Tesi di Laurea

ESG Performance,
M&A uncertainty,
and long-term operating performance

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Anno Accademico
2020 / 2021

Summary

Introduction

According to the Institute for Mergers, Acquisitions, and Alliances (IMAA) in 2019 more than 49 thousand mergers and acquisitions (M&A, henceforth) took place around the world, with an aggregate value of almost 3.4 trillion US dollars. The common reason why the managers of the bidding firm engage in M&As is to increase the shareholders wealth through economies of scale, synergies, and opportunities for diversification. A takeover attempt involves the interests of several different stakeholders, which in turn imply a great number of possible risks. Shareholder oppositions, internal target resistance, financing problems and regulatory intervention are among the several risks that can ultimately lead to the failure of the takeover attempt. The completion risk (i.e., the risk a deal may not be consummated) is directly connected to the reactions of all the stakeholders involved within the acquirer and the target companies, and information asymmetry plays a key role in determining the completion uncertainty.

The arbitrage spread, revealing the market pricing of the target conditional to the existence of the offer, is a good proxy for completion uncertainty. In fact, the adjustment of market prices toward the offered bid price contains important information about the market expectations considering acquirer, target, and bid characteristics (Jindra and Walkling, 2004). The higher is the probability of deal success the smaller is the spread, and vice versa. Branch and Yang (2003) suggested that the payment method could be a signal about the uncertainty of both target and acquirer stock values as well as their financial soundness. Consistently, Jetley and Ji (2010) found that cash payments are associated with lower arbitrage spread compared to stock mergers. Jetley et al. (2010) found also that hostile deals feature higher arbitrage spreads than do friendly mergers and the target market capitalization is negatively related to arbitrage spread. Further, the possibility of a price revision should narrow the spreads or even lead the market stock price above the offer price, and Jindra et al. (2004) found that arbitrage spread is significantly and positively related to the expected duration of an offer.

Another feature of M&As in which the reactions and the engagement of stakeholders could play an important role is the long-term performance of the firm resulting from the merger. Several studies have investigated factors affecting the post-acquisition accounting performance, trying to figure out how and which variables impact the outcome of a M&A, creating or destroying value in the long run. In general, researchers have struggled to find

evidence of improved performance following M&A activity. King, Dalton, Daily and Covin (2004) and Touch and O'Sullivan (2007) in their review of the previous studies highlighted how there are mixed evidence of improved post-acquisition performance. Heron and Lie (2002) found that acquiring firms experience above-industry levels of operating performance before acquisitions and, after acquisitions, they continue to exhibit operating performance levels in excess of their respective industry peers. Despite the higher premiums received by the target shareholders of a hostile bid, the acquiring firm seem to experience better results compared to a friendly takeover (Touch et al., 2007). More recently, Cui and Chi-Moon Leung (2020) found that payments in stock have a negative and significant effect on the acquirer post-acquisition returns, while cash payments are associated with positive post-acquisition returns. Another result of this latter study is that the managerial ability of the acquiring firm seems to be associated to stronger operating performance in the post-acquisition long-term period. Moreover, as suggested by Touch et al. (2007), the industry-specific knowledges, skills, and experience of the bidder' managerial board are much more important than generic managerial ability in effectively managing the integration process, and therefore creating synergies and value.

All these studies, on both completion uncertainty and long-term performance, focused only on the financial measures of a company, leaving unexplored the nonfinancial dimension. The way a company treats its stakeholders could be determinant in the expected outcome of M&A deals. Moreover, the environmental problems that a firm might face and how this company manage those risks could play a significant role in the negotiation process and in the long-term performance. Based on stakeholder theory (Freeman, 1984), our study expands the previous literature by examining the association between ESG performance, arbitrage spread, and acquirer post-acquisition return on assets. The acronym ESG (Environmental, Social, and corporate Governance) refer to the three dimensions used to measure how a firm perform in term of sustainability and social impact. The ESG performance ratings are a synthetic measure to represent how good (or bad) a company perform in terms of these non-financial aspects. These ratings, together with social and environmental practices themselves, providing more information besides the classical accounting measures, could be useful to lower the information asymmetry between the target and the acquirer, and ultimately lead to a lower completion uncertainty. Given the importance of the support of stakeholders for good post-

acquisition performance, the ESG performance could play a fundamental role also in determining the long-term performance of the company resulting from the merger.

In the first part of our analysis, we begin by examining how the target' and acquirer' ESG performance ratings availability (hereafter referred as "ESG coverage") impact the completion uncertainty proxied by the arbitrage spread. Cho, Lee and Pfeiffer (2013) showed that both positive and negative ESG performances appear to provide information that reduce information asymmetry, which in turn should imply a lower completion uncertainty. Thus, we expect that both target' and acquirer' ESG coverage are negatively related to arbitrage spread. Then we examine how different level of ESG performance could affect the completion uncertainty. Looking to the target side, Gomes and Marsat (2018) found that acquirer firms pay higher premiums for targets with higher ESG performance, suggesting that good social and environmental performance help to reduce the uncertainty regarding the target value. Choi, Petra, Guar and Kim (2015) found similar results, and they stated that the signals associated with both target' high ESG performance (ESG strengths) and low ESG performance (ESG concerns) play a significant role in mitigating information asymmetry. Thus, we expect that both target' high ESG performance and low ESG performance should reduce information asymmetry. Looking to the acquirer side, Deng, Kang and Low (2013) showed that mergers initiated by acquirer with high ESG performance take less time to complete and are less likely to fail than mergers initiated by acquirers with low ESG performance. Similar results were found by Arouri, Gomes and Pukthuanthong (2019). They found that acquirer's ESG performance are negatively related to arbitrage spread, suggesting that an acquirer with high ESG performance should feature an increased support by the stakeholders, thus leading to a faster completion and an increased probability of deal success. Therefore, we expect to find a negative (positive) relation between acquirer' high ESG performance (low ESG performance) and arbitrage spread.

In the second part of our analysis, we examine whether the ESG performance levels of target and acquirer have an impact on the long-term accounting performance of the company resulting from the merger. Looking at the target side, Aktas, de Bodt and Cosuin (2011) found that acquirers abnormal returns are positively associated with targets' social and environmental performance. This result was confirmed by Chen, Lu and Liu (2019), and they added that these abnormal returns are also related to an improvement in the acquirer ESG performance, excluding the alternative disciplinary view of the M&A

market. On the other side, the target low ESG performance could cause financial losses to the acquirer, as well as it can damage its reputation and the relationship with their stakeholders, thus leading to negative post-acquisition performance. Therefore, we expect to find a positive (negative) relation between target' high ESG performance (low ESG performance) and the acquirer post-merger return on assets. Looking at the acquirer side, Deng et al. (2013) sustained that the value of the environmental and social performance is reflected on improved merger performance on the long run. Further, they found that the resulting company from a merger with a low ESG performing acquirer experience a deterioration of the post-acquisition operating performance, while mergers by high ESG performing acquirers experience no significant change in post-merger operating performance. Therefore, we expect to find a positive (negative) relation between acquirer' high ESG performance (low ESG performance) and the acquirer post-merger return on assets.

We perform our analysis with two similar linear regression model. Our data sample is composed of 736 completed US takeover transactions that took place from 1992 to 2014. We have not found any relation between target and acquirer KLD coverage and arbitrage spread. Both target ESG strengths and concerns are negatively related to arbitrage spread, but these two relations do not seem to be significant. Acquirer ESG concerns is positively related to arbitrage spread while acquirer ESG strengths does not seem to have an impact on arbitrage spread.

Analysing the relationship between target and acquirer ESG performance levels and acquirer post-acquisition return on assets, we have found that target ESG strengths is not significant, while target ESG concerns is negatively related to acquirer long-term ROA. Further, we have found that acquirer ESG strengths are not significant and acquirer ESG concerns is positively related to acquirer post-acquisition ROA.

Finally, we check the robustness of our results by performing a set of different tests which confirm our main findings.

1 M&A and ESG: A brief review

1.1 The M&A context

1.1.1 Why mergers might occur

The research papers analysing the takeover market and the number of variables involved in these operations are so many that is almost impossible to cover everything. We'll try to summarize some of the main findings that can be useful for the purpose of this work. Economic theory has provided many possible reasons for why mergers might occur:

- Efficiency-related reasons that often involve economies of scale or other "synergies".
- Attempts to create market power.
- Market discipline, as in the case of the removal of incompetent target management.
- Self-serving attempts by acquirer management to "over-expand" and other agency costs.
- To take advantage of opportunities for diversification, like by exploiting internal capital markets and managing risk.

The relevance of these reasons seems to change over time (Andrade, Mitchell, Stafford, 2001).

The two most consistent empirical features of merger activity over the last century are that the mergers occur in waves and that, within a wave, mergers strongly cluster by industry. To explain the mergers waves, Andrade et al. (2001) showed that, among the others industry shocks, deregulation becomes a dominant factor in merger and acquisition activity after the late 1980s, accounting for nearly half of the merger activity since then.

The payment method choice is among the most strategic aspects for several reasons, including tax effects, its impact on the conditional expected value of the bid to asymmetrically informed bidders and targets, and corporate control considerations. In their extensive literature review, Betton, Eckbo and Thorburn (2008) pointed that stock offers are more likely the greater the bidder's asset size and market-to-book ratio. Stock offers are less likely the greater the share of stocks owned by the bidder's managers and

the greater the dispersion of the analysts forecasts of the bidder earnings. Moreover, Branch and Yang (2003) suggested that the payment method could be a signal of the uncertainty of both target and acquirer stock values as well as their financial soundness and they found that cash payments tend to enhance the likelihood of a successful takeover attempt.

The payment method is also connected to the offer premium. Several findings suggested that all-cash offers are associated with greater offer premiums and the average offer premium in successful single-bid takeover contests is higher than the average initial offer premium in multi-bid contests, suggesting a kind of prevention effect from competition of greater premiums (Betton et al., 2008). Offer premium seems to be greater for public bidders and for hostile takeovers (Kini, Kracaw, Mian, 2004) and it's positively associated with target's market-to-book ratio. On the other side the offer premium is lower for toehold bidders and for firms with a powerful Chair (Ghannam, Matolcsy, Spiropoulos, Thai, 2019), as well as when the bidder's CEO is female. The offer premium is negatively associated with the target total equity capitalization.

An important question is whether mergers create or destroy value. The most used variable for assessing whether mergers create value for shareholders comes from short-window event studies, where the cumulative abnormal stock return (CAR) around the merger announcement is used as a measure of value creation or destruction. Many studies have demonstrated that mergers seem to create shareholders value (Andrade et al., 2001). Heron and Lie (2002) showed that the combined cumulative abnormal returns are positive for both cash and stock transactions, but they are significantly higher for cash acquisitions. Most of the gains are enjoyed by the target shareholders while the acquiring firms experience on average negative abnormal stock returns around announcements of stock-financed acquisitions and normal returns around cash acquisitions. The last result can be explained by the fact that stock-financed mergers can be viewed as two simultaneous operations: a merger and an equity issue. On average, equity issues are associated with negative abnormal returns because, according to Pecking Order Theory, managers are more likely to issue equity when they perceive that it is overvalued by the stock market. This negative effect is attenuated for stock-paying acquirers that are subject to low investor attention. Adra and Barbopoulus (2018) found that these firms realize significantly higher CAR compared to stock-paying acquirers that are subject to high investor attention. Anyway, the cumulative abnormal stock return around the

announcement date is a short window measure which reflects the investors perception of the possible future value of the merged companies. We will talk again about CAR on paragraph 1.3.3, while we are going to present some results about actual future performance on paragraph 1.1.3.

Another feature of the takeover market is its disciplinary role. Kini et al. (2004) found a weakly significant negative relation between the probability of post-takeover CEO turnover and pre-takeover performance. Particularly, the likelihood of CEO turnover is higher if the bid is hostile. Moreover, managers undertaking value-reducing acquisitions seems to face a higher probability of being replaced than managers undertaking value-increasing acquisitions.

1.1.2 Arbitrage spread and uncertainty

Following the announcement of a merger the target company stock price typically adjusts upward going towards the price offered by the acquirer. The difference between these two prices expressed in percentage is known as the arbitrage spread.

In setting the bid price, the acquirer reveals information about its valuation of the target. In contrast, the arbitrage spread reveals the market pricing of the target conditional on the existence of the offer. Thus, the adjustment of market prices toward or even above the offered bid price contains important information about the market interpretation of the offer in light of bidder, target, and bid characteristics (Jindra and Walkling, 2004).

The risk arbitrage (or merger arbitrage) is an investment strategy that attempts to profit from the arbitrage spread. Basically, it is like a bet on the likelihood that the proposed transaction will go through. If a merger attempt is successful, the target stock price will converge to the offer price and the spread will close to zero as the consummation date approaches. If the merger fails, the spread will increase on the termination announcement, resulting in a loss for the arbitrageur.

The characteristics of this investment depend on the form of payment offered to the target shareholders. In a cash merger, the strategy is to buy the target company shares and to hold them until merger consummation, obtaining a profit equal to the initial spread. In a stock merger, the arbitrageurs sell short the acquiring firm stock and in addition buy the target stock, profiting the difference between the price obtained from the short sale of the acquirer stock and the price paid for the target' stock (Mitchell and Pulvino, 2001).

Overall, the existing academic literature shows that risk arbitrage strategies generate substantial excess returns. Mitchell et al. (2001) found that these excess returns documented in previous studies are not due to market inefficiencies in the pricing of the firms involved, but they are due to practical limitations and transaction costs (such as the brokerage commissions and the cost associated with trading non perfectly liquid securities) that prevent the investors from realizing these extraordinary returns. Mitchell et al. (2001) estimated annually excess returns of 10.3 percent when assuming that there are no transaction costs, while when they considered these costs in the analysis the excess returns fall to 4 percent annually. Moreover, Mitchell et al. (2001) postulated that the risk arbitrageurs, providing liquidity especially during severe market downturns, receive a risk premium to compensate for the risk of deal failure.

Merger completion risk, among several factors influencing arbitrage spread, is a major risk factor. The uncertainty about the merger success is reflected on the arbitrage spread. Indeed, the higher is the probability of deal success the smaller is the spread (the target market share price is closer to the price offered by the bidder), and vice versa. Consequently, the target stock price measured well before the resolution of a deal is a good predictor of the stock price at the conclusion of the deal itself (Mitchell et al. 2001). Two deal characteristics which have an impact on the likelihood of merger success, and consequently on the arbitrage spread, are hostile bid and the payment method. Jetley and Ji (2010) found that hostile deals present higher arbitrage spreads compared do friendly mergers, and cash payments result in lower arbitrage spreads compared to stock mergers. Friendly offers and cash transactions seem to be associated with a higher probability of successful completion and thus result in a lower arbitrage spread.

Jetley et al. (2010) also found that the target market capitalization is negatively related to arbitrage spread, which suggests that the arbitrage spread is smaller for larger target companies because of lower transaction costs related to higher liquidity and more readily available information.

Upward revisions in the bid price are frequent and generate greater returns. The possibility of a price revision should narrow the spreads or even lead the market stock price above the offer price (that would mean a negative spread). By this point of view, an increased probability of realizing the initial bid price implies a reduced probability of revision and that would lead to a wider spread, which contrasts the findings presented before. Jindra et al. (2004) showed that the arbitrage spread is significantly negatively

related to the actual revision ratio that materializes. Coherently they found that arbitrage spread is significantly related to bid premiums. In fact, a high bid premium tends to deter competing offers and reduce the likelihood of resistance, making a bid revision less probable.

Another important factor to consider is the duration of the acquisition process. The longer it is, the higher are the holding cost for the funds involved on the risk arbitrage strategy. Jindra et al. (2004) found that arbitrage spread is significantly and positively related to the expected duration of an offer.

Jetley el al. (2010) documented a substantial decline of the arbitrage spread since the 1990. They highlighted how some changes in the main characteristics of a deal, such as increased popularity of cash deals, lower bid premiums and less hostile deals, have led to a reduction in the risk associated with the risk arbitrage strategy. This, combined with the increased interest in this kind of strategy and the augmented trading activity of the target stock following the merge announcement, can explain the decline of arbitrage spread.

1.1.3 The long-term performance

One of the most studied and controversial question about mergers and acquisitions is whether they create or destroy value in the long run.

The first issue faced by researchers is whether to use accounting performance measures or share price data. In the literature most of the research has focused on the second option mainly for two reasons: the accounting information could be subject to managerial manipulation through earnings management and changing in accounting policies, and the accounting measures are harder to compare (Touch and O'Sullivan, 2007). On the other side stock returns reflect investors perception of a firm's future performance (which could be biased) and it involves both economic gains and capital market inefficiencies (Cui and Chi-Moon Leung, 2020). We will focus on accounting performance findings, mostly on the return on asset' related research as it is the dependent variable that we are going to use for assessing long-term performance.

Heron and Lie (2002) found that acquiring firms experience above-industry levels of operating performance before acquisitions and, subsequent to acquisitions, they continue to exhibit operating performance levels in excess of their respective industries and significantly outperform control firms with similar pre-event operating performance.

In general, researchers have struggled to find evidence of improved performance following M&A activity. King, Dalton, Daily, Covin (2004) and Touch et al. (2007) in their review of the previous studies highlighted how there are mixed or no evidence of improved post-acquisition performance.

Heron et al. (2002) found no evidence that the operating performance changes across different payment methods and this result was confirmed by the meta-analysis of King et al. (2004). The more recent study of Cui et al. (2020) found that payments in stock has a negative and significant effect on the acquirer post-acquisition returns, while cash payments are associated with positive post-acquisition returns.

The findings about hostile takeovers in the literature review of Touch et al. (2007) seem to support the disciplinary view of M&A. Indeed, despite the higher premiums received by the target shareholders on a hostile bid, the acquiring companies seem to experience better results compared to friendly takeovers.

More recently Cui et al. (2020) tried to examine the relationship between the managerial ability of the acquiring firms and their long-term performance after a takeover. Their results suggest that acquiring firms with superior managerial ability are able to generate stronger operating performance in the post-acquisition long-term period.

Moreover, Cui et al. (2020) posited that the industry-specific knowledges, skills, and experiences of the acquiring firm's managerial team are much more important than generic managerial ability in effectively managing the integration process and in creating positive synergy value in M&As. While King et al. (2004) showed that the results on the impact of diversification on post-acquisition performance are contradictory, Touch et al. (2007) suggested that pursuing related acquisitions lead to better performance, while conglomerate acquisitions show more negative results.

Ghannam et al. (2019) found that the companies where the role of Chair and CEO are separated and the Chair has a strong influence, when they get involved in a merger, they experience a greater long-term improvement on the return on assets compared to the firms with a less powerful Chair.

A similar effect was found by Loyeung (2019) while analysing the effect of hiring a boutique financial advisor. Loyeung showed that acquirers which hire boutique advisors in the takeover process are expected to experience a long-term improvement in terms of higher ROA and a lower likelihood of goodwill impairment. These results are due to the

specific market knowledges and experiences of the boutique advisors, which make them able to identify and complete deals that are more valuable for the acquirers.

1.2 ESG performance

1.2.1 The stakeholder theory

A stakeholder approach of the strategic management started to be an important movement around the mid 80's when R. Edward Freeman published his book "Strategic Management - A Stakeholder Approach" in 1984.

An important element of this theory is the definition of the word "stakeholder". Donaldson and Preston (1995), quoting a definition of the Stanford Research Institute of the 1963, defined the stakeholders as *"those groups without whose support the organization would cease to exist"*.

The central concern of a stakeholder approach is the survival of the firm, seen in Freeman's words as *"the achievement of an organization's objectives"* (Freeman and Mcvea, 2001). Therefore, the purpose of stakeholder management is to devise methods to manage the several groups of stakeholders and their relationships with the company in a strategic fashion. The managers need to understand the concerns of shareholders, employees, customers, suppliers, lenders and society, and consequently formulate and implement processes which satisfy all and only those groups who have a stake in the business (Donaldson et al., 1995), ensuring their support for the long-term success of the firm.

The stakeholder approach suggest that a successful strategy is the one that integrate the interest of all stakeholders rather than maximizing the returns of one single group (the shareholders) given the limitations provided by the other groups (Freeman et al., 2001). The latter is the shareholder view, arguing managers should maximize the profits for shareholders. Jensen (2001) states that the stakeholder theory cannot be viewed as a legitimate contender to value maximization because it fails to provide a complete specification of the corporate purpose and the objective function. Given that is not possible to maximize a two or more variables objective function, Jensen asserts that

without a clear mission the managers will experience managerial confusion, conflicts, inefficiencies a perhaps even competitive failure.

Freeman et al. (2001) rejected the very idea of maximizing a single objective function as a useful way of thinking about management strategy. In the view of Freeman, stakeholder management is a never-ending task of balancing and integrating multiple relationships and multiple objectives.

All the practices and the strategic choices implemented by a company in accordance with stakeholder approach goes behind the name of corporate social responsibility (CSR).

1.2.2 ESG performance rating

The acronym ESG (Environmental, Social and corporate Governance) refers to the three main factors used to measure the sustainability and social impact of a company. These three dimensions are seen by conscious investors as intangible assets within the firm, and they are included in the screening process for potential investments.

To assess a company's ESG performance, investors look to a broad range of firm behaviours. The environmental dimension entails the evaluation of any environmental risks a company might face and how the company is managing those risks. Those risks include energy efficiency, waste management, air and water pollution, carbon emissions, treatment of animals, and so on. The social dimension envelops the company's consideration of people and their relationships. These include the respect of human rights, community relationships, customers satisfaction, labour conditions and employee's inclusion and diversity. Corporate governance is preoccupied with the necessary standards to run a company and includes assessment of the board composition, the audit committee and accounting transparency, the executive compensations, lobbying, political contributions and conflicts of interest, illegal activities, bribery and corruption.

Assessing the ESG performance of a company could be a difficult task for investors. The complexity of some topics and the attempt of firms to enhance their image by disclosing strengths and hiding possible concerns makes the evaluations of a company's sustainability performance complicated. Social and environmental rating agencies seek to make ESG performance information more transparent and easily available. These rating agencies examine firms past environmental performance and consider firms' outlook by

collecting information not only from the company disclosures but also from different sources available in the market. For their accuracy and transparency in summarizing the ESG performance, these ratings are widely used by researchers and investors (Chatterji, Levine and Toffel, 2009).

For this thesis we have used the ESG performance ratings provided by Kinder, Lydenberg, and Domini (KLD). A description of these ratings is provided in paragraph 2.2.2.

1.2.3 ESG performance and information asymmetry

An important feature of the ESG performances is their effect on information asymmetry.

In a study focused on the environmental performance, Clarkson, Li, Richardson and Vasvari (2008) found a positive association between the environmental performance of a company and the level of discretionary disclosures that the company itself makes in its environmental and social reports. In fact, a well performing company has incentives to disclose its quality because, among several reasons, firms with high ESG performance enjoy a reduction in the cost of equity capital compared to their industry peers (Dhaliwal, Li, Tsang, Yang, 2011).

Moreover, Dhaliwal et al. (2011) showed that firms with superior ESG performance, and therefore an increased disclosure activity, attract institutional investors and experience a greater analyst coverage. They also found that following the increased disclosure activity the analysts can achieve lower absolute forecast errors and dispersion, confirming the increased transparency of the company.

Kim, Park and Wier (2012) found that firms with good ESG performance are less likely to engage in earnings management. They suggested that firms with good ESG performance reflects managers' ethical concerns and tend to be more conservative in accounting and operating decisions, providing more transparent financial information.

Using as a measure of information asymmetry the bid-ask spread and the KLD rating for the ESG performance, Cho, Lee and Pfeiffer (2013) found that both positive and negative ESG performances appear to provide information that reduces information asymmetry. These results suggest that the ESG performances in general, whether socially desirable or undesirable, are helpful in reducing information asymmetry. Also, when assessing the effects of ESG-related information they suggested evaluating separately the positive performance from the negative performance to avoid losing useful information about the

company for investment decisions. In this further analysis Cho et al. (2013) found that negative ESG performance has a greater impact on reducing bid-ask spread than positive ESG performance does. These results suggest that both ESG strength and ESG concern play a significant role in reducing stock market information asymmetry, with a stronger disclosure effect connected to the negative ESG performance.

1.2.4 The value enhancing capabilities of ESG performance

Trying to understand whether ESG performance could enhance the value of a company is probably the most common research question about the stakeholder approach.

We can distinguish two contrasting views: the agency cost view and the conflict-resolution view.

The agency cost view asserts that the managers could get involved in socially responsible practices for a self-serving attempt, for obtaining private benefits at the expenses of the shareholders. Surroca and Tribo (2008) found a positive correlation between managerial entrenchment strategies and socially responsible actions, and the combination of the two results in a significantly negative impact on financial performance. In general, some studies showed that socially responsible firms are associated with higher agency problems.

In a review article, Malik (2014) supported the conflict resolution view and argued that firms get involved in social practices as a strategic tool to maximize firm value. It was found that the benefits connected to ESG practices outweigh the potential costs, resulting in a positive effect for the shareholders value as well as for all the other stakeholders, both in the short term and in the long run. Indeed, ESG performance plays a significant role in enhancing firm value by promoting employee productivity, expanding product market share, building a corporate reputation, and strengthening a firm's relationship with society, regulators, and other stakeholders.

For example, Jiao (2010) found a positive association between the ESG performance of a firm and its Tobin's Q. In particular, it was found that the positive valuation effect varies across different stakeholders. Better social performance in terms of employee relations and environmental issues seems to lead to a stronger positive valuation effect. These results suggest that stakeholder's welfare represents intangibles, such as reputation or human capital, which are crucial for the creation of value for the shareholders.

Malik (2014) maintains that the previous research have clearly demonstrated firms with good ESG performance outperform less socially responsible firms in terms of various accounting measures, including: return on investment (ROI), return on assets (ROA), and return on sales (ROS). Malik (2014) also found a positive association between the ESG performance and the stock market performance proxied by stock returns, market capitalization and market to book ratio.

An engagement in social activities could be used by the managers of a company for hiding some poor practices. Martínez-Ferrero, Banerjee, García-Sánchez (2016) found that the markets are not able to distinguish the situations where ESG practices are used as a short-term strategy to improve corporate image. In general, ESG performance have a negative effect on cost of capital and good social performances have the effect to mask earnings management practices. In this case the social commitment is used by the managers to manipulate the perception of the company for lowering the cost of capital and obtaining short-term private benefits at the expenses of the long-term investors. Similarly, Dhaliwal, Li, Tsang and Yang (2014) found that the negative association between ESG performance disclosure and the cost of equity capital is more pronounced in countries or firms with higher levels of financial opaqueness.

A different point of view was expressed by Arouri and Pijourlet (2017) when they showed that firms with good ESG performance feature a greater value of cash holdings. The value of cash holdings depends on the investors expectation about how the cash could be used. Since cash is a liquid asset, managers can easily turn this resource into private benefits, and for that reason cash holdings are associated with higher agency problem. Arouri et al. (2017) argued that investors consider the firm's social practices as a mean for increasing shareholders wealth by solving conflict with stakeholders and by adopting an efficient use of cash resources.

An important problem arising when trying to evaluate whether ESG performance enhances firm' value is the endogeneity issue. It can be difficult to understand whether a good performing company engages in social practices because it has the resources to do so or if the good ESG performance of the firm leads to better financial performance. Waddock and Graves (1997) found that corporate social performance depends positively on the financial performance. It was found also that the financial performance depends on good ESG performance. Waddock et al. (1997) described this as a virtuous circle, but it is not clear whether the tenet is an initial availability of extra resources or if it is an initial

attention to social practices. To solve this problem, Aktas, de Bodt and Cosuin (2011) suggested performing this kind of analysis in the mergers and acquisitions framework. Indeed, M&As are mainly unanticipated events and relating the financial performance of the acquirer with the ESG performance of the target (or vice versa) should help to avoid the endogeneity issue.

1.3 ESG performance and takeovers

1.3.1 How ESG performance influence M&A operations

Despite the enormous amount of research papers about the many aspects involved in a takeover and the several studies about the impacts of a firm's social performance on finances, the literature on how the ESG performances of the acquirer and of the target can affect the relative M&A operation is still limited.

One of the most recent contribution (Gomes, 2019) started from the hypothesis that the ESG performance can be seen as a set of intangible assets that could positively impact the value of a firm, making the firm itself a more appealing target for a possible acquirer. Indeed, good social performances are associated with a risk reduction due to increased transparency, better earnings quality and lower risk of future claims and reputation damages. Gomes (2019) found that target firms feature on average higher ESG performance than comparable non-target firms and the likelihood of becoming a target is higher for company with good social performance. Moreover, it was found that these results hold for all the individual dimensions of ESG (environment, social, governance).

From the other side, Krishnamurti, Shams, Pensiero and Velayutham (2019) showed that the ESG performance of the bidding firm are positively associated with the chance of choosing a target with good social performance. As stated before, the high ESG performance of the target reduce the risks for the acquirer, and a better cultural fit could ease the integration process between the two firm, leading to a more effective merge.

Also, bidders with good social performance are found to be more likely to acquire domestic targets than foreign targets (Krishnamurti et al., 2019). In fact, international acquisitions are associated with higher risks due to different accounting and legal system, political issues, and greater information asymmetry.

Zhang, Zhang and Yang (2020) found that firms with good ESG performances are likely to avoid deal characteristics that are deemed to be value-destroying. In line with this, socially aware bidders tend to avoid multiple bids in a fiscal year and will prefer only cash as a payment method.

Since high bid premiums are associated with high agency costs and overconfident managers, the ESG performance of the bidders are found to be negatively related to bid premiums (Krishnamurti et al., 2019). In fact, managers involved in social practices are more likely to avoid opportunistic behaviours and tend to be more cautious when making a takeover, and therefore they tend to pay lower bid premiums.

On the other side, the good social performance of the target is valuable for the acquirer. Chen, Lu and Liu (2019) found that on average the bidders pay higher premiums to those targets with high ESG performance.

Another relation found by Krishnamurti et al. (2019) is the one between the acquirer leverage and the target's social performance. They found that bidders with high leverage tend to prefer targets with good ESG performance. The authors justified this result sustaining that highly leveraged bidders are more careful in the target selection because they are subjected to more stringent controls by their lending institutions.

A firm with good ESG performance enjoys a better reputation among its stakeholders thanks to a major commitment on satisfying the instances of all the parts involved for the success of the company. Reputation plays a significant role when companies attempt an M&A operation. Indeed, when the bidder has good ESG performance the stakeholders of the target company have stronger incentives to support the completion of the deal, while in the opposite case (i.e., when the bidder has poor social performance) the stakeholders are more likely to contrast the operation, increasing the time needed for reaching an agreement or even leading to the failure of the acquisition attempt. Consistent with this argument Deng, Kang and Low (2013) found that mergers undertook by acquirers with good ESG performance are predicted to take less time to complete and are less likely to fail than those started by bidders with poor social performance.

1.3.2 Information asymmetry and completion uncertainty

As stated previously, an important feature of the ESG performance is their effect on information asymmetry. Given that information asymmetry is a key factor in M&A operations, studying the impact of a firm's social performance on the uncertainty around a takeover is an interesting topic.

Choi, Petra, Guar and Kim (2015) focused on the target's ESG performance and its effects on the information asymmetry proxied by the bid premiums paid by the acquirer. The higher the information asymmetry, the higher the risk for the acquirer and therefore the lower the bid premium that the bidder is available to pay. An important feature of this study is that the authors analysed the effect of positive ESG performance and negative ESG performance separately. What they found is that the signals associated with both positive and negative ESG performances play a significant role in mitigating information asymmetry.

When the target is from a different industry or from a different institutional environment the information provided by the target's social performance seem to be more valuable for the bidder, because entering in a new market involves a series of risks that could be damaging for the company. Choi et al. (2015) found that in these kinds of operations (M&As across unrelated industries) the acquirer is likely to pay a higher premium for a good socially performing target and the information associated with the target's negative ESG performance seem to be more relevant for reducing the information asymmetry.

In contrast, in same industry deals the acquirer already knows the target's market, it knows the risks involved and it knows how to deal with the target's stakeholders, and for these reasons it seems not to highly value the target's ESG performance as much as it does in unrelated takeovers.

Overall, Choi et al. (2015) found that the acquirer, when deciding the bid premiums, trades at a discount the target's negative ESG performance and pays a premium for the positive ESG performance.

Arouri, Gomes and Pukthuanthong (2019) studied the impact of the acquirer's ESG performance on the completion uncertainty proxied by the arbitrage spread. The authors argued that arbitrage spread is a good proxy for ex ante uncertainty around a takeover because it conveys the market expectations around the deal expected outcome (i.e., if the deal will be successfully completed or not).

Overall, Arouri et al. (2019) suggested that the market perceives socially responsible acquirers as more likely to complete mergers and acquisitions in a timely and successful manner. Indeed, they found that acquirer's ESG performance are negatively related to arbitrage spread. Similar results were also found when focusing on the individual dimensions of the ESG performance (environmental, social, and governance).

These results were justified by the authors whit a series of arguments. First, the target firms' stakeholders are less likely to oppose the acquisition attempt because there is a reduced probability of a breach in implicit contracts when the acquirer is a good socially performing firm. Second, the negative reputation of the acquirer can decrease the potential value of the target compared to the potential value of the same target if the acquirer would be a good socially performing company. Therefore, the target's shareholders are less likely to oppose an offer by a bidder with good ESG performance. Third, M&A operations conducted by good socially performing firms should embed less financing uncertainty and therefore less completion uncertainty. Finally, good ESG performance can improve a firm's image among regulators and thus reduce the probability of regulatory intervention during a takeover.

Arouri et al. (2019) concluded showing that the negative relation of acquirer's ESG performance and completion uncertainty holds regardless of the ESG performance of the target.

1.3.3 ESG practices and post-acquisition performance

Like in the "classical" research on takeovers, also the studies about the ESG performance's impact on the M&As outcome mainly focus on share price data.

Among the firsts to analyse the topic, Aktas et al. (2011) found that the acquirer's abnormal returns around the announcement date are positively associated with targets' social and environmental performance. More recently, Chen et al. (2019) found similar results analysing the short window cumulative abnormal returns of the value-weighted portfolio of the acquirer and the target firms. They found that the stronger is the target's ESG performance relative to the acquirer's, the higher are the acquirer returns. These results suggest that the shareholders positively value ESG related investments.

From a different point of view, someone could argue that the social practices of the target company are value destroying and the positive announcement returns are due to the

disciplinary role of the acquirer, that put an end to the target's waste of resources. In both Aktas et al. (2011) and Chen et al. (2019) were found that on average the acquirer ESG performance improve following the acquisition of a good socially performing target, suggesting that the bidder's positive returns are due to a learning process of the target's ESG practices and experiences.

Looking at the acquirer's ESG performance, Zhang et al. (2020) highlight that a good socially performing firm can preserve its market returns when experiencing a potentially harmful event like an acquisition. This kind of events involve the interests of many stakeholders and the good ESG performance of the acquirer is a positive signal that encourage stakeholders to cooperate. This in turn reassures the investors that the risks connected to the takeover will be minimized. On the other side, Zhang et al. (2020) also found that the acquirer's high ESG performance could backfire when the firm conducts hostile takeovers. In fact, hostile takeovers are not consistent with the socially responsible behaviour of a company, and therefore this incongruent signal could damage the reputation of the bidder, compromising the success of the M&A.

Chen et al. (2019), analysing the post-merger long-term market performance, showed that the acquirers that buy good socially performing firms experience a significant improvement in Tobin's Q ratio. Moreover, they found that the positive effects of the target superior ESG performance are more pronounced when the target firm has strong operating performance.

Deng et al. (2013), focusing on the ESG performance of the bidder, sustained that the value of the environmental and social performance is not fully incorporated into the stock price immediately after the merger announcement date but is reflected on improved merger performance on the long run. Indeed, they found that, while the portfolio of low ESG performing acquirers does not exhibit significant abnormal returns, the portfolio of high ESG performing acquirers earns significantly positive abnormal returns on the long run. Also, they showed that the long-term effects of ESG performance on firm value are stronger for small firms than for large firms.

Moreover, Deng et al. (2013) found that the resulting company from a merge with a low ESG performing acquirer experience a deterioration of the post-merger operating performance, while mergers by high ESG performing acquirers experience no significant change in post-merger operating performance.

2 The impact of the ESG Performance

2.1 Hypothesis development

2.1.1 Target's and Acquirer's ESG performance and M&A completion uncertainty

Involving the interests of several stakeholders, M&A operations feature a great number of risks. These risks could lead to the failure of the deal itself. The greater is the information asymmetry between the bidding firm and the target company, the higher is the uncertainty surrounding the takeover.

The arbitrage spread following the acquisition announcement is a good proxy to measure the completion uncertainty, as it reflects the expectations of the market participants about the outcome of the operation. The greater the risk of failure perceived by the investors, the higher the arbitrage spread, and vice versa (Jindra et al. 2004).

Given the importance of relationships among all stakeholders involved in a takeover and the role that these stakeholders have on the possible outcome of an M&A, stakeholder theory provides an interesting field to try to assess the variables influencing the completion uncertainty.

Stakeholder theory states that a firm should consider not only the instances of the shareholders, but it has to compound the interests of all the stakeholders connected to the firm itself. According to this theory, in order to enhance the performance and the value of the company, a firm should employ a series of actions to build mutual trust with the stakeholders through an increased accountability and transparency. To do so, the ESG practices are voluntary initiatives that firms take towards various stakeholders to improve the relationship with them. In turn these practices result in a series of benefits for the firms themselves, such as increased employee productivity, improved corporate reputation, lower cost of capital, lower financial risks, better operating performance, and reduced information asymmetry (Cho et al., 2013; Diemont et al., 2016; Malik, 2014; Martinez-Ferrero, 2016). In particular, the last feature provides us with the basis for studying the relationship between ESG performance and completion uncertainty. Cho et

al. (2013) found that ESG performance appear to provide information that reduces information asymmetry, which in turn should imply a lower completion uncertainty.

To evaluate the ESG performance of a firm is a difficult task. ESG performance rating agencies, gathering information from different sources beyond the simple voluntary disclosure of the subject company, provide ESG performance scores which are more understandable and transparent. Moreover, these ratings are more reliable than voluntary disclosure because companies could try to conceal negative information.

Cho et al. (2013) used the ESG performance ratings given by Kinder, Lydenberg, and Domini (KLD) and they found that the mere availability of ESG performance ratings is associated with lower information asymmetry, independently if the information provided are socially desirable or undesirable.

Given this background we first explore how the ESG performance ratings availability (ESG coverage) impacts the information asymmetry between targets and acquirers and therefore the arbitrage spreads. If ESG coverage reduce the target and the acquirer information asymmetry, the negotiation between the two firms could be more transparent and fairer, thus leading to a lower risk of failure. Based on these considerations we postulate the following hypothesis:

> **Hypothesis 1)** T*arget's ESG coverage decrease the completion uncertainty and thus is negatively related to arbitrage spread.*

> **Hypothesis 2)** A*cquirer's ESG coverage decrease the completion uncertainty and thus is negatively related to arbitrage spread.*

Then we turn our attention to how different level of ESG performance could affect the completion uncertainty. In general, firms with high ESG performance tend to disclose their good social and environmental performance to improve their reputation to the outsiders. These reports improve the firm transparency, providing information that go beyond the mere financial information. Moreover, firms with high ESG performance are more committed to ethical behaviour, thus reporting more transparent and reliable financial information to the market.

Looking to the target ESG performance, if an acquirer fails to detect possible environmental or social issues within the target this could result in a negative post-acquisition performance. For this reason, the targets' ESG performance are increasingly

taken into consideration by the acquirers in the merger decision-making process. Gomes et al. (2018) found that acquirer firms positively value the targets ESG performance, and they pay higher premiums for targets with higher ESG performance, suggesting that good social and environmental performance help to reduce information asymmetry regarding the target value. Choi et al. (2015) found similar results for the acquisition premium, and they stated that the signals associated with both target' high ESG performance (ESG strengths) and low ESG performance (ESG concerns) play a significant role in mitigating information asymmetry. Further, they argued that the signals associated with target ESG concerns are more relevant for the acquirer.

Following the above findings, we suggest that both high ESG performance and low ESG performance of the target should help to reduce the information asymmetry problem in a M&A operation. Based on these considerations we postulate the following hypothesis:

> **Hypothesis 3)** T*arget's high ESG performance (ESG strengths) decrease the completion uncertainty and thus is negatively related to arbitrage spread.*

> **Hypothesis 4)** T*arget's low ESG performance (ESG concerns) decrease the completion uncertainty and thus is negatively related to arbitrage spread.*

Looking at the acquirer side, high ESG performance are often associated with a stronger reputation and a stronger commitment to honour implicit contracts. The good reputation of a firm makes more easier for the acquirer to finance a takeover, with a reduced cost of capital and a lower financial risk perceived by the investors (Martinez-Ferrero et al., 2016), thus leading to a lower completion uncertainty. Moreover, the stronger reputation connected to high ESG performance is fundamental for current and potential stakeholders. M&As are events that could change the long-term relationships between the firm and the stakeholders and in some cases there is the need to renegotiate the contracts within the new entity resulting from the merger (Deng et al., 2013). Therefore, the acquirer's good reputation and the commitment to respect explicit and implicit contracts are fundamental to ensure the stakeholders' support to the operation. Deng et al. (2013) found that mergers initiated by acquirer with high ESG performance take less time to complete and are less likely to fail than mergers initiated by acquirers with low ESG performance. These findings suggest that high ESG performance leads to a reduction of the conflicts of interests between shareholders and other stakeholders, resulting in a

better outcome for both the parties. On the other side, target' stakeholders could protest and lobby against a takeover conducted by an acquirer with low ESG performance. The pressure of the stakeholders could convince the target' board to refuse the offer. Also the target' shareholders could oppose the merger offered by a socially irresponsible acquirer. In fact, the negative reputation of the bidder could decrease the value of the target compared to the value of the same target if the offer would be done by an acquirer with high ESG performance. Moreover, good socially performing acquirers could also enjoy a better reputation among regulators, reducing the risk of regulatory intervention during the M&A process.

Therefore, as found by Arouri et al. (2019), an acquirer with high ESG performance should feature an increased support by all parties involved in the operation compared to a low ESG performance bidder, thus leading to a faster completion and an increased probability of deal success. Based on these considerations we postulate the following hypothesis:

> **Hypothesis 5)** A*cquirer's high ESG performance (ESG strengths) decrease the completion uncertainty and thus is negatively related to arbitrage spread.*

> **Hypothesis 6)** A*cquirer's low ESG performance (ESG concerns) increase the completion uncertainty and thus is positively related to arbitrage spread.*

2.1.2 Target's and Acquirer's ESG performance and acquirer long-term operating performance

When an M&A is completed, the main question becomes whether and how the ESG performance of the acquirer and the target have an impact on the long-term performance of the resulting company.

From the standpoint of stakeholder theory, the acquisition of a target with high ESG performance should improve the acquirer long-term performance. Aktas et al. (2011) found that acquirers abnormal returns are positively associated with targets' social and environmental performance. As found by Chen et al. (2019), these abnormal returns are also related to an improvement of the acquirer ESG performance, thus excluding the alternative view of the disciplinary role of the bidder. Acquirers seem to learn from the social and environmental practices of the targets, improving the relationship with their own stakeholders and thus enhancing the firm value thanks to a greater support provided

by them. On the other side, the target low ESG performance and the consequent issues could cause financial losses to the acquirer, as well as damage to its reputation and the relationship with the stakeholders, thus leading to negative post-acquisition performance. Gomes et al. (2018) found that acquirer firms positively value the targets ESG performance, and they pay higher premiums for targets with higher ESG performance, suggesting that the acquirer board expect to achieve higher returns when buying targets with good social and environmental performance.

Therefore, given that the acquisition of a target with high ESG performance is positively associated with acquirer abnormal returns and is related to an improvement in the acquirer ESG performance, we expect to find a similar relation between the target' ESG performance and the acquirer' long-term accounting performance. Based on these considerations we postulate the following hypothesis:

> **Hypothesis 7)** T*arget's high ESG performance (ESG strengths) is positively related to acquirer long-term performance measured by acquirer's ROA.*

> **Hypothesis 8)** T*arget's low ESG performance (ESG concerns) is negatively related to acquirer long-term performance measured by acquirer's ROA.*

Looking to the bidder side, an acquirer good reputation and the commitment to respect explicit and implicit contracts are fundamental to ensure the stakeholders' support through the whole operation process. The M&A does not finish with the completion of the deal. The effective merger process could take several months to complete and the support of the stakeholders is paramount to achieve good post-acquisition performance. The support of the stakeholders is also fundamental for the resulting entity to achieve good long-term performance. On the other side, acquirer' low ESG performance can bring about difficulties, including employee strikes, low employee productivity, regulators sanctions, and high litigation risk. Deng et al. (2013) found that the positive effect of the acquirer high ESG performance is not fully incorporated into the stock price immediately after the merger announcement date but is reflected on improved performance on the long run. Moreover, they found that the resulting company from a merge with a low ESG performing acquirer experience a deterioration of the post-merger operating performance.

Therefore, an acquirer with high ESG performance should experience better long-term post-acquisition performance compared to an acquirer with lo ESG performance. Based on these considerations we postulate the following hypothesis:

Hypothesis 9) Acquirer*'s high ESG performance (ESG strengths) is positively related to acquirer long-term performance measured by acquirer's ROA.*

Hypothesis 10) Acquirer*'s low ESG performance (ESG concerns) is negatively related to acquirer long-term performance measured by acquirer's ROA.*

2.2 Data sample, variables, and model specifications

2.2.1 Data sample

For this study we use a sample of only completed takeover transactions in the US market that took place between January 1, 1992 and December 31, 2014. Data on takeovers are collected from Thomson Reuters' EIKON M&A database. The transactions that we include are in the forms of: merger, acquisition of assets, acquisition of major assets, and acquisition of certain assets. The following criteria have been applied for selecting the transactions to include in our sample. 1) Target and acquirer are publicly traded to ensure access to all the data we need (accounting and market data). 2) Acquirers own less than 5% of shares of the target firm before the transaction. This criterion is set to ensure that acquirers do not have an information advantage with respect to the target value to capture at best the reducing information asymmetry effect of ESG performance. 3) After the transaction the acquirers own more than 50% of the target firm since we need acquirers to take control of the target firm. Further, we do not take in consideration all the transactions whose payment method is not in the form of cash, stock, or a combination of them or if this information is not available. The transactions matching these criteria are 4,521.

Next, for both acquirers and targets we collected the stock price data from the Center for Research in Security Prices (CRSP) and the accounting data from COMPUSTAT. After eliminating all the operations with missing data, we obtained a final sample of 736 transactions. Finally, we obtained the data about the ESG performance ratings for both

targets and acquirers from KLD. In our sample we have KLD coverage for 535 acquirers and 297 targets, and the transactions where both acquirer and target have data for the ESG performance are 289.

The starting date of our sample is 1991 because the KLD ESG performance ratings are available from that year. In our tests we use one-year-lag ESG performance ratings. The end date of 2013 is due to the availability of aggregate scores up to that point for each ESG performance component.

COMPUSTAT, CRSP, and KLD are accessed via Wharton Research Data Service (WRDS).

2.2.2 Definition of the main variables

Arbitrage spread

Our dependent variable for the first analysis of this thesis is the arbitrage spread. Following Arouri et al. (2019) and Jetley and Ji (2010), the arbitrage spreads are computed one day after the announcement date. The computation of the arbitrage spread depends on the payment's method chose by the acquirer.

The arbitrage spread for cash deals (i.e., mergers in which target shareholders are paid in cash only) is given by:

$$Arb.Spread_{Cash} = \frac{P_{Offer} - P_{Target}}{P_{Target}}$$

Where:

$Arb.Spread_{Cash}$ is the arbitrage spread for a cash deal one trading day after the offer's announcement date;

P_{Offer} is the price in cash that an acquiring company offers to pay for each share of the target company's common stock;

P_{Target} is the target company stock's closing price one trading day after the offer's announcement date.

The arbitrage spread for stock deals (i.e., mergers in which target shareholders are paid with common stock of the acquiring company) is given by:

$$Arb.Spread_{Stock} = \frac{(P_{Acquirer} * ER) - P_{Target}}{P_{Target}}$$

Where:

$Arb.\,Spread_{Stock}$ is the arbitrage spread for a stock deal one trading day after the offer's announcement date;

$P_{Acquirer}$ is the acquirer company stock's closing price one trading day after the offer's announcement date;

ER is the deal exchange ratio (i.e., the number of shares of the acquiring company's common stock offered to the target company's shareholders in exchange for one share of the target company's common stock);

P_{Target} is the target company stock's closing price one trading day after the offer's announcement date.

For the deals where the payment method is a mix of cash and stocks, we computed the arbitrage spread as if it were stock only deals, because the proportion of cash and stock is not available.

Return On Assets

The dependent variables for the second analysis of this thesis are the acquirer's return on assets (ROA) one, two and three years after the announcement date. Following Adra et al. (2018), the ROAs are computed as the net income (or the income before extraordinary items) divided by the total assets. The ROA one year after the announcement date (A.ROAone) is computed at the end of the calendar year after the acquisition announcement year, and so on for A.ROAtwo and A.ROAthree.

ESG coverage, ESG strengths and ESG concerns

Following the work of Hussaini and Rigoni (2020), the main independent variables for the two parts of our analysis are ESG coverage, ESG strengths and ESG concerns of both the target and the acquirer. We obtained these data from KLD, one of the most well-known agencies providing firm ESG performance ratings.

ESG coverage is a binary variable that takes the value of 1 if the firm is covered by KLD ratings in the year prior to the deal announcement, and 0 otherwise.

In the KLD evaluations the firms' ESG performance are divided in 13 dimensions: seven of them are qualitative issue areas and six are controversial business issues. KLD provides binary ratings for a set of strengths and concerns in each of the seven qualitative issue

areas, where 1 shows the presence of a specific strength or concern and 0 shows the absence of such a strength or concern. For the controversial business issues KLD provides a binary rating in terms of concerns only. Because of this difference, following prior research, we only focus on qualitative issue areas. Further, data on human rights are not available for the entire sample period because they were added in 2002; therefore, we exclude human rights from our ESG performance computation. Consequently, our ESG performance computation is based on the six remaining qualitative issue areas: environment, community, employee relations, diversity, product, and governance.

To ensure that market participants have ESG performance information, we use acquirer and target ESG performance in the year prior to the deal announcement. To avoid losing useful information about ESG performance in the context of information asymmetry, following Cho et al. (2013) we compute aggregate ESG strengths and aggregate ESG concerns for each firm separately. To do so, we first sum all ratings for strength or concern indicators in each qualitative issue area and scale them by the maximum possible number of strength or concern indicators in that specific ESG category. Then, to calculate the overall ESG aggregate strengths and concerns, we add all the strength and concern scores across all qualitative issue areas constructed prior and divide it by six, the number of qualitative issue areas.

2.2.3 The definition of control variables

In this section we present the set of variables that we have decided to include in our models. These control variables, according to the literature, may affect the dependent variables and for that reason they are included in our analysis. We are going to describe the expected effect of the control variables on both arbitrage spread and ROA, and they will be ordered depending on if they are associated to the acquirer, the target or the transaction. Definitions and expected signs are also summarized in Table 11 in appendix A.

Acquirer size (A.Size): Large firms feature a lower risk to fail and have a stronger contractual power with lending institutions and other firms in general. For these reasons large firms can finance the M&A operations more easily than small firms, increasing the probability of completion success. Large firms can also have a greater experience in

takeover operations, and they can afford the advice of a greater number of consultants with higher experience. Arouri et al. (2019) found a negative association between the acquirer's size and the arbitrage spread, and we expect to find the same result. Moreover, large firms feature a more experienced managerial board which is better able to manage the post-acquisition processes, leading to higher operating performance compared to firms with a less experienced managerial board. For that reason, like for Cui et al. (2020), we expect to find a positive relation between acquirer's size and acquirer ROA. To control for these effects, we use the logarithm of the acquirer's total assets at the end of the fiscal year preceding the deal announcement.

Acquirer leverage (A.Leverage): Acquirers with a high leverage could find more difficult to finance their takeover operations, decreasing the likelihood of completion success. Arouri et al. (2019) have controlled for this effect and they did not find any significant relation with the arbitrage spread. This variable's sign is left for empirical confirmation. Ghannam et al. (2019) posited that firms with higher leverage tend to avoid value reducing acquisitions, suggesting a positive relation between acquirer leverage and acquirer ROA. We expect to find a positive relation between these last two variables, as it was found by Cui et al. (2020). We calculate the leverage ratio of the acquirer by dividing its long-term debt by its total assets at the end of the fiscal year preceding the deal announcement.

Acquirer free cash flow (A.FCF): Acquirers with a high free cash flow have more resources for undertaking takeover operations without the need of external resources or contingent payment. These imply a higher probability of only cash payments, which in turn is associated with a higher completion probability. Anyway, Arouri et al. (2019) did not find any significant relation between acquirer free cash flow and arbitrage spread. Setting the control variables for the acquirer post-acquisition ROA, Ghannam et al. (2019) included free cash flow as a control for the agency costs. In fact, managers with many resources can have the incentive to waste them in self-serving behaviours. On the other side, a high free cash flow could reflect the good work done by the managerial board and we could expect good performances also after the acquisition. To capture this effect, we calculate the acquirer's free cash flow as operating income before depreciation minus interest expenses, taxes, preferred dividend, and common dividend divided by the book value of total assets. This variable is calculated at the end of the most recent fiscal year before the

deal announcement. The effects sign of this variable on both arbitrage spread and ROA is left for empirical confirmation.

Acquirer market-to-book ratio (A.MB): The acquirer market-to-book ratio could be seen as a proxy of managerial quality. Capable managers are more likely to successfully close a takeover offer, and therefore the arbitrage spread should be lower. On the other side, high M/B ratio could reflect an overvaluation of the stocks, which incentivize the managers to use stock offers, which in turn are associated with a higher completion uncertainty. This variable's sign is left for empirical confirmation. Heron et al. (2002) found that high acquirer market-to-book ratio is associated with higher post acquisition performance and this effect is stronger when the target M/B ratio is low. We expect a positive effect of acquirer market-to-book ratio on acquirer ROA. We calculate acquirer M/B ratio by dividing the market value of common equity by the book value at the end of the fiscal year preceding the deal announcement.

Acquirer stock return (A.Stock.Return): Following Arouri et al. (2019) we include the acquirer stock return to avoid that the ESG performance proxied for managerial quality. Like for the market-to-book ratio, also high stock returns could reflect an overvaluation of the stocks, leading to a higher completion uncertainty in case of stock payment deals. The effect of this variable on both arbitrage spread and post-acquisition ROA is uncertain and is left for empirical confirmation. Acquirer stock return is calculated as the buy and hold cumulative stock returns over the period of -154 business days to -28 business days prior to the deal announcement.

Acquirer bid-ask spread (A.Bid.Ask): A high bid-ask spread could means both high information asymmetry and an abnormal trading volume. In the first case a high bid-ask spread could represent the uncertainty around the deal completion and therefore a higher arbitrage spread is expected. In the second case the increased trading activity could narrow the arbitrage spread. The effect of this variable on both arbitrage spread and post-acquisition ROA is uncertain. The bid-ask spread is calculated as the average over the period of -251 business days to -30 business days prior to the deal announcement of high stock price minus low stock price all divided by the closing stock price.

Acquirer analyst coverage (A.Analyst): The analyst, with their work of collection and elaboration of data, help to reduce the information asymmetry about the firms they

follow. Therefore, we expect that the more are the analyst to cover a firm, the lower is the information asymmetry associated to that firm. Thus, we expect a negative relation between analyst coverage and arbitrage spread. The effect on the acquirer post-acquisition ROA is uncertain. We calculated the analyst coverage as the maximum number of analysts who cover the acquirer and provide earnings forecasts any month in the year before the takeover transaction's year.

Target leverage (T.Leverage): Target firms with high debt levels are less attractive and the acquirer shareholders could react negatively when the bidding firm management make a takeover offer (Loyeung, 2019). This reaction should lower the probability of a successful completion, thus increasing the arbitrage spread. Despite Branch et al. (2003) found that the target leverage is positively related to the probability of takeover attempt success, we expect to find a positive relation between target leverage and arbitrage spread. The effect on the acquirer post-acquisition ROA is uncertain. The target leverage ratio is calculated like the acquirer leverage.

Target market-to-book ratio (T.MB): A high market-to-book ratio could mean that the target firm stock price is overvalued. This could make more difficult to find an agreement for the two involved companies, because the information asymmetry is higher. A high market-to-book ratio is also associated to high growth companies, which are more complicated to evaluate. Both the cases could lead to a higher arbitrage spread and, like Arouri et al. (2019), we expect to find a positive association between target M/B ratio and arbitrage spread. Specular to what we have stated before, a low market-to-book ratio could mean that the target firm is undervalued, and this could lead to an improvement of the acquirer post acquisition ROA. A low M/B ratio could also signal restricted investment opportunities (Gomes et al., 2018), thus leading to a negative effect on the acquirer ROA. This variable's sign is left for empirical confirmation. The target market-to-book ratio is calculated like the acquirer M/B ratio.

Target return on asset (T.ROA): The effect of the target ROA on the arbitrage spread is uncertain. We could expect that the acquisitions of targets with high earnings may lead to an improvement of the bidders ROA. Gomes et al. (2018) suggest that buying a firm with strong earnings could also reduce the potential gains coming from the replacement of inefficient management, which in turn have a negative association with the acquirer post

acquisition performance. This variable's sign is left for empirical confirmation. The target ROA is calculated as the net income (or income before extraordinary items) divided by the total assets.

Target sales growth (T.Sales.Growth): The evaluation of a firm with high sales growth could be more difficult and this could be the source of a higher information asymmetry, thus leading to a higher uncertainty about the deal completion. We expect to find a positive relation between target sales growth and arbitrage spread. For the effect of the target sales growth on the acquirer post acquisition ROA we can do a similar reasoning to the one done for the effects of target ROA. This variable's sign is left for empirical confirmation. The target sales growth is obtained doing the difference between the target sales on the fiscal year prior the deal announcement and the target sales two fiscal years prior the deal announcement all divided by the target sales two fiscal years prior the deal announcement.

Target R&D expenditure (T.RD): Following the previous literature (Choi et al., 2015; Gomes et al., 2018) target's R&D capital is usually considered one of the main factors that contribute to information asymmetry. Consequently, we expect to find a positive relation between target R&D expenditure and arbitrage spread. Target's R&D activities can feature important synergistic resources to the acquirer (Gomes et al., 2018), and could be expected to be positively related to acquirer post-acquisition ROA. This variable is computed by dividing the target's R&D expenditure by its total assets at the end of the most recent fiscal year before the deal announcement.

Target bid-ask spread (T.Bid.Ask): For the target bid-ask spread we can apply the same reasoning done for the acquirer bid-ask spread. The effect of this variable on both arbitrage spread and post-acquisition ROA is left for empirical confirmation. We have obtained this variable in the same way of the acquirer bid-ask spread.

Target analyst coverage (T.Analyst): For the target analyst coverage we can apply the same reasoning done for the acquirer analyst coverage. We expect a negative relation between target analyst coverage and arbitrage spread. The effect on the acquirer post-acquisition ROA is uncertain. We have obtained this variable in the same way of the acquirer analyst coverage.

Target high-tech (T.Hi.Tech): High-tech firms are characterized by a high level of human capital and intangible assets, making it more difficult to evaluate their value. The high information asymmetry regarding these firms may result in a higher completion uncertainty and therefore in a higher arbitrage spread. We expect to find a positive relation between this variable and the arbitrage spread. The effect on the acquirer post-acquisition ROA is uncertain. We create the target high-tech variable by defining it equal to 1 when the target belongs to a high-tech industry and define it 0 otherwise.

Relative size (R.Size): The firm size is an important factor in predicting the success of a takeover. The larger is the relative size of the target compared to the acquirer, the more problematic becomes the information asymmetry (Branch et al., 2003). On the other side, firms with smaller capitalization are likely to have less liquid stocks, making more difficult to take position in the target firm (Jindra et al., 2004) and therefore increasing the arbitrage spread. We leave this variable's sign for empirical confirmation. Larger targets are associated with higher integration costs (Gomes et al., 2018) and therefore we can expect a negative association between relative size and acquirer post-acquisition ROA. The relative size is computed as the target firm's total assets divided by the acquirer firm's total assets at the end of the most recent fiscal year prior to the deal announcement.

Cash dummy (Cash.Only): Branch et al. (2004) found that cash deals appear to be associated with narrower arbitrage spreads, suggesting that M&A operations with cash are more likely to be successful than stock offers. Like in Arouri et al. (2019), we expect to find a negative relation between the cash dummy variable and the arbitrage spread. Cash deals were also found to have a positive effect on the acquirer post-acquisition operating performance (Cui et al., 2020). Thus, we expect to find a positive association between cash dummy variable and acquirer post-acquisition ROA. The cash dummy variable is constructed by defining it equal to 1 when the payment method is cash only and define it 0 otherwise.

Stock dummy (Stock.Only): Contrary to cash payments, stock payments are associated with higher information asymmetry and lower post acquisition performance for the acquirer (Cui et al., 2020). We expect an opposite effect compared to the cash dummy variable for both arbitrage spread and acquirer post-acquisition ROA. The stock dummy variable is

constructed by defining it equal to 1 when the payment method is stock only and define it 0 otherwise.

Bid premium (Premium): The bid premium has a double effect on the arbitrage spread. An offer with a high bid premium is more likely to be accepted by the target company, thus reducing the completion uncertainty and in turn reducing the arbitrage spread. On the other side, a high bid premium has the effect to deter competing bids, making the probability of bid revision less likely and therefore it could increase the arbitrage spread. The second effect seems to prevail (Jindra et al., 2004) so we expect to find a positive relation between bid premium and arbitrage spread. The effect of the bid premium on the acquirer post-acquisition performance is uncertain. We computed this variable subtracting from the final target share price paid by the acquirer the target share price 28 days before the deal announcement, all divided by the latter.

Related industry (Related): The industry relatedness of target and acquirer can have an impact on the characteristics of a deal as well as on the probability of its completion (Jindra et al., 2004). Indeed, the information asymmetry is lower when the two involved firms operate in the same industry (Loyeung, 2019) and therefore we could expect a negative effect of the related industry variable on the arbitrage spread. Heron et al. (2002) found that the operating performance improvements are significantly greater when target firms are from the same industry as the acquirer and Cui et al. (2020) suggested that industry-specific knowledge and experience of the acquirer managerial team are much more important than generic managerial ability in effectively managing the integration process. Thus, we expect to find a positive relation between the related industry variable and the acquirer post-acquisition ROA. We control for this variable by defining it equal to 1 when the target and the acquirer are in the same two-digit SIC industry and define it 0 otherwise.

Same state (S.State): Previous studies have documented that the geographical distance between the acquirer and the target could represent a source of information asymmetry. Similarly, the information asymmetry between the two involved firms could be higher when the target and the acquirer are based in two different states. We expect to find a negative relation between the same state dummy variable and the arbitrage spread. The effect of this variable on the acquirer post-acquisition ROA is uncertain. To control for this

effect, we have constructed a dummy variable that takes the value of 1 if a target and an acquirer are in the same US state, and 0 otherwise.

A summary of definitions and of expected signs on the dependent variables is provided in Table 11 in appendix A.

2.2.4 Model specification

In this thesis we have performed two different analyses with a similar model. In the first part we have examined whether target and acquirer ESG performance rating coverage and ESG performance levels affect the completion uncertainty proxied by the arbitrage spread ($Arb.Spread$). In the second part we have examined whether the ESG performance levels (i.e., ESG strengths and ESG concerns) have an impact on acquirer return on assets on the three calendar years subsequent the deal announcement ($A.ROA(t+k)$, with $k = 1, 2, 3$ to represent the one, two and three years following the deal announcement).

For the first part we have performed two sets of tests. In the first, we have examined the effect of the mere availability of target and acquirer ESG ratings on the dependent variable (hypothesis 1 and 2). In the second, we have examined the impact of ESG strengths and concerns of both acquirer and target on arbitrage spread (hypothesis 3, 4, 5 and 6).

For the second part we have examined the impact of ESG strengths and concerns of both acquirer and target on acquirer post-acquisition return on assets (hypothesis 7, 8, 9 and 10)

The linear regression models for the two parts of our analysis are the following:

First Model: $$Arb.Spread_i = \alpha + \beta X_i + \gamma Z_i + \tau + \vartheta + \varepsilon_i$$

Second Model: $$A.ROA(t+k)_i = \alpha + \beta X_i + \gamma Z_i + \tau + \vartheta + \varepsilon_i \quad \text{with} \quad k = 1, 2, 3$$

In both the models, X_i is the vector of our variables of interest and Z_i is the vector of control variables.

In the first set of tests for the first model the variables of interest are the target ESG performance rating availability ($T.KLD.Cov$) and the acquirer ESG performance rating availability ($A.KLD.Cov$).

For the second model and for the second set of tests for the first model, the variables of interest are target ESG strengths ($T.ESG.Strenghts$), target ESG concerns ($T.ESG.Concerns$), acquirer ESG strengths ($A.ESG.Strenghts$) and acquirer ESG concerns ($A.ESG.Concerns$).

Z_i is the vector of control variables that we have included in all our tests. These control variables are:

- Acquirer size *(A.Size).*
- Acquirer leverage *(A.Leverage).*
- Acquirer free cash flow *(A.FCF).*
- Acquirer market-to-book ratio *(A.MB).*
- Acquirer stock return *(A.Stock.Return).*
- Acquirer bid-ask spread *(A.Bid.Ask)*.
- Acquirer analyst coverage *(A.Analyst).*
- Target leverage *(T.Leverage).*
- Target market-to-book ratio *(T.MB).*
- Target return on asset *(T.ROA).*
- Target sales growth *(T.Sales.Growth).*
- Target R&D expenditure *(T.RD).*
- Target bid-ask spread *(T.Bid.Ask).*
- Target analyst coverage *(T.Analyst).*
- Target high-tech *(T.Hi.Tech).*
- Relative size *(R.Size).*
- Cash dummy *(Cash.Only).*
- Stock dummy *(Stock.Only).*
- Bid premium *(Premium).*
- Related industry *(Related).*
- Same state *(S.State).*

Finally, in all our tests we have controlled the year effect (τ) and the industry effect (ϑ).

2.3 Results

2.3.1 Descriptive statistics

Table 1 reports the sample distribution across years, the arbitrage spread, the acquirer return on assets one, two and three years after the announcement date, target and acquirer ESG coverage, and industry relatedness of the deal according to two-digit SIC codes.

Table 1 reveals that the average arbitrage spread has declined after the 90's, confirming the results showed by Jetley et al. (2010). In our regressions we control the year effect to check for this trend. Looking at the ROA, we can see that the ROA one year subsequent the deal announcement is on average lower that the ROAs on two and three years after the announcement date. This could suggest that the possible positive effects of a merge can take some time before appearing. Furthermore, for both targets and acquirers, the ESG coverage increase sharply in 2004. This is because during that year KLD expanded its coverage to the largest 3,000 US firms.

Table 1. Sample Characteristics

This table reports the distribution of the deals year by year, the average arbitrage spread (Arb.Spread), the average acquirer's ROA for each of the three years following the announcement date (ROA (t+1), ROA (t+2), ROA (t+3)), the ESG coverage of target and acquirer, and industry relatedness of the deal according to two-digit SIC code.

Year	No. of Deals	Arb.Spread	ROA (t+1)	ROA (t+2)	ROA (t+3)	T.ESG.Cov	A.ESG.Cov	Related
1992	4	14.25%	1.71%	4.48%	3.82%	1	2	4
1993	5	7.73%	-4.42%	2.16%	3.62%	0	1	4
1994	10	16.79%	8.13%	9.60%	9.62%	1	5	7
1995	18	9.77%	4.09%	3.50%	2.75%	1	4	13
1996	22	14.46%	4.13%	6.22%	4.13%	1	5	12
1997	22	8.40%	2.05%	1.94%	5.67%	1	7	11
1998	28	14.21%	3.91%	3.01%	1.52%	1	8	17
1999	44	13.57%	-2.51%	-0.46%	-3.21%	2	27	19
2000	41	9.27%	-3.38%	1.09%	3.04%	1	15	31
2001	40	9.22%	-9.11%	-1.49%	2.24%	1	13	30
2002	26	9.03%	0.25%	-0.78%	-1.59%	2	16	20
2003	29	4.11%	1.05%	1.48%	2.29%	1	16	21
2004	37	2.92%	2.16%	3.26%	3.59%	23	35	23
2005	45	3.65%	-0.85%	3.60%	0.19%	28	39	32
2006	47	2.71%	4.95%	3.48%	4.23%	32	46	22
2007	45	4.35%	2.08%	2.35%	4.40%	34	43	27
2008	30	0.93%	5.26%	6.72%	5.15%	16	28	21
2009	32	9.33%	6.63%	7.42%	6.65%	23	30	20
2010	52	2.67%	4.40%	4.02%	3.01%	35	48	37
2011	25	9.60%	1.30%	2.72%	3.48%	19	22	19
2012	38	6.71%	4.80%	5.12%	4.57%	23	37	22
2013	40	8.67%	2.19%	2.87%	3.12%	26	37	31
2014	56	3.35%	0.90%	1.65%	1.75%	25	51	45
Total	736	6.97%	1.65%	2.93%	2.91%	297	535	485

Further, Table 2 shows that a larger fraction of the deals that took place between acquirers and targets belonged to the same two-digit industry.

Table 2 provides summary statistics for all the variables included in our models, both dependent and independent. High standard deviation in some variables necessitates reporting the medians of the variables as well.

We can observe that 72.7% of the acquirers and 40.4% of the targets in our total sample have ESG performance ratings available. This difference can be explained by the fact that rating agencies tend to cover larger firms. Moreover, acquirers have higher ESG strengths compared to targets. Acquirers have an average (median) ESG strength of 0.094 (0.049), while the average (median) ESG strength of targets is only 0.025 (0). Then, the average

(median) measure of ESG concerns is 0.089 (0.067) for acquirers while the corresponding measure for targets is 0.072 (0.06). Further, we can notice that more than half of the target firms covered by KLD have a ESG strengths rating equal to zero, which can mean both no information available and a lack of good performance.

Looking at control variables, as expected, acquirers are bigger than targets. On average, the latter is 33,2% the size of the bidder. In mean, the debt structure of both the involved companies in a merger is quite similar; acquirers have an average (median) of 0.159 (0.128) and targets have an average (median) of 0.137 (0.05). We can notice that more than 25% of the targets are unlevered. The average (median) M/B ratio for acquirers is 3.97 (2.62), whereas the corresponding ratio for targets is 2.59 (1.98). As shown also by the 1st and 3rd percentile, the bidders have higher M/B ratios than the targets. The average (median) bid-ask spread for targets is 0.05(0.04), slightly higher than the 0.03(0.03) of acquirers. As expected, acquirers are followed by a higher number of analysts compared to targets. The average (median) analyst coverage for the acquirers is 14.6 (12.5) while for the targets is only 6.04 (4). We can notice that the average target return on assets is negative (-0.04). Compared to the acquirer post-acquisition ROA, the target ROA in the 1st, 2nd and 3rd percentile are lower. These results could sustain the disciplinary role view of the M&A market. Looking at the payment methods, we can see that 49.5% of the deals are done with cash only, 29.1% are done with stocks only and the remaining 21.4% are mixed. The 23.8% of the target firms are in high-tech industries. Finally, 66.3% of the transactions took place between companies that were in the same industry based on their two-digit SIC code, and in 23.8% of the cases the two involved companies were based in the same US state.

In Table 3 we report the correlations between our explanatory variables. We can notice that there are several significant correlations among those variables. The highest correlation is between acquirer bid-ask spread and target bid-ask spread (0.64), which is significant at the 1% level. To account for possible multicollinearity issues in our regression models, we have examined the variance inflation factor (VIF) for linear regression models. The maximum VIF for each model is reported at the bottom of the regressions results table. Using the conventional rule of thumb of 10, we can state that all VIFs are within the acceptable range (the highest VIF founded is 5.82) and thus multicollinearity is not a concern in our results.

Table 2. Descriptive Statistics

This table reports the descriptive statistics of acquirer, target, and transaction-related variables for the sample of 736 US completed takeovers that took place between publicly traded acquirers and targets over the period of 1992 to 2014

Variable	N	Mean	St. Dev.	Min	Pctl(25)	Median	Pctl(75)	Max
Arb.Spread	736	0.070	0.173	-0.886	0.009	0.030	0.078	1.798
A.ROAone	667	0.017	0.189	-3.075	0.008	0.033	0.079	0.341
A.ROAtwo	648	0.029	0.105	-1.206	0.009	0.038	0.078	0.292
A.ROAthree	565	0.029	0.107	-1.058	0.008	0.035	0.077	0.431
A.KLD.Cov	736	0.727	0.446	0	0	1	1	1
A.ESG.Strengths	535	0.094	0.121	0	0	0.049	0.118	0.756
A.ESG.Concerns	535	0.089	0.085	0	0.033	0.067	0.123	0.533
T.KLD.Cov	736	0.404	0.491	0	0	0	1	1
T.ESG.Strengths	297	0.025	0.045	0	0	0	0.03	0.35
T.ESG.Concerns	297	0.072	0.063	0	0.03	0.06	0.11	0.35
A.Size	736	3.563	0.907	0.620	2.91	3.59	4.2	6.05
A.Leverage	736	0.159	0.155	0	0.034	0.128	0.232	0.811
A.FCF	736	0.066	0.097	-0.780	0.01	0.07	0.12	0.38
A.MB	736	3.972	9.838	-142.830	1.71	2.615	4.195	163.42
A.Stock.Return	736	0.097	0.368	-0.752	-0.0705	0.052	0.202	5.721
A.Bid.Ask	736	0.032	0.018	0.010	0.021	0.027	0.039	0.116
A.Analyst	736	14.610	10.566	0	6	12.5	22	54
T.Leverage	736	0.137	0.222	0	0	0.05	0.2	3.23
T.MB	736	2.586	7.089	-111.970	1.19	1.98	3.292	58.15
T.ROA	736	-0.040	0.254	-2.880	-0.04	0.01	0.06	0.4
T.Sales.Growth	736	0.268	1.225	-1	-0.01	0.09	0.23	22.07
T.RD	736	0.074	0.131	0	0	0.005	0.11	0.98
T.Bid.Ask	736	0.046	0.025	0.009	0.028	0.040	0.058	0.166
T.Analyst	736	6.041	6.421	0	1	4	9	42
T.Hi.Tech	736	0.238	0.426	0	0	0	0	1
R.Size	736	0.332	1.596	0	0.02	0.105	0.33	41.24
Cash.Only	736	0.495	0.500	0	0	0	1	1
Stock.Only	736	0.291	0.500	0	0	0	1	1
Premium	736	0.455	0.453	-0.911	0.2025	0.3695	0.612	5.176
Related	736	0.663	0.473	0	0	1	1	1
S.State	736	0.238	0.426	0	0	0	0	1

Table 3. Correlation Matrix

This table reports the correlation coefficients for the explanatory variables that are used in the regression models. The sample consists of 739 US completed takeovers that took place between publicly traded acquirers and targets over the period of 1992 to 2014. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively.

	1	2	3	4	5	6	7	8	9	10	11	12	13
1.A.KLD.Cov	1												
2. A.ESG.Strengths		1											
3. A.ESG.Concerns		0.47***	1										
4. T.KLD.Cov	0.45***	0.2***	0.23***	1									
5. T.ESG.Strengths	0.04	0.23***	0.19***		1								
6. T.ESG.Concerns	-0.03	0.04	0.34***		0.13**	1							
7. A.Size	0.57***	0.56***	0.51***	0.39***	0.2***	0.1*	1						
8. A.Leverage	0.02	0.01	-0.03	0.16***	-0.04	-0.01	0.05	1					
9. A.FCF	0.15***	0.13***	0.07	0.12***	-0.02	0.01	0.13***	0.02	1				
10. A.MB	-0.01	0.04	0.02	-0.01	-0.02	0.05	-0.01	0.13***	0.11***	1			
11. A.Stock.Return	-0.13***	-0.01	-0.04	-0.05	-0.03	-0.06	-0.03	0.02	0.02	0.03	1		
12. A.Bid.Ask	-0.46***	-0.22***	-0.13***	-0.31***	-0.08	0.04	-0.53***	-0.07**	-0.25***	0.08**	0.12***	1	
13. A.Analyst	0.46***	0.37***	0.27***	0.23***	0.15**	0.04	0.63***	-0.07*	0.27***	0.13***	0.02	-0.26***	1
14. T.Leverage	0.04	0.02	0.09**	0.17***	0.01	0.03	0.09**	0.32***	0.02	0.01	0	-0.1**	-0.03
15. T.MB	-0.01	-0.04	-0.09*	-0.04	-0.06	-0.01	-0.08**	-0.08**	0.09**	0.07*	0.04	0.07*	0.06*
16. T.ROA	0.06	-0.09**	-0.08*	0.13***	0.04	0.09	0.12***	0.05	0.12***	-0.04	0.06	-0.18***	0.03
17. T.Sales.Growth	-0.02	0.04	0.05	-0.08**	-0.06	-0.01	0.02	0.11***	0.04	0.22***	0.01	0.03	0.1**
18. T.RD	0	0.2***	0.13***	-0.06	-0.07	-0.08	-0.08**	-0.12***	0.02	0.06	0	0.16***	0.17***
19. T.Bid.Ask	-0.26***	0.03	0.03	-0.29***	-0.17***	0	-0.31***	-0.13***	-0.05	0.1**	0.07*	0.64***	0
20. T.Analyst	0.25***	0.28***	0.22***	0.5***	0.32***	0.07	0.34***	0.07*	0.16***	0.05	0.01	-0.12***	0.47***
21. T.Hi.Tech	-0.04	0.1**	-0.03	-0.04	-0.06	-0.05	-0.09**	-0.11***	0.08**	0.04	0.12***	0.25***	0.13***
22. R.Size	-0.05	-0.04	-0.01	-0.01	0.06	0.12**	-0.2***	0	-0.03	0	-0.03	0.06	-0.07*
23. Cash.Only	0.27***	0.21***	0.15***	0.14***	-0.08	-0.15**	0.21***	0.06	0.26***	-0.03	-0.04	-0.25***	0.18***
24. Stock.Only	-0.27***	-0.16***	-0.07*	-0.22***	-0.01	0.08	-0.14***	-0.13***	-0.19***	0.08**	0.06*	0.22***	-0.07**
25. Premium	0.01	0.11**	0.05	-0.11***	-0.03	-0.01	-0.03	-0.06*	-0.02	0.04	-0.03	0.12***	0.05
26. Related	-0.09**	-0.12***	-0.13***	-0.06*	0.06	0.05	-0.1**	-0.02	-0.12***	0.01	0.03	0.06	-0.1**
27. S.State	-0.07**	-0.09**	-0.11**	-0.05	0	0.01	-0.03	-0.07**	-0.11***	-0.03	0.01	-0.01	-0.09**

(Continued)

Table 3. Correlation Matrix (continued)

	14	15	16	17	18	19	20	21	22	23	24	25	26
14. T.Leverage	1												
15. T.MB	-0.14***	1											
16. T.ROA	-0.07*	-0.04	1										
17. T.Sales.Growth	0.04	0.03	-0.06	1									
18. T.RD	-0.06	0.13***	-0.6***	0.07*	1								
19. T.Bid.Ask	-0.08**	0.05	-0.44***	0.1**	0.39***	1							
20. T.Analyst	0.13***	0.05	0.1**	0.01	0.02	-0.15***	1						
21. T.Hi.Tech	-0.16***	0.11***	-0.06*	0.03	0.24***	0.27***	0.1**	1					
22. R.Size	0.09**	0	0.03	0.01	-0.06	-0.03	0.04	-0.05	1				
23. Cash.Only	0	-0.05	-0.05	-0.03	0.15***	-0.03	-0.04	0.13***	-0.12***	1			
24. Stock.Only	-0.12***	0.04	0	0.07*	-0.06	0.06	-0.08**	-0.06	0.02	-0.63***	1		
25. Premium	0.06	-0.05	-0.25***	0.04	0.24***	0.27***	-0.05	0.05	-0.01	0.1**	-0.02	1	
26. Related	0.06*	-0.03	-0.02	0.02	0.04	-0.08**	-0.02	-0.03	0.06	-0.17***	0.12***	-0.04	1
27. S.State	-0.08*	0	0	-0.01	-0.03	-0.11***	-0.02	-0.03	0.02	-0.16***	0.11***	-0.06*	0.08**

2.3.2 ESG coverage, ESG strengths, ESG concerns and arbitrage spread

In Table 4 we report the estimates of four alternative versions of our first linear regression model to examine whether ESG coverage of targets and acquirers have an impact on arbitrage spread. We have built a hierarchical regression analysis to assess the effect of each variable of interest. Model 1 includes only the control variables. In Model 2, we add the targets' ESG coverage variable, and in Model 3 we insert the acquirers' ESG coverage instead of the targets' ESG coverage. In the last model (Model 4) we include both targets and acquirers ESG coverage to examine their simultaneous effect on arbitrage spread. Following a similar process, in Table 5 we report the estimates of three alternative regression models to examine the effect of the ESG strengths and ESG concerns of both targets and acquirers on arbitrage spread. Using the same control variables, in Model 5 we check the effects of targets ESG strengths and concerns. In model 6 we control for acquirers ESG strengths and concerns and in model 7 we include both targets and acquirers ESG strengths and concerns. The number of observations available for the analysis of ESG strengths and concerns is reduced compared to the initial sample accordingly to KLD coverage. Specifically, Model 5 (only target ESG performance) has 297 observations available, Model 6 (only acquirer ESG performance) has 535 observations available, and Model 7 (both target and acquirer ESG performance) has 289 observations

available. All the regressions in our study were run using White's (1980) heteroscedasticity-consistent standard errors.

Looking at the control variables in our four models for the ESG coverage in Table 4, we can notice that the only significant variables are acquirer bid-ask spread, target bid-ask spread and bid premium. Consistent with the findings in prior studies (Arouri et al., 2019; Jindra et al., 2004), bid premium is positively related to arbitrage spread, with significant levels of 1% in all our four models. The high bid premium deterring effect on competing offers seems to have a stronger impact on arbitrage spread than the opposite effect of an increased likelihood of deal acceptance by the target company. Also the acquirer bid-ask spread is positively related to arbitrage spread with significant levels of 1% in all the models. Higher acquirer bid-ask spread seems to be a good proxy for the uncertainty around an M&A. An opposite effect is shown by the results of the target bid-ask spread. All significant at the 10% level, the target bid-ask spread coefficients have a negative sign, suggesting that the abnormal volume of transactions on the target stocks has the effect of reducing the arbitrage spread, prevailing on the effect of a greater uncertainty, and confirming the results of Jindra et al. (2004).

Consistent with Arouri et al. (2019), we find no evidence of a possible effect on the arbitrage spread of acquirers' managerial quality proxied by the acquirer cumulative stock returns prior the deal announcement, as well as for the acquirer leverage, the acquirer free cash flow and the acquirer market-to-book ratio. Looking at the findings of previous studies, Arouri et al. (2019) found the acquirer size to be negatively related to arbitrage spread. We find a similar result, but our findings are not significant. Whereas Arouri et al. (2019) found a positive coefficient for the target market-to-book ratio, we find a negative and unsignificant relation. Finally, consistent with the general literature on M&As, even if not significant, cash payments (stock payments) are negatively (positively) associated with arbitrage spread, confirming that cash payments feature on average a lower completion uncertainty.

In this first set of analysis we have found no results in support of hypothesis 1 and hypothesis 2. The KLD coverage of both targets and acquirers do not seem to have any effect on arbitrage spread. We will try to provide an explanation for these non-results after having commented the results of the regression models for the acquirers and targets ESG strengths and concerns.

Table 4. ESG Coverage and Arbitrage Spread

This table reports the results of linear regression models where the dependent variable is the arbitrage spread. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

	Model 1	Model 2	Model 3	Model 4
Constant	0.102	0.1025	0.1001	0.1007
	(0.9959)	(1.0010)	(0.9754)	(0.9807)
T.KLD.Cov		0.0062		0.0061
		(0.3780)		(0.3693)
A.KLD.Cov			0.0063	0.0062
			(0.3582)	(0.3473)
A.Size	-0.0035	-0.0042	-0.0042	-0.0049
	(-0.2790)	(-0.3358)	(-0.3291)	(-0.3845)
A.Leverage	0.0155	0.0149	0.0159	0.0152
	(0.2739)	(0.2601)	(0.2803)	(0.2664)
A.FCF	0.0009	0.0019	0.0012	0.0022
	(0.0084)	(0.0180)	(0.0121)	(0.0213)
A.MB	-0.0007	-0.0007	-0.0007	-0.0007
	(-1.5491)	(-1.5531)	(-1.5171)	(-1.5214)
A.Stock.Return	0.005	0.0048	0.0055	0.0052
	(0.3044)	(0.2886)	(0.3295)	(0.3127)
A.Bid.Ask	2.4843***	2.4843***	2.5063***	2.5057***
	(3.3189)	(3.3201)	(3.3568)	(3.3584)
A.Analyst	0.001	0.001	0.0009	0.0009
	(1.2285)	(1.2780)	(1.1777)	(1.2261)
T.Leverage	0.0414	0.0404	0.0416	0.0406
	(1.2615)	(1.2299)	(1.2704)	(1.2388)
T.MB	-0.0001	-0.0001	-0.0001	-0.0001
	(-0.1970)	(-0.1893)	(-0.2154)	(-0.2073)
T.ROA	0.0144	0.014	0.0146	0.0143
	(0.5226)	(0.5072)	(0.5286)	(0.5133)
T.Sales.Growth	0.0013	0.0014	0.0013	0.0015
	(0.2362)	(0.2650)	(0.2446)	(0.2726)
T.RD	-0.0381	-0.0382	-0.0367	-0.0368
	(-0.7159)	(-0.7186)	(-0.6927)	(-0.6960)
T.Bid.Ask	-0.7512*	-0.7464*	-0.7525*	-0.7478*
	(-1.8002)	(-1.8020)	(-1.8050)	(-1.8068)
T.Analyst	-0.0001	-0.0003	-0.0001	-0.0003
	(-0.1233)	(-0.2568)	(-0.0983)	(-0.2310)
T.Hi.Tech	-0.0063	-0.0055	-0.0058	-0.005
	(-0.3293)	(-0.2776)	(-0.3002)	(-0.2516)
R.Size	0.0006	0.0005	0.0005	0.0004
	(0.2418)	(0.2238)	(0.1888)	(0.1725)
Cash.Only	-0.0044	-0.0042	-0.0043	-0.0042
	(-0.2560)	(-0.2465)	(-0.2546)	(-0.2453)
Stock.Only	0.0048	0.0048	0.0051	0.005
	(0.2512)	(0.2490)	(0.2625)	(0.2601)
Premium	0.0856***	0.0858***	0.0852***	0.0854***
	(3.6012)	(3.6066)	(3.5978)	(3.6027)
Related	-0.0024	-0.0022	-0.0024	-0.0022

	(-0.1787)	(-0.1665)	(-0.1815)	(-0.1695)
S.State	0.0201	0.0203	0.0203	0.0205
	(1.1296)	(1.1370)	(1.1614)	(1.1683)
Year Effect	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes
Observations	736	736	736	736
Adjusted R²	0.093	0.092	0.092	0.091
Maximum VIF	4.00	4.12	4.13	4.24

Looking at the results of the analysis for the ESG strengths and concerns on Table 5 we can notice that the coefficients of the control variables change slightly. Bid premium is still positively related to arbitrage spread (significant at the 5% level) while target bid-ask spread and acquirer bid-ask spread are not significant in these three models. Model 5 and Model 7 present a negative coefficient for the acquirer market-to-book ratio significant at the 5% level. This suggest that acquirer's managerial quality could reduce completion uncertainty. Moreover, in the same two models (Model 5 and Model 7), target leverage is positively related to arbitrage spread with a 5% significant level. Consistent with our expectations, target firms with high debt levels are less attractive and acquirer shareholders could react negatively when the bidding firm management make a takeover offer, increasing the uncertainty around a takeover. Finally, in line with the literature, in Model 6 we find a negative coefficient for cash payments significant at the 1% level and a positive coefficient for stock payments significant at the 5% level, confirming that cash payments feature on average a lower completion uncertainty.

In this second set of analysis, we find only one significant coefficient among our variables of interest. Consistent with our hypothesis 3 and 4, target' ESG strengths and concerns are negatively related to arbitrage spread, but the coefficients are not significant. Unexpectedly, but not significant, acquirer ESG strengths seems to be positively related to arbitrage spread, contrary to what we posited in hypothesis 5. Finally, in Model 6, acquirer ESG concerns is positively related to arbitrage spread with a 10% significant level, giving support to our hypothesis 6.

Table 5. ESG Strengths and Concerns and Arbitrage Spread

This table reports the results of linear regression models where the dependent variable is the arbitrage spread. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

	Model 5	Model 6	Model 7
Constant	0.0149	0.0098	0.0448
	(0.1127)	(0.1034)	(0.3013)
T.ESG.Strengths	-0.0274		-0.0276
	(-0.1160)		(-0.1075)
T.ESG.Concerns	-0.1908		-0.2036
	(-1.1608)		(-1.2669)
A.ESG.Strengths		0.0262	0.0751
		(0.3868)	(0.8229)
A.ESG.Concerns		0.1768*	0.1094
		(1.8551)	(0.7919)
A.Size	-0.0041	-0.0141	-0.0207
	(-0.2210)	(-0.7715)	(-0.8427)
A.Leverage	-0.0113	0.013	-0.0259
	(-0.0913)	(0.1855)	(-0.2038)
A.FCF	-0.0165	0.2659	0.0904
	(-0.1050)	(1.4180)	(0.5507)
A.MB	-0.0036**	-0.0011	-0.0042**
	(-2.0273)	(-1.1890)	(-2.2290)
A.Stock.Return	-0.0563	-0.0164	-0.0955*
	(-1.0095)	(-0.4232)	(-1.8414)
A.Bid.Ask	0.8524	1.5755	1.7509
	(0.5754)	(1.5289)	(1.2405)
A.Analyst	0.0011	0.0013	0.0014
	(1.0120)	(1.4932)	(1.1311)
T.Leverage	0.0862**	0.0405	0.0717**
	(2.0248)	(1.4054)	(1.9848)
T.MB	0.0007	-0.0001	0.0003
	(1.0412)	(-0.1370)	(0.4904)
T.ROA	0.0805	0.0001	0.0369
	(1.0479)	(0.0014)	(0.5359)
T.Sales.Growth	-0.0187	-0.0022	-0.0217
	(-0.3824)	(-0.4452)	(-0.4462)
T.RD	-0.0768	-0.0626	-0.0816
	(-0.4225)	(-1.1763)	(-0.4411)
T.Bid.Ask	-0.9297	-0.4413	-1.2548
	(-0.7737)	(-0.7122)	(-1.1314)
T.Analyst	0.0015	-0.0004	0.0004
	(0.7829)	(-0.3649)	(0.2384)
T.Hi.Tech	-0.0198	0.0036	-0.0145
	(-0.7012)	(0.2109)	(-0.4947)
R.Size	-0.0186	-0.0009	0.015
	(-0.4674)	(-0.4460)	(0.4742)
Cash.Only	-0.0264	-0.0240*	-0.0104
	(-1.0530)	(-1.7048)	(-0.4887)
Stock.Only	0.015	0.0439**	0.0344

	(0.4705)	(1.9753)	(1.0791)
Premium	0.1429**	0.0639**	0.1178**
	(2.3034)	(2.3766)	(2.0180)
Related	-0.0154	0.0153	-0.0147
	(-0.8487)	(1.1296)	(-0.8163)
S.State	0.0296	0.0245	0.0377
	(0.7847)	(1.1895)	(1.0044)
Year Effect	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes
Observations	297	535	289
Adjusted R^2	0.120	0.066	0.081
Maximum VIF	4.98	5.12	5.67

Arouri et al. (2019) stated that more socially responsible firms are perceived by the market as more capable of successfully and timely completing mergers and acquisitions. In fact, they found that arbitrage spreads are negatively related to the acquirer's ESG performance. Looking at Table 4 and Table 5, we find only partially comparable results. This misalignment with our expectations and the most recent literature could be explained by looking at the structure of our dataset. Arouri et al. (2019) used a more recent set of data (from 2004 to 2016), with more than 70% of the offers taking place after 2010. Our dataset is "older", with 21% of the deals relative to the 90's, 50% in the first decade of the millennium and the remaining 29% taking place after the 2010. The last years increased attention of the investors on the environmental and social issues could help to explain the differences in our results. Our sample is focused on the US market while Arouri et al. (2019) used a geographically diverse sample, with companies based in 45 different countries. As shown by Choi et al. (2015), a geographic remote acquirer is more likely to utilize signals associated with a target's ESG ratings to mitigate problems of information asymmetry. Finally, while Arouri et al. (2019) use a data sample of both successful and unsuccessful bids, our study is focused only on successfully completed mergers.

2.3.3 ESG strengths, ESG concerns and acquirer ROA

In Table 6 and in Table 7 we report the estimates for different versions of our second linear regression model to examine whether ESG strengths and ESG concerns of targets and acquirers have an impact on the post/acquisition ROA of the bidding firm. In Table 6 we present 3 models: Model 8 has as a dependent variable the acquirer ROA one year subsequent the merger announcement date, Model 9 the acquirer ROA two years after the announcement date, and Model 10 the acquirer ROA three years after the announcement date. These three models include only the control variables. In Table 7 we keep the same structure as in Table 6 but adding target and acquirer ESG strengths and ESG concerns.

The total number of observations available for acquirer ROA one, two and three years after the announcement date are respectively 667, 648 and 565. When looking for acquirers and targets ESG strengths and concerns these numbers decrease to 266 for Model 11 (acquirer ROA one year after the announcement date), 260 for Model 12 (acquirer ROA two year after) and 228 for Model 13 (acquirer ROA three year after). All the regressions in our study were run using White's (1980) heteroscedasticity-consistent standard errors.

Looking at the results in Table 6 we can notice that acquirer free cash flow is positively related to acquirer ROA for all the three different time windows, and all the coefficients are significant at the 1% level. These results suggest that high free cash flow can reflect the good managerial ability of the bidding firms' board. That could lead to superior operating performance also after a merger, with an effect that prevails on the agency costs related issues. The acquirer bid-ask spread has a negative relation to acquirer ROA, significant at 5% level for acquirer ROA one year after the announcement date and at 10% level for the ROA measured two and three years after the merger. While Loyeung (2019) does not find any significant relation, we find that an increased volatility on acquirer stocks before the announcement date is negatively related to the acquirer post-acquisition ROA. Acquirer analyst coverage is positively related with acquirer ROA two and three years after announcement date, both to a significant level of 1%. The high attention around a bidding company could push the managerial board to be more careful when undertaking an M&A, avoiding possible value destroying operations. Target analyst coverage present a negative coefficient for the acquirer ROA two years after the announcement date significant at a 5% level. Cui et al. (2020) stated that the industry-

specific knowledges and skills of the acquirer managerial board have a more pronounced positive effect on post-acquisition long-term performance. Contrary to this statement and to our expectations, we find a negative coefficient for our related industry variable for the acquirer ROA measured three years after the merger, with a significant level of 10%. For our dataset, the positive effect of possible synergies between companies belonging to different industries seems to be prevalent. While Ghannam et al. (2019) and Cui et al. (2020) have found a positive relation between the acquirer leverage and its post-acquisition ROA and a negative sign between the acquirer market-to-book ratio and the same dependent variable, we have not found such results.

Table 6. Control Variables and Acquirer ROA

This table reports the results of linear regression models where the dependent variables are acquirer ROA one, two and three years after the announcement date. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

	Model 8 (A.ROAone)	Model 9 (A.ROAtwo)	Model 10 (A.ROAthree)
Constant	0.1422	0.0973**	0.0159
	(1.0844)	(2.4106)	(0.2762)
A.Size	-0.022	-0.0057	0.0108
	(-0.6206)	(-0.6411)	(1.3766)
A.Leverage	-0.012	0.0168	0.0011
	(-0.2100)	(0.5284)	(0.0332)
A.FCF	0.4940***	0.3061***	0.2885***
	(3.4193)	(4.3402)	(2.7699)
A.MB	-0.0001	0.0002	0.0001
	(-0.2199)	(0.7451)	(0.1766)
A.Stock.Return	0.0296	-0.0273	-0.0042
	(1.1463)	(-0.9892)	(-0.2662)
A.Bid.Ask	-4.4482**	-1.9147***	-1.1064***
	(-2.2025)	(-3.8604)	(-2.7119)
A.Analyst	0.0021	0.0019***	0.0016***
	(1.5751)	(2.7772)	(2.6191)
T.Leverage	-0.0095	-0.0136	-0.0049
	(-0.5205)	(-1.0049)	(-0.3543)
T.MB	-0.0011	0.0002	0.0002
	(-1.5269)	(0.6936)	(0.4975)
T.ROA	-0.003	-0.0163	0.0144
	(-0.0614)	(-0.6745)	(0.7657)
T.Sales.Growth	-0.0016	-0.0035	0.0003
	(-0.7033)	(-1.3048)	(0.1429)
T.RD	0.0219	0.0242	0.0666
	(0.2382)	(0.5959)	(1.1316)
T.Bid.Ask	0.1294	-0.2996	0.0804
	(0.4197)	(-1.0493)	(0.3332)

T.Analyst	-0.001	-0.0016**	-0.0008
	(-0.8067)	(-2.1466)	(-1.0645)
T.Hi.Tech	-0.0007	0.0069	0.019
	(-0.0461)	(0.4330)	(1.2392)
R.Size	0.0011	-0.0005	0.0004
	(0.6268)	(-0.4177)	(0.3738)
Cash.Only	0.0384	0.0053	-0.0028
	(1.5031)	(0.5042)	(-0.2515)
Stock.Only	0.0386	-0.0034	-0.0018
	(1.2872)	(-0.2691)	(-0.1301)
Premium	-0.0157	0.0048	0.001
	(-1.0009)	(0.3432)	(0.0782)
Related	0.0065	-0.0087	-0.0154*
	(0.4505)	(-1.2397)	(-1.6555)
S.State	-0.01	-0.0012	0.0162
	(-0.5759)	(-0.1344)	(1.4452)
Year Effect	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes
Observations	667	648	565
Adjusted R^2	0.2411	0.2766	0.1986
Maximum VIF	3.76	3.74	3.70

As we can see in Table 7, when adding our variables of interest (i.e., targets and acquirers ESG strengths and concerns) we find other significant relations between the control variables and the dependent variables. Consistent with the findings of Cui et al. (2020), we find a significant relation at the 1% level between the acquirer size and the acquirer ROA one year after the announcement date, which could mean that larger company feature on average a managerial board more capable of handling the issues related to a M&A. Acquirer stock return presents a positive sign significant at the 5% level for the acquirer ROA one year after the announcement date. The target leverage is negatively related to the acquirer ROA three years after the mergers with a significant level of 5%. The high debt levels of a target could damage the post-acquisition performance of the bidder. While Loyeung (2019) does not find any relation, we find a negative sign for the target market-to-book ratio coefficient for the ROA measured on the subsequent year to the merger. This could mean that target with high M/B ratio may be overvalued, and therefore the bidder could have done "a bad deal". Target sales growth is negatively related to our dependent variable with a significant level of 5% for the two- and three-years window. Target bid-ask spread is positively related to acquirer ROA on the first year after the announcement date, with a significant level of 10%. Even if not significant, this relation become negative for the two following years. Like Loyeung (2019), and consistent with our expectations, we find a negative relation between the relative size of the two

firms and the acquirer post-acquisition ROA, with a significant level of 5% for the two years window, suggesting that the integration process for a relatively larger target could be more difficult and could lead to worst operating performance. Finally, while Cui et al. (2020) found the cash payments to be positively related to acquirer post-acquisition ROA and, on the opposite, the stock payments to be negatively related, we have found such relations only for the latter, with a significant level of 10% for the ROA measured three years after the announcement date.

In this set of analysis, contrary to our expectations, target ESG strengths presents negative but not significant coefficients, not providing support to our hypothesis 7. Consistent with our hypothesis 8, target ESG concerns is negatively related to acquirer post-acquisition ROA, with a significant level of 10% for the ROA one year after the announcement date and a significant level of 5% for the ROA measured three years after the merger. With mixed signs and no significant coefficients, the results about acquirer ESG strengths do not provide support to our hypothesis 9. Finally, contrary to our hypothesis 10, we find that acquirer ESG concerns are positively related to acquirer post-acquisition ROA, with a significant level of 10% for the ROA measured three years after the announcement date. This last result is not consistent with stakeholder theory. It could be posited that the positive effect of acquirer ESG concerns on the acquirer post-acquisition ROA provide support to shareholder theory, suggesting a possible disciplinary role of acquirers on the regards of inefficient targets. Our results, overall, do not support this view too, because in the same Model 13 the target ESG concerns are negatively related to the acquirer post-acquisition ROA.

We can find a possible explanation of this misalignment with our expectations by looking at the dataset composition. Our set of data is composed of only US based firms and almost the 66% of the mergers observed are between companies in the same industry. This means that in most of the cases the acquirer managing board could have had a specific knowledge about the target market and the target itself, which can suggest that the ESG performance levels of both target and acquirer could have played a marginal role in this scenario.

Table 7. ESG Strengths and Concerns and Acquirer ROA

This table reports the results of linear regression models where the dependent variables are acquirer ROA one, two and three years after the announcement date. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

	Model 11 (A.ROAone)	Model 12 (A.ROAtwo)	Model 13 (A.ROAthree)
Constant	0.0082	0.1462**	-0.0049
	(0.1692)	(2.3644)	(-0.0619)
T.ESG.Strengths	-0.0616	-0.0339	-0.2077
	(-0.7112)	(-0.4161)	(-1.5447)
T.ESG.Concerns	-0.1804*	-0.0562	-0.2830**
	(-1.8015)	(-0.6213)	(-2.2969)
A.ESG.Strengths	-0.021	0.0293	0.0129
	(-0.5615)	(1.0866)	(0.2749)
A.ESG.Concerns	-0.0386	0.075	0.1709*
	(-0.6118)	(1.3492)	(1.7689)
A.Size	0.0436***	-0.0192	0.0011
	(2.7645)	(-1.3547)	(0.0672)
A.Leverage	-0.036	0.0231	0.0391
	(-0.6814)	(0.6388)	(0.8509)
A.FCF	1.0408***	0.0936	0.0111
	(4.1237)	(1.0434)	(0.0547)
A.MB	-0.0015	0.0007	0.0017
	(-1.0987)	(1.2371)	(1.1705)
A.Stock.Return	0.0678**	0.0048	0.0368
	(2.3546)	(0.2286)	(1.2466)
A.Bid.Ask	-3.7159***	-1.9561***	-2.0796*
	(-3.0767)	(-2.9652)	(-1.8600)
A.Analyst	-0.0005	0.0014*	0.0022*
	(-0.4652)	(1.8959)	(1.7006)
T.Leverage	-0.0107	-0.0204	-0.0328**
	(-0.4955)	(-1.1776)	(-2.0051)
T.MB	-0.0013**	-0.0001	-0.0002
	(-2.5025)	(-0.3419)	(-0.3915)
T.ROA	0.0393	0.0063	-0.0272
	(0.8511)	(0.2043)	(-0.6879)
T.Sales.Growth	-0.0177	-0.0378**	-0.0305**
	(-1.1743)	(-2.1523)	(-1.9911)
T.RD	0.08	0.0439	0.0182
	(0.8192)	(0.6966)	(0.2392)
T.Bid.Ask	1.1334*	-0.4177	-0.1828
	(1.7810)	(-1.0194)	(-0.2926)
T.Analyst	-0.0004	-0.0007	-0.0006
	(-0.4351)	(-0.9786)	(-0.5878)
T.Hi.Tech	-0.0152	0.0428	0.011
	(-0.9822)	(1.6446)	(0.3703)
R.Size	-0.0076	-0.0499**	-0.004
	(-0.5625)	(-1.9750)	(-0.2602)
Cash.Only	-0.0195	0.012	-0.0219
	(-1.3511)	(1.1244)	(-1.1145)

Stock.Only	0.0174	0.0006	-0.0399*
	(0.7796)	(0.0396)	(-1.7032)
Premium	-0.0184	-0.0025	-0.0035
	(-1.1649)	(-0.1919)	(-0.1814)
Related	-0.0166*	-0.0067	-0.0178*
	(-1.8218)	(-0.7830)	(-1.8001)
S.State	0.0019	-0.0082	0.0219
	(0.1356)	(-0.8112)	(1.5850)
Year Effect	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes
Observations	266	260	228
Adjusted R²	0.5313	0.3179	0.1013
Maximum VIF	5.73	5.67	5.82

2.3.4 Further analysis

In this section, we report several supplemental tests aimed to assess the robustness of our earlier analyses.

Negative Arbitrage Spread

Following Arouri et al. (2019), we remove from our sample the deals that feature a negative arbitrage spread. Negative arbitrage spreads occur when there is the possibility of an offer price revision by the current acquirer, or when a competing offer is expected, causing an abnormal trading volume of the target stocks. Negative arbitrage spreads may be less intuitive to understand, and in turn this could bias our results. Removing the takeovers connected to a negative arbitrage spread reduce our data sample of 101 observations. We report these additional analyses on both ESG coverage and ESG strengths and concerns in Table 8.

The results do not show significant differences compared to our main models, apart for the effect of acquirer low ESG performance (acquirer ESG concerns) that are still positively related to arbitrage spread but the coefficients are not significant anymore.

Table 8. ESG Performance and positive Arbitrage Spread

This table reports the results of linear regression models where the dependent variable is the arbitrage spread for only positive observations. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

	Model 14	Model 15	Model 16	Model 17	Model 18	Model 19
Constant	0.1684	0.1663	0.1703	-0.3241	-0.0494	-0.2998
	(1.4856)	(1.4601)	(1.5101)	(-1.1818)	(-0.4396)	(-1.0820)
T.KLD.Cov	0.017		0.0169			
	(1.1437)		(1.1413)			
A.KLD.Cov		-0.0081	-0.008			
		(-0.4910)	(-0.4840)			
T.ESG.Strengths				-0.1256		-0.1546
				(-0.4919)		(-0.5726)
T.ESG.Concerns				-0.1563		-0.1441
				(-0.9022)		(-0.8139)
A.ESG.Strengths					0.0259	0.0942
					(0.3798)	(0.9448)
A.ESG.Concerns					0.1507	0.0607
					(1.5477)	(0.4348)
A.Size	-0.0071	-0.0041	-0.0063	0.0302	0.0002	0.0191
	(-0.5368)	(-0.3105)	(-0.4727)	(1.4158)	(0.0088)	(0.7028)
A.Leverage	0.0521	0.0549	0.052	-0.02	0.0557	0.0212
	(0.8198)	(0.8742)	(0.8175)	(-0.1329)	(0.7258)	(0.1331)
A.FCF	0.0518	0.0498	0.0518	0.1169	0.3257*	0.1841
	(0.4778)	(0.4599)	(0.4779)	(0.7343)	(1.6616)	(0.9969)
A.MB	-0.0029***	-0.0028***	-0.0028***	-0.0046**	-0.0036**	-0.0053**
	(-2.8124)	(-2.6697)	(-2.7538)	(-2.3232)	(-2.3105)	(-2.3637)
A.Stock.Return	0.0027	0.003	0.0022	-0.0469	0.0001	-0.0604
	(0.1506)	(0.1713)	(0.1216)	(-0.8073)	(0.0024)	(-1.0062)
A.Bid.Ask	2.9782***	2.9556***	2.9482***	4.0617**	2.7844**	4.5428**
	(3.5654)	(3.5410)	(3.5366)	(2.5804)	(2.5214)	(2.5432)
A.Analyst	0.0009	0.001	0.001	0.0007	0.0011	0.0005
	(1.2193)	(1.3011)	(1.4207)	(0.4780)	(1.3824)	(0.3467)
T.Leverage	0.0246	0.0264	0.0241	0.0478	0.0223	0.0536
	(0.7878)	(0.8365)	(0.7740)	(1.3526)	(0.7678)	(1.5533)
T.MB	-0.0012	-0.0012	-0.0012	-0.0012	-0.0011	-0.0012
	(-1.1041)	(-1.1308)	(-1.0966)	(-1.4003)	(-1.1339)	(-1.3312)
T.ROA	0.0145	0.0153	0.0141	0.0395	0.0036	0.0401
	(0.5340)	(0.5698)	(0.5239)	(0.5820)	(0.0992)	(0.5911)
T.Sales.Growth	0.0003	-0.0001	0.0003	-0.0432	-0.0033	-0.0465
	(0.0541)	(-0.0177)	(0.0526)	(-0.7443)	(-0.5928)	(-0.8029)
T.RD	0.0106	0.0119	0.0088	0.056	-0.0089	0.0394
	(0.1687)	(0.1926)	(0.1416)	(0.2873)	(-0.1374)	(0.1978)
T.Bid.Ask	-0.4524	-0.4688	-0.4502	-0.5724	-0.238	-0.4611
	(-1.1247)	(-1.1598)	(-1.1199)	(-0.7772)	(-0.3964)	(-0.6613)
T.Analyst	0.0009	0.0013	0.0008	0.0013	0.0005	0.0013

	(0.7490)	(1.2240)	(0.7229)	(0.8484)	(0.5210)	(0.8281)
T.Hi.Tech	-0.0108	-0.0128	-0.0111	-0.0217	0.0013	-0.02
	(-0.4764)	(-0.5732)	(-0.4868)	(-0.5132)	(0.0657)	(-0.4432)
R.Size	0.002	0.0023	0.0021	0.0333	-0.0001	0.0302
	(0.5707)	(0.6414)	(0.6095)	(1.0750)	(-0.0429)	(0.9611)
Cash.Only	-0.0157	-0.0161	-0.0156	-0.0199	-0.0372***	-0.0245
	(-0.8793)	(-0.9000)	(-0.8764)	(-0.8741)	(-2.6665)	(-1.0835)
Stock.Only	0.0097	0.0092	0.0094	0.0406	0.0457**	0.0455
	(0.5329)	(0.5020)	(0.5175)	(1.2641)	(2.0574)	(1.2575)
Premium	0.0406**	0.0407**	0.0410**	0.0492	0.0353	0.0456
	(1.9829)	(1.9885)	(1.9995)	(0.7661)	(1.4080)	(0.7124)
Related	-0.0017	-0.0024	-0.0018	-0.0173	0.0178	-0.0152
	(-0.1217)	(-0.1730)	(-0.1331)	(-0.9964)	(1.2720)	(-0.8257)
S.State	0.0254	0.0243	0.025	0.0262	0.0147	0.031
	(1.2981)	(1.2566)	(1.2946)	(0.6245)	(0.6721)	(0.7376)
Year Effect	Yes	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes	Yes
Observations	635	635	635	249	466	242
Adjusted R²	0.0955	0.0946	0.0941	0.0725	0.068	0.0434

Delta ROA

In this section we analyse the effect of ESG performance level on the acquirer post-acquisition ROA using a different specification for the dependent variables. Instead of using the absolute value of the observed return on asset, we calculate the percental variation over time of the same variable. We calculate the percent change in ROA between the first and the second year subsequent the deal announcement as the ROA measured two years after the merger minus the ROA one year after the merger, all divided by the latter. The same procedure is used for the delta ROA between the second and the third year. We report the results of this set of tests in Table 9.

While we find confirmation of the positive relation between the acquirer ESG concerns and the change on the acquirer post-acquisition ROA, we do not find such confirmation for the negative effect of the target ESG concerns.

Table 9. ESG Strengths and Concerns and Delta Acquirer ROA

This table reports the results of linear regression models where the dependent variables are the percentage change of acquirer ROA between the first and the second year (Δ.ROA.1-2) and between the second and the third year (Δ.ROA.2-3) subsequent the announcement date. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

	Δ.ROA.1-2	Δ.ROA.1-2	Δ.ROA.2-3	Δ.ROA.2-3
Constant	-3.3933	1.4216	-2.2294	-18.2004
	(-0.9687)	(0.9190)	(-0.6073)	(-1.0836)
T.ESG.Strengths		-1.8801		-5.8895
		(-0.7556)		(-0.4608)
T.ESG.Concerns		2.6683		-3.5012
		(0.8138)		(-0.3390)
A.ESG.Strengths		0.2345		0.4344
		(0.2200)		(0.1162)
A.ESG.Concerns		4.1881**		1.8508
		(2.3954)		(0.2829)
A.Size	-1.0746	-0.0249	-0.545	0.0272
	(-0.9875)	(-0.0794)	(-0.7480)	(0.0127)
A.Leverage	0.0201	-3.2666**	1.3086	-3.7425
	(0.0102)	(-2.0981)	(0.7759)	(-0.7876)
A.FCF	-1.496	1.7279	1.1797	3.4989
	(-0.6097)	(1.0897)	(0.6875)	(0.5108)
A.MB	0.0198	0.0315	-0.0152**	-0.0009
	(0.7211)	(1.6258)	(-1.9975)	(-0.0180)
A.Stock.Return	-0.0076	0.4687	0.9322	4.8484
	(-0.0102)	(0.5281)	(0.7007)	(0.9308)
A.Bid.Ask	-48.5619	-28.5553*	6.7772	86.0706
	(-1.0462)	(-1.7166)	(0.3048)	(0.9565)
A.Analyst	0.1192	-0.0012	0.0714*	0.0368
	(1.1919)	(-0.0599)	(1.6704)	(0.3167)
T.Leverage	-0.1908	-0.3116	0.5222	1.6917
	(-0.2053)	(-0.8851)	(0.6668)	(0.9353)
T.MB	0.0643	-0.0126	-0.1211	-0.1544
	(0.9051)	(-1.5044)	(-1.3781)	(-1.5178)
T.ROA	2.0959	-1.4542*	0.8054	1.8631
	(0.9358)	(-1.8504)	(0.7613)	(0.4222)
T.Sales.Growth	-0.1274	-0.1655	0.0459	0.5666
	(-1.2968)	(-0.5683)	(0.4022)	(0.3777)
T.RD	0.4643	-4.8015***	0.4758	6.9588
	(0.2160)	(-2.7779)	(0.2084)	(1.0478)
T.Bid.Ask	42.4144	11.3054	-2.9036	0.3801
	(1.2837)	(0.9335)	(-0.2185)	(0.0045)
T.Analyst	0.0143	-0.0072	0.0412	0.1157
	(0.3272)	(-0.4287)	(0.7005)	(1.1139)
T.Hi.Tech	-3.276	-1.3892*	0.6648	1.818

	(-1.3698)	(-1.8952)	(0.6024)	(1.5945)
R.Size	-0.0695	-0.7258	-0.1061	0.5163
	(-0.8896)	(-1.4473)	(-1.2410)	(0.3249)
Cash.Only	1.6358	-1.0779***	-0.6915	-0.3709
	(1.4823)	(-2.9436)	(-1.2569)	(-0.2710)
Stock.Only	0.9245	-0.5809	0.579	3.601
	(0.8447)	(-1.3270)	(0.5197)	(1.0902)
Premium	-0.8197	-0.1086	0.2468	-1.9303
	(-1.2099)	(-0.3510)	(0.5067)	(-1.2544)
Related	0.3338	0.9497**	0.5274	0.911
	(0.2630)	(2.5644)	(1.1744)	(0.7180)
S.State	0.1462	0.1119	0.0262	-1.4243
	(0.2458)	(0.4029)	(0.0443)	(-0.6854)
Year Effect	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes
Observations	648	260	565	228
Adjusted R²	-0.0232	0.025	-0.0061	-0.0427

Reduced Models

In our main analyses, when testing the effect of acquirers and targets ESG strengths and concerns on the dependent variables, the data sample is reduced accordingly to the availability of KLD coverage. Given the high number of control variables we use for our linear regression models, the relatively low number of observations could represent an issue. To check for that problem, we repeat the analysis with two reduced versions of our regression models, one for the arbitrage spread and one for the acquirer post-acquisition ROA. The reduced versions of the models are obtained eliminating some of the control variables that seem to have no effect on our main analyses. We report the results of the reduced regression models in Table 10.

The results for arbitrage spread do not change compared to our main analyses. Looking to the acquirer post-acquisition ROA, we find confirmation for the main results about target ESG concerns and acquirer ESG concerns. Moreover, in the reduced model for the ROA measured two years after the announcement date we find a significant positive relation between the dependent variable and the acquirer ESG strengths, which is consistent with our hypothesis 9. On the other side, we find also a significant negative relation between target ESG strengths and acquirer ROA three years after the merger, which contrasts with our hypothesis 7.

Table 10. Reduced Models

This table reports the results of reduced versions of the linear regression models used in the main part of our analysis. The dependent variables are the arbitrage spread and the acquirer ROA one, two and three years following the announcement date. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

Dependent var.	Arb.Spread	A.ROAone	A.ROAtwo	A.ROAthree
Constant	0.0378	0.0312	0.1447**	-0.01
	(0.6314)	(0.6110)	(2.4427)	(-0.1326)
T.ESG.Strengths	-0.0277	-0.0694	-0.0756	-0.2695**
	(-0.1002)	(-0.6852)	(-0.9868)	(-2.2865)
T.ESG.Concerns	-0.1692	-0.1746*	-0.0627	-0.2722**
	(-1.0514)	(-1.6919)	(-0.6716)	(-2.1276)
A.ESG.Strengths	0.0283	-0.0254	0.0432*	0.0201
	(0.2769)	(-0.5839)	(1.6707)	(0.3981)
A.ESG.Concerns	0.0347	-0.0394	0.0839	0.1704*
	(0.3274)	(-0.5755)	(1.5513)	(1.7762)
A.Size		0.0384**	-0.0216*	0.0003
		(2.2392)	(-1.6944)	(0.0193)
A.FCF	0.1137	1.0237***	0.0976	0.0011
	(0.6340)	(4.0287)	(1.0403)	(0.0050)
A.MB	-0.0038**			
	(-2.1292)			
A.Stock.Return	-0.1040*	0.0706**	0.0031	0.0256
	(-1.9656)	(2.2842)	(0.1389)	(0.7996)
A.Bid.Ask	2.2616	-3.9021***	-2.1756***	-2.1951**
	(1.6175)	(-3.5808)	(-3.4061)	(-2.1194)
A.Analyst	0.0005	-0.0006	0.0013*	0.0023**
	(0.5358)	(-0.5995)	(1.8947)	(1.9890)
T.Leverage	0.0457	-0.0263*	-0.0163	-0.0201**
	(1.1391)	(-1.6641)	(-1.2933)	(-1.9847)
T.MB	0.0002	-0.0012**	-0.0001	-0.0002
	(0.3801)	(-2.4356)	(-0.2012)	(-0.3966)
T.Sales.Growth		-0.0129	-0.0369**	-0.0329**
		(-0.7520)	(-2.0811)	(-2.1792)
T.Bid.Ask	-2.1126**	0.8615*	-0.1527	0.0433
	(-2.2133)	(1.7745)	(-0.5021)	(0.0836)
T.Analyst	0.0008			
	(0.4566)			
R.Size		-0.0177	-0.0490**	0.005
		(-1.2534)	(-1.9971)	(0.3161)
Cash.Only	-0.0204	-0.0203	0.0157	-0.0163
	(-0.9449)	(-1.3435)	(1.3802)	(-0.8254)
Stock.Only	0.0371	0.0178	0.0032	-0.0345
	(1.1148)	(0.7920)	(0.2028)	(-1.4837)

Premium	0.1128**			
	(2.2482)			
Related	-0.0171	-0.0159*	-0.0048	-0.0154
	(-0.9303)	(-1.8259)	(-0.5662)	(-1.4511)
Year Effect	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes
Observations	289	266	260	228
Adjusted R^2	0.0952	0.5353	0.3204	0.1141

Accounting for Null ESG Performance

KLD may cover a firm, but the relative ESG performance ratings can be 0, which can mean there is no information available. In our sample there are 54 observations in which the acquirer, or the target, or both present this peculiarity. Although this number is low and are unlikely to affect our main results, following Hussaini et al. (2020), we re-estimate our analyses with only non-zero performance ratings in KLD. We report the results of this set of tests in Table 12 in Appendix A.

The results for arbitrage spread do not change compared to our main analyses. The results for the acquirer post-acquisition ROA do not change too, apart for the target ESG strengths. We have found a significant negative relation between target ESG strengths and acquirer ROA three years after the merger, which contrasts with our hypothesis 7.

Financial Crisis

In our data sample there are 54 mergers that took place during the 2007–2009 financial crisis. It is therefore possible that our results could be biased by the circumstances that characterize that period of economic distress. The impact of the ESG performance on firms is more significant during periods of market stress, and including deals announced during the financial crisis period could results in a biased estimation of the impact of ESG performance on our dependent variables. Following Arouri et al. (2019), we control for this potential issue by removing from our data sample the mergers undertake during the financial crisis period. Specifically, we remove all the deals announced between December 2007 and June 2009. The results of the analysis with this modified data sample are reported in Table 13 in Appendix A.

These results do not differ from our previous findings on both arbitrage spread and acquirer post-acquisition ROA.

Financial Firms

Financial firms have different reporting policies and are subject to different regulations compared to firms belonging to other sectors. In several papers (Jindra et al., 2004; Deng et al., 2013; Arouri et al., 2019) these firms are excluded from their investigations. To make sure our results are not biased by the inclusion of financial firms, we remove the deals involving financial firms. The new data set has 160 less observations, and with that sample we re-estimate our main models. The results of these analysis are reported in Table 14 in Appendix A.

These results do not differ from our previous findings on both arbitrage spread and acquirer post-acquisition ROA.

Conclusion

In this thesis we have studied two different features of M&A operations. First, we have examined whether increased transparency induced by the availability of ESG ratings and ESG performance levels are associated with completion uncertainty proxied by the arbitrage spread. Second, we have investigated how the ESG performance levels of both the involved companies affect the acquirer return on assets on the three years subsequent the announcement date. For all our assessments we used linear regression models.

In the first set of analysis, we have not found any relation between target and acquirer KLD coverage and the arbitrage spread. The simple availability of ESG performance ratings for both targets and acquirers does not seem to have an impact on completion uncertainty. Both target ESG strengths and concerns are negatively related to arbitrage spread. Even if these last two relations are not significant, their signs are consistent with the view that both negative and positive information about the environmental and social performance of a target help to reduce the uncertainty around a takeover. Acquirer ESG concerns is positively related to arbitrage spread while acquirer ESG strengths does not seem to have an impact on arbitrage spread. These results suggest that the signals provided by the negative environmental and social performance of the bidder are a more valuable information for the market to determine the probability of completion of the deal. In general, we can suggest that ESG performance are helpful to reduce information asymmetry in the M&A context. Anyway, our results are not as strong as we expected. This misalignment with our expectations could be due to the structure of our dataset. Compared to other studies with stronger results, our set of data is "older", with observations spanning through three different decades. Also, the takeovers in analysis are between US based company only. For the investors and for the companies involved, the information provided by the ESG performance ratings might be less relevant in a domestic market than as they are in an international environment. Moreover, our dataset includes only successful M&As, meaning that we have a partial view of the whole takeover market.

In the second part of this thesis, analysing the relationship between the target and acquirer ESG performance levels and the acquirer post-acquisition return on assets, we have found that target ESG strengths is not significant, while target ESG concerns is negatively related to acquirer long-term ROA, partially confirming the findings of Aktas et al. (2011). These results suggest that the target negative ESG performance can be

damaging for the acquirer long term performance, while the target positive ESG performance does not seem to have an opposite effect. Further, we have found that acquirer ESG strengths are not significant and, surprisingly, acquirer ESG concerns is positively related to acquirer post-acquisition ROA. The last results not only do not support our hypothesis and the stakeholder theory but seems to confirm the opposite shareholder view. We obtain similar results when using as dependent variable the percentage variation over time of the acquirer ROA. Anyway, our overall results are not consistent even with the shareholder theory because, when acquirer ESG concerns are positively related to acquirer post-acquisition ROA, simultaneously the target ESG concerns are negatively related to the depend variable. Again, the composition of our dataset could explain why our results are not as expected. All the takeover transactions in exam are between US based company and the 66% of them are between firms in the same industry. In this kind of scenario, the specific knowledge of the acquirer managing board could be predominant in determining the long-term performance of the resulting company, making the ESG performance levels of both acquirer and target less significant than what they could be in an international and diversified environment.

Given the limitations of this thesis, future studies could examine how the same variables of interest impact the completion uncertainty and the acquirer post-acquisition performance by an international point of view, examining takeovers taking place between companies based in different countries. Further, instead of focusing on firm aggregate ESG strengths and concerns could be interesting to analyse how each single component of the ESG performance affects our dependent variables, to see whether and how some dimensions are more important than others in the M&A process.

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Appendix A

Table 11. Variables' Definitions/Measures

This table reports the definitions of the control variables that are used in this study and the hypothesized effect on arbitrage spread and acquirer return on assets.

Variable	Definition/Measure	Expected sign on Arbitrage Spread	Expected sign on Acquirer ROA
Target ESG coverage	Indicator variable that takes the value of 1 if the target is covered by KLD.	-	
Acquirer ESG coverage	Indicator variable that takes the value of 1 if the acquirer is covered by KLD.	-	
Target ESG strengths	Target firm sum of all strengths score across all six categories of ESG (environment, community, employee relations, diversity, product, and governance) divided by 6.	-	+
Target ESG concerns	Target firm sum of all concerns score across all six categories of ESG (environment, community, employee relations, diversity, product, and governance) divided by 6.	+	-
Acquirer ESG strengths	Acquirer firm sum of all strengths score across all six categories of ESG (environment, community, employee relations, diversity, product, and governance) divided by 6.	-	+
Acqurier ESG concerns	Acquirer firm sum of all concerns score across all six categories of ESG (environment, community, employee relations, diversity, product, and governance) divided by 6.	+	-
Acquirer size	Log (total assets).	-	+
Acquirer leverage	Total long-term debt divided by total assets.	uncertain	+
Acquirer free cash flow	Operating income before depreciation minus interest expenses, taxes, preferred dividend, and common dividend divided by book value of total assets.	uncertain	uncertain
Acquirer M/B ratio	Acquirer number of common shares outstanding multiplied by its share price divided by its book value of equity.	uncertain	+
Acqurier stock return	Acquirer share price 28 business days before the deal announcement minus acquirer share price 154 business days before the deal announcement divided by acquirer share price 154 business days before the deal announcement.	uncertain	uncertain
Acquirer bid-ask spread	Average from -251 business days to -30 business days prior the deal announcement of (high stock price - low stock price) / closing stock price.	uncertain	uncertain
Acquirer analyst coverage	Maximum number of analysts who provide estimation of EPS in any month in the most recent fiscal year prior to the deal announcement.	-	uncertain
Target leverage	Total long-term debt divided by total assets.	+	uncertain
Target M/B ratio	Number of common shares outstanding multiplied by share price divided by book value of equity.	+	uncertain
Target return on asset	Net income divided by the total assets.	uncertain	uncertain

Target sales growth	(target sales in year t minus target sales in year $t-1$)/target sales in year t, where t is the fiscal year prior to the deal announcement.	+	uncertain
Target R&D expenditure	R&D investment divided by total assets.	+	+
Target bid-ask spread	Average from -251 business days to -30 business days prior the deal announcement of (high stock price - low stock price) / closing stock price.	uncertain	uncertain
Target analyst coverage	Maximum number of analysts who provide estimation of EPS in any month in the most recent fiscal year prior to the deal announcement.	-	uncertain
Target high-tech	Indicator variable that takes the value of 1 if target firm is in high-tech industry.	+	uncertain
Relative size	Target total assets divided by acquirer total assets.	uncertain	-
Cash dummy	Indicator variable that takes the value of 1 if the payment method is cash only.	-	+
Stock dummy	Indicator variable that takes the value of 1 if the payment method is stock only.	+	-
Bid premium	Target share price offered minus target share price 28 days before deal announcement, divided by target share price 28 days before deal announcement.	+	uncertain
Related industry	Indicator variable that takes the value of 1 if acquirer firm and target firm share the same two-digit SIC codes.	-	+
Same state	Indicator variable that takes the value of 1 if the acquirer and target are in the same US state according to Thomson Reuters EIKON M&A database.	-	uncertain

Table 12. ESG Performance Without Missing Information

This table reports the results of the linear regression models used in the main part of our analysis. The observations with KLD coverage but with no data available (both ESG strengths and concerns equal to 0) have been cancelled from the dataset used for these regression models. The dependent variables are the arbitrage spread and the acquirer ROA one, two and three years following the announcement date. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

Dependent var.	Arb.Spread	Arb.Spread	A.ROAone	A.ROAtwo	A.ROAthree
Constant	0.1787	-0.0256	-0.0466	0.1274*	0.0337
	(1.5619)	(-0.1214)	(-0.6414)	(1.9298)	(0.3104)
T.KLD.Cov	0.0059				
	(0.3332)				
A.KLD.Cov	0.0165				
	(0.8850)				
T.ESG.Strengths		0.2172	-0.0959	-0.0433	-0.2709*
		(1.1942)	(-1.0208)	(-0.4850)	(-1.8330)
T.ESG.Concerns		-0.138	-0.159	-0.0352	-0.2823**
		(-0.8620)	(-1.3466)	(-0.3453)	(-2.1492)
A.ESG.Strengths		-0.0253	-0.0132	0.0372	0.0304
		(-0.4038)	(-0.3246)	(1.2814)	(0.6243)
A.ESG.Concerns		0.2429**	-0.0392	0.079	0.2122**
		(2.3989)	(-0.6128)	(1.4374)	(2.1438)
A.Size	-0.0085	-0.035	0.0414***	-0.0201	-0.0051
	(-0.6757)	(-1.6276)	(2.6680)	(-1.4080)	(-0.3162)
A.Leverage	-0.0261	-0.1704***	-0.053	0.0267	0.0599
	(-0.5517)	(-2.9419)	(-0.8803)	(0.6900)	(1.1098)
A.FCF	0.014	0.0657	1.0446***	0.0843	0.0228
	(0.1334)	(0.3924)	(4.0314)	(0.9392)	(0.1140)
A.MB	-0.0006	-0.0034**	-0.0015	0.0006	0.0015
	(-1.2917)	(-2.0993)	(-1.2004)	(1.0671)	(1.0780)
A.Stock.Return	0.0073	-0.0899*	0.0627*	-0.0062	0.0355
	(0.4234)	(-1.8339)	(1.8685)	(-0.2679)	(1.0305)
A.Bid.Ask	2.6083***	1.3665	-4.0186***	-1.7839**	-2.3256*
	(3.3920)	(1.0325)	(-3.0332)	(-2.4808)	(-1.7067)
A.Analyst	0.0006	0.001	-0.0002	0.0016**	0.0028*
	(0.7905)	(0.8648)	(-0.2180)	(2.1737)	(1.9015)
T.Leverage	0.046	0.0773*	-0.0045	-0.0203	-0.0326*
	(1.3696)	(1.8607)	(-0.2306)	(-1.1688)	(-1.9153)
T.MB	-0.0002	0.0009	-0.0012**	-0.0001	-0.0002
	(-0.2851)	(1.4613)	(-2.5439)	(-0.3074)	(-0.4941)
T.ROA	0.0175	-0.0064	0.066	-0.0032	-0.0343
	(0.6068)	(-0.0993)	(1.4682)	(-0.0982)	(-0.8585)
T.Sales.Growth	0.0044	0.0417	-0.0171	-0.0312	-0.0320*
	(1.0008)	(1.4922)	(-1.0466)	(-1.5244)	(-1.8132)
T.RD	-0.0361	-0.2079	0.0941	0.0234	-0.0012
	(-0.6572)	(-1.5043)	(0.8909)	(0.3216)	(-0.0130)
T.Bid.Ask	-0.8700**	-1.9751*	1.3979*	-0.4701	-0.1739
	(-2.0325)	(-1.7240)	(1.8633)	(-0.9626)	(-0.2464)
T.Analyst	-0.0008	-0.0009	-0.0002	-0.001	-0.0009
	(-0.6863)	(-0.6646)	(-0.1631)	(-1.2863)	(-0.7778)
T.Hi.Tech	-0.0052	0.0013	-0.0138	0.0389	0.0031

	(-0.2521)	(0.0503)	(-0.8278)	(1.2555)	(0.0987)
R.Size	0.0001	0.0332	-0.0047	-0.0540*	-0.0046
	(0.0546)	(1.1978)	(-0.3242)	(-1.9714)	(-0.3146)
Cash.Only	-0.0032	-0.0042	-0.018	0.0071	-0.0351
	(-0.1820)	(-0.1936)	(-1.1109)	(0.5965)	(-1.5564)
Stock.Only	0.0037	0.0211	0.0198	-0.0008	-0.0487*
	(0.1855)	(0.6838)	(0.8017)	(-0.0445)	(-1.8966)
Premium	0.0882***	0.1529***	-0.0262*	-0.0046	-0.0027
	(3.6050)	(3.1371)	(-1.6883)	(-0.3441)	(-0.1360)
Related	-0.0049	-0.0216	-0.0132	-0.0061	-0.0138
	(-0.3649)	(-1.1500)	(-1.2491)	(-0.6207)	(-1.2143)
S.State	0.01	0.0047	-0.0084	-0.0102	0.0275*
	(0.7003)	(0.2607)	(-0.5420)	(-0.8917)	(1.6861)
Year Effect	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes
Observations	682	257	237	231	203
Adjusted R^2	0.1202	0.3023	0.5463	0.3152	0.1114

Table 13. ESG Performance and Financial Crisis

This table reports the results of the linear regression models used in the main part of our analysis. The observations from December 2007 and June 2009 have been cancelled from the dataset used for these regression models to consider the effect of the financial crisis. The dependent variables are the arbitrage spread and the acquirer ROA one, two and three years following the announcement date. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

Dependent var.	Arb.Spread	Arb.Spread	A.ROAone	A.ROAtwo	A.ROAthree
Constant	0.1216	0.0186	-0.0259	0.1994***	0.0396
	(1.1471)	(0.1429)	(-0.3802)	(2.6471)	(0.4123)
T.KLD.Cov	0.0006				
	(0.0370)				
A.KLD.Cov	0.0086				
	(0.4697)				
T.ESG.Strengths		-0.0683	-0.0928	-0.0301	-0.2155
		(-0.2586)	(-0.8868)	(-0.2995)	(-1.5756)
T.ESG.Concerns		-0.0451	-0.2254*	-0.0724	-0.2521*
		(-0.3456)	(-1.9034)	(-0.7366)	(-1.7152)
A.ESG.Strengths		0.1038	-0.0339	0.0253	0.0254
		(1.0543)	(-0.8142)	(0.8642)	(0.4928)
A.ESG.Concerns		0.0805	-0.0387	0.0616	0.1733*
		(0.6168)	(-0.5979)	(1.1345)	(1.7863)
A.Size	-0.0069	-0.0148	0.0514***	-0.0251	-0.0076
	(-0.5364)	(-0.6993)	(2.6872)	(-1.5036)	(-0.3707)
A.Leverage	0.0319	0.0041	-0.0775	0.0096	0.0428
	(0.5182)	(0.0296)	(-1.4448)	(0.2547)	(0.8376)
A.FCF	-0.0996	-0.1444**	1.1157***	0.002	-0.0951
	(-1.3783)	(-2.3805)	(4.2129)	(0.0240)	(-0.4606)
A.MB	-0.001	-0.0039**	-0.0016	0.0012**	0.0021
	(-1.3669)	(-2.1375)	(-1.2114)	(2.5264)	(1.5136)
A.Stock.Return	0.0127	-0.0031	0.0692**	0.0366	0.0719**
	(0.7312)	(-0.0629)	(2.0765)	(1.5578)	(2.3270)
A.Bid.Ask	2.2296***	-0.3213	-3.3349**	-2.4928***	-2.9212**
	(3.1809)	(-0.3660)	(-2.4823)	(-3.7281)	(-2.1638)
A.Analyst	0.0012*	0.001	-0.0003	0.0014*	0.002
	(1.6496)	(0.9079)	(-0.2981)	(1.8273)	(1.5111)
T.Leverage	0.0642	0.1088**	0.0296	-0.0278	-0.0445
	(1.4836)	(2.5662)	(0.9204)	(-0.8786)	(-1.4823)
T.MB	0.0001	0.0002	-0.0011***	-0.0002	-0.0004
	(0.1423)	(0.3627)	(-2.6201)	(-0.6502)	(-0.9982)
T.ROA	0.0051	0.0097	0.0128	-0.0168	-0.0495
	(0.1945)	(0.1559)	(0.2695)	(-0.5210)	(-1.0047)
T.Sales.Growth	-0.00005	-0.0519	-0.0238	-0.0446**	-0.0425**
	(-0.0082)	(-0.9347)	(-1.5745)	(-2.3250)	(-2.5191)
T.RD	-0.0277	0.0799	-0.033	0.0656	0.0702
	(-0.4663)	(0.3558)	(-0.3764)	(0.8353)	(0.7715)
T.Bid.Ask	-0.6464	0.2501	0.942	-0.6845	-0.1419
	(-1.5195)	(0.2482)	(1.2966)	(-1.3561)	(-0.1751)
T.Analyst	0.0004	0.0017	-0.0009	-0.0005	-0.0001
	(0.3671)	(0.8235)	(-0.9147)	(-0.6602)	(-0.1426)
T.Hi.Tech	-0.0028	-0.0261	-0.0176	0.0442*	0.0106

	(-0.1403)	(-0.9149)	(-1.0673)	(1.7063)	(0.3348)
R.Size	-0.00001	0.0329	-0.0013	-0.0738**	-0.0192
	(-0.0047)	(1.2344)	(-0.0742)	(-2.3019)	(-0.8975)
Cash.Only	-0.0021	-0.0151	-0.0167	0.0038	-0.0279
	(-0.1202)	(-0.7788)	(-1.0685)	(0.3075)	(-1.2293)
Stock.Only	-0.0061	-0.0154	0.024	-0.0185	-0.0602**
	(-0.3373)	(-0.7226)	(0.9533)	(-1.3781)	(-2.2215)
Premium	0.0691***	0.0155	-0.009	-0.022	-0.0467**
	(3.6408)	(0.2160)	(-0.4945)	(-1.4873)	(-2.3900)
Related	-0.0099	-0.0119	-0.0128	-0.0091	-0.0201*
	(-0.7203)	(-0.6610)	(-1.3488)	(-0.9383)	(-1.7219)
S.State	0.0149	0.0335	0.0064	-0.0094	0.022
	(0.7913)	(0.8603)	(0.4438)	(-0.8917)	(1.4627)
Year Effect	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes
Observations	691	264	243	237	208
Adjusted R^2	0.0832	0.0005	0.5654	0.3653	0.1314

Table 14. ESG Performance and Financial Firms

This table reports the results of the linear regression models used in the main part of our analysis. The observations regarding the merger of companies both belonging to financial industry have been cancelled from the dataset used for these regression models. The dependent variables are the arbitrage spread and the acquirer ROA one, two and three years following the announcement date. The symbols *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. Z-statistics are calculated using White heteroscedasticity-consistent standard errors. T-statistics are presented in parentheses.

Dependent var.	Arb.Spread	Arb.Spread	A.ROAone	A.ROAtwo	A.ROAthree
Constant	0.1193	-0.0077	-0.0151	0.1742**	0.0143
	(1.1078)	(-0.0508)	(-0.2390)	(2.2094	(0.1673)
T.KLD.Cov	0.0067				
	(0.3747)				
A.KLD.Cov	0.0037				
	(0.1771)				
T.ESG.Strengths		-0.1416	-0.052	-0.0391	-0.2594
		(-0.5702)	(-0.4840)	(-0.4342)	(-1.5922)
T.ESG.Concerns		-0.1393	-0.1634	-0.0997	-0.4205***
		(-0.6779)	(-1.5045)	(-1.0089)	(-2.8510)
A.ESG.Strengths		0.0819	-0.0346	0.0257	0.0072
		(0.8936)	(-0.8407)	(0.9056)	(0.1417)
A.ESG.Concerns		0.1609	-0.0533	0.0737	0.1865
		(1.1827)	(-0.6934)	(1.1378)	(1.5840)
A.Size	-0.0051	-0.0269	0.0484***	-0.0205	0.0073
	(-0.3483)	(-1.0846)	(2.6559)	(-1.0618)	(0.3739)
A.Leverage	0.0626	0.0323	-0.026	0.0223	0.0375
	(1.0164)	(0.2669)	(-0.4716)	(0.5165)	(0.7381)
A.FCF	-0.0104	0.123	1.0305***	0.0533	-0.02
	(-0.0944)	(0.7063)	(4.0631)	(0.5974)	(-0.0998)
A.MB	-0.0007	-0.0043**	-0.0013	0.0010*	0.0019
	(-1.6274)	(-2.2925)	(-0.9994)	(1.9087)	(1.3882)
A.Stock.Return	0.0017	-0.08	0.0740**	0.0059	0.0401
	(0.1036)	(-1.3547)	(2.3476)	(0.2551)	(1.1597)
A.Bid.Ask	2.4261***	1.9643	-4.0326***	-2.1000***	-2.0140*
	(3.1416)	(1.2120)	(-3.1537)	(-2.9150)	(-1.7973)
A.Analyst	0.0018**	0.0016	-0.0003	0.0017**	0.0030*
	(2.0990)	(1.3024)	(-0.2609)	(2.0021)	(1.8909)
T.Leverage	0.0277	0.0745**	-0.0023	-0.025	-0.0423**
	(0.9553)	(2.1397)	(-0.0986)	(-1.3228)	(-2.3112)
T.MB	-0.0003	0.0007	-0.0014**	0.0001	0.0001
	(-0.3770)	(1.4347)	(-2.3219)	(0.3536)	(0.2536)
T.ROA	0.0132	0.0507	0.0499	-0.0108	-0.0452
	(0.4662)	(0.7134)	(0.9941)	(-0.3274)	(-1.0375)
T.Sales.Growth	0.0009	-0.0406	-0.0146	-0.0401**	-0.0289*
	(0.1509)	(-0.7716)	(-0.8413)	(-2.1600)	(-1.6937)
T.RD	-0.0103	-0.0671	0.0778	0.0267	0.0259
	(-0.1934)	(-0.3634)	(0.8041)	(0.4034)	(0.3333)
T.Bid.Ask	-0.8562**	-0.1368	1.5671*	-0.9752*	-1.2328
	(-2.1560)	(-0.1748)	(1.6702)	(-1.7345)	(-1.4404)
T.Analyst	-0.0007	0.0024	-0.0002	-0.0009	-0.0019
	(-0.5834)	(1.3457)	(-0.1560)	(-1.1557)	(-1.4879)
T.Hi.Tech	-0.0015	-0.026	-0.0192	0.0398	0.0128

	(-0.0792)	(-0.8748)	(-1.1505)	(1.5948)	(0.4230)
R.Size	-0.0006	-0.0072	-0.0215	-0.0699*	-0.0003
	(-0.2314)	(-0.2767)	(-1.1523)	(-1.9375)	(-0.0150)
Cash.Only	-0.0208	0.0011	-0.0212	0.0082	-0.0361
	(-1.2182)	(0.0409)	(-1.2773)	(0.6095)	(-1.5035)
Stock.Only	-0.0073	0.0335	0.0238	0.0193	-0.0531
	(-0.3038)	(0.7647)	(0.7095)	(0.8216)	(-1.4216)
Premium	0.0726***	0.0755	-0.0284	0.0031	0.0067
	(2.7717)	(1.1876)	(-1.6490)	(0.2044)	(0.2953)
Related	0.0022	-0.0086	-0.0118	-0.0022	-0.0182
	(0.1799)	(-0.5328)	(-1.0902)	(-0.2180)	(-1.3912)
S.State	0.0208	0.0458	-0.007	-0.0091	0.0363**
	(0.9731)	(1.0037)	(-0.3983)	(-0.7361)	(1.9991)
Year Effect	Yes	Yes	Yes	Yes	Yes
Industry Effect	Yes	Yes	Yes	Yes	Yes
Observations	576	238	223	219	188
Adjusted R^2	0.0917	0.0419	0.536	0.3149	0.1026