-0,015	-0,292	-0,222	-0,325	-0,132	-0,363	-0,110	-0,494	-0,050	0,082	-0,036	0,060	-0,283	-0,266	-0,132	1		
Cash Deal	0,058	0,015	0,292	0,222	0,325	0,132	0,363	0,110	0,494	0,050	-0,082	0,036	-0,060	0,283	0,266	0,132	-1	1	
Deal Value	0,022	0,106	0,366	0,381	0,398	0,141	0,586	0,214	0,222	0,108	-0,008	0,140	0,029	0,007	0,010	-0,082	-0,0039	0,0039	1

Figure 3: Correlation Heat Map.

Note: Figure 3 presents the correlation heat map which shows the correlation between all variables. The scale is -1 to 1 with a gradient scale from green to red the further away from 0 the correlation is.