Bang for Your (Green) Buck: The Effects of ESG Risk on US M&A Performance

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Abstract

Mergers & Acquisitions (M&A) is a fundamental corporate activity that has not received much attention from an environmental, social, and governance (ESG) perspective. In this paper, I analyze how buyer and target ESG risks affect US M&A performance in both the short and long run as measured by deal valuations and changes in buyer operating metrics, respectively. I utilize a sample of 341 transactions from 2007-2020 with a cumulative value over $3 trillion from Capital IQ where both the buyer and target have available ESG data provided by RepRisk. Utilizing OLS, my results suggest that higher ESG risk causes buyers to pay more and targets to receive less. In the long run, buyer ESG risk is an important determinant of performance. When examining the components of ESG, governance is the most consistently significant, followed by social, then environmental – though it becomes more significant in the long run. Additionally, all three components appear to have some non-linear impacts on M&A performance.

JEL classification: G34, G14, M14, G24

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I. Introduction

Reflecting the mainstream adoption of environmental, social, and governance (ESG) considerations, BlackRock, the world's largest asset manager with over $7.4 trillion in assets under management, announced that the firm would "put sustainability at the center of how we invest" in a statement from the CEO in 2020 (BlackRock, 2020). Despite the growing interest in ESG, its effects on fundamental corporate activities such as mergers & acquisitions (M&A) remain unclear and unknown, as there is a dearth of research answering such questions.

In this paper, I investigate the effects of both buyer and target ESG risk on the financial performance of mergers & acquisitions in the US from 2007-2020 in both the short and long run as measured initially by deal valuation and later by changes in buyer operating metrics such as return on assets, respectively. I also investigate the impacts of the individual components of ESG to determine which, if any, aspects of environmental, social, and governance matter the most for M&A performance.

Mergers & Acquisitions

M&A or mergers and acquisitions occur when two companies combine in some way. In a merger, two companies combine to form a new single entity, while in an acquisition, a company acquires and absorbs some or all of the assets of another company (Corporate Finance Institute, 2021). In an M&A, the buyer can be referred to as the "acquirer" while the company whose assets are being bought or merged with can be referred to as the "target." M&A's can be characterized as "friendly" or "hostile," depending on the willingness of the target company to sell itself. This investigation does

not distinguish between friendly nor hostile transactions. Transactions can also be characterized as "horizontal" or "vertical." A horizontal deal occurs when both the buyer and target operate in similar industries, while vertical deals occur when the transacting companies operate in adjacent links along the supply chain (Corporate Finance Institute, 2021). This investigation tracks whether transactions occur within the same industry.

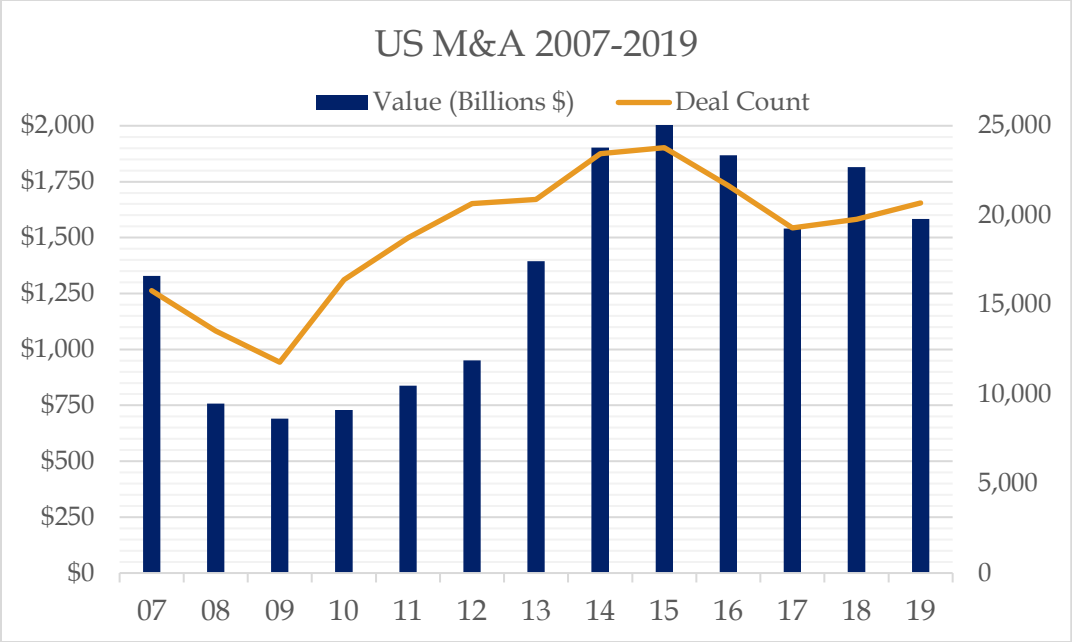

Figure 1: *US M&A Cumulative Deal Value & Count 2007-2019*

Looking at figure 1, above, US deal value dropped significantly after 2007 due to the great recession remaining under $1 trillion until 2013. With low interest rates and excess corporate cash reserves, volume grew quickly peaking in 2015 at $2 trillion in value. The M&A market has cooled off since its 2015 peak, and the number of deals generally has followed the trends in value. In 2019, approximately 20,600 transactions occurred totaling $1.6 trillion in value for an average value of $76.6 million per deal (Statista, 2020).

Environmental, Social, Governance

Moving to the concept of environmental, social, and governance, or ESG, it was first coined in 2004 in the UN Global Compact. The Global Compact codified the belief that, "Companies that perform better with regard to [ESG] issues can increase shareholder value by… properly managing risks, anticipating regulatory action… while at the same time contributing to the sustainable development of the societies in which they operate" (United Nations, 2004). Put simply, ESG refers to the consideration of environmental, social, and governance factors alongside financial factors during the investment and management process.

The idea underpinning ESG can be traced back to the concept of socially responsible investing (SRI) which came to prominence in the US during the 1960's as investors sought to avoid investments, such as companies involved in the Vietnam war, that conflicted with their moral values. A similar idea later emerged known as corporate social responsibility (CSR), which referred to the belief that businesses have a responsibility to society beyond their obligations to their stockholders. Some examples of CSR as defined by Fulton et al. (2012) include: corporate governance, employee relationships, customer relationships, environmental management, philanthropy, and community involvement. In this vein, ESG can be thought of as the systematic and quantitative measurement of a firm's CSR practices and impacts.

Applying ESG to investing involves a broad spectrum of investment possibilities ranging from exclusionary screening to ESG integration to its strongest form – impact investing. Exclusionary screening entails excluding companies that are poor ESG

performers or that operate in objectionable industries. ESG integration, which is the most prominent form of ESG investing today, pertains to the integration of ESG factors such as governance policies or environmental risks in the due-diligence process generally for the purpose of mitigating risk and potential downsides. ESG integration can also be used for the purpose of generating excess returns. Impact investing is the strongest form of ESG investing, and it explicitly seeks measurable social returns and can also seek financial returns as well.

In 2018, the global market for ESG investing grew to over $30 trillion. Of the $30 trillion, $12 trillion of assets were US-domiciled and were mostly held by asset management firms and community investment funds practicing negative screening and ESG integration (Global Sustainable Investment Review, 2018). Figure 2, below, illustrates the rapid growth of ESG related investing in the US over the past two decades from under $0.5 trillion of assets in 1995 to nearly $17 trillion in 2020 with most of that

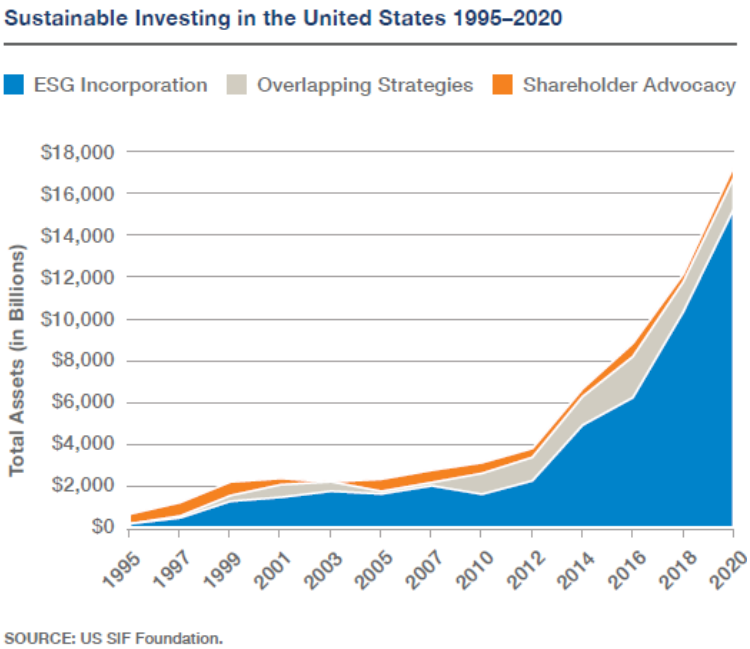

Figure 2: *US Sustainable Investing Growth 1995-2020 (Source: US SIF Foundation)*

growth occurring after 2012. A small portion of ESG investing has taken the form of shareholder advocacy which involves influencing firm behavior through corporate engagement.

A major component of ESG is quantifying and measuring the impact of companies on their environment and broader stakeholders, and many firms have begun to report ESG metrics. Reflecting ESG adoption on the firm side, the largest sustainability disclosure database, GRI, states that 82% of the world's largest 250 corporations already report on their sustainability performance using GRI's standards (Global Reporting Initiative, 2020). Figure 3, below, reveals the rapid growth in ESG reporting by firms in the S&P 500 showcasing how the majority of firms were disclosing ESG information as early as 2012. Note the parallel growth in disclosure (Fig. 3) alongside ESG investing (Fig. 2). However, headwinds to reporting still remain such as the lack of a standardized ESG framework as well as reporting being a costly and complex undertaking for smaller firms.

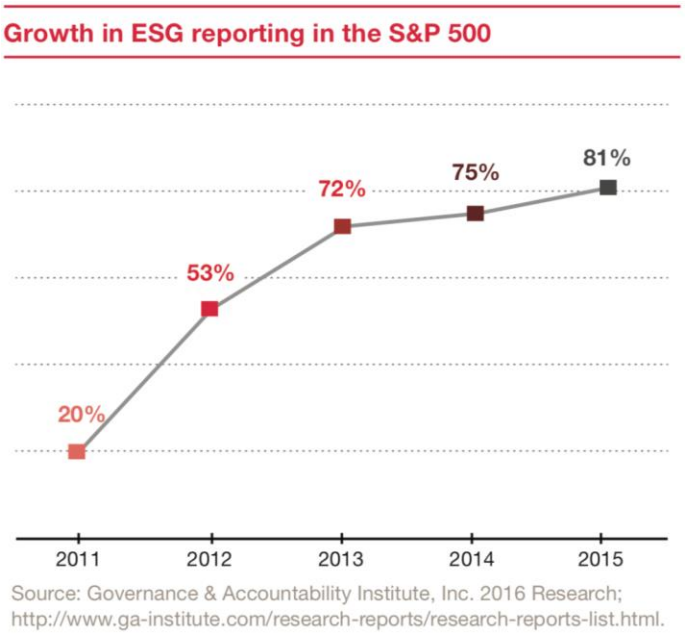

Figure 3: *Growth in ESG Reporting in the S&P 500 (Source: G&A Institute, 2016)*

There are various reasons driving the growth of ESG within firms. Ioannou and Serafeim (2017) investigate why firms disclose ESG practices, and note how globally, regulatory ESG disclosure mandates are a driving factor. They find that ESG disclosure mandates are positively correlated with Tobin's q for affected firms. Even for firms without regulatory mandates, they suggest that firms seek to disclose ESG practices to enhance their credibility and comparability. Meyers and Kirby (2010) explain the rise of ESG from a different perspective using the idea of externalities. They point to three factors driving the rise of ESG. The first is scale – larger firms generate larger externalities but also have the potential to drive greater positive change. The next factor is sensors – it is much easier and cheaper to quantify the impacts of firms nowadays. The third factor is sensibilities – perceptions have changed as more information about firms is uncovered and as we become a more globalized society. Another major reason for the growth of ESG is that younger generations increasingly care about *how* their financial returns are being generated. A white paper released by Allianz (2018) notes how 55% of investing millennials have discussed ESG investing with a financial professional and that ESG investing is a way to align their values with their financial goals.

Given the growth of ESG investing and firms incorporating and disclosing sustainable practices via corporate social responsibility, research has emerged investigating primarily the effects of ESG on portfolio returns on the investor side and on corporate value on the firm side. Friede et al. (2015) examine the data of 2,200 prior studies investigating the link between ESG and corporate financial performance and find that over 90% of studies report a non-negative relation between the two. Kim (2019)

examines 51 papers studying the impact of SRI on investment performance in the US and finds that the returns from SRI are not significantly different from conventional funds. This refutes a common argument against ESG investing that investors sacrifice returns. However, this finding also means that investors are unlikely to generate excess returns. Given the increasing importance of ESG considerations and their potential effects, it is crucial to understand how they might affect other fundamental areas of finance such as M&A.

I aim to contribute towards rectifying this dearth of analysis by examining the effects of both acquirer & target ESG risk on M&A financial performance in the US from 2007-2020 in both the short and long run as measured initially by deal valuation and later by changes in buyer operating metrics such as return on assets, respectively. I also investigate the impacts of the individual components of ESG to determine which, if any, aspects of environmental, social, and governance matter the most for M&A performance. I carve my niche by 1) examining both mergers and acquisitions, 2) breaking down ESG into its individual E, S, and G components, 3) analyzing both short and long term M&A performance, 4) including private firms that have publicly accessible financials, and lastly 5) being among the first studies to use RepRisk ESG scores in the M&A space.

Utilizing OLS regressions, I show that higher ESG risk causes buyers to pay more and targets to receive less. In the long run, buyer ESG risk is an important determinant of performance, while target ESG risk is insignificant. When examining the components of ESG, governance is the most consistently significant, followed by social, then

environmental – though it becomes more significant in the long run. Additionally, overall ESG risk appears to have some non-linear impacts on M&A performance.

The remainder of this paper is structured as follows. I will first discuss the relevant literature providing an overview of general M&A and ESG literature before moving on to papers that investigate both topics together. I will then discuss applicable economic theories and their predictions regarding the effects of ESG risk on M&A performance. In the data section, I will provide a comprehensive overview of my sample before moving onto the empirical methodology and results section. There, I will detail my regressions and results providing interpretations and insights wherever possible. Lastly, I conclude my paper with a discussion of my contributions and possible further extensions to research in the ESG and M&A space.

II. Literature Review

General M&A Literature

There is a vast breadth of literature investigating whether M&A activities create or destroy value or simply transfer wealth, how that value falls upon the buyer and target, and why firms undertake M&A activities. Jensen and Ruback (1983) layout some of the reasons from theory why firms engage in M&A. One such reason is to seek cost reductions, known as synergies, through the realization of economies of scale or vertical integration. Another reason is to increase market and pricing power via increased size, but also through strategic complements between firms. In terms of their findings on value, Jensen and Ruback conclude that M&A's generate positive gains and that target firm shareholders receive the majority of the benefit while bidding firm shareholders at least do not lose. Lastly, they note that this value is unlikely to come from the creation of market power. Another popular explanation for M&A revolves around improving the efficiency of poorly performing target firms. Known as efficiency theory, it is supported by Servaes (1991) who finds that total returns are higher when more efficient firms, as measured by Tobin's q, acquire less efficient firms. This finding is later supported by Maksimovic and Phillips (2002) with the authors noting that the market for corporate assets facilitates the redeployment of assets from firms with a lower ability to exploit them to firms with a higher ability. Andrade and Stafford (1999) note that when firms have good growth opportunities, M&A's offer an alternative to internal investment in terms of allowing a firm to grow its capital base. The authors also consider industry-level forces affecting M&A. They find that in contractionary periods and often in response to

industry shocks, mergers and acquisitions serve to reduce excess industry capacity. One interesting theory regarding acquisitions paid for with stocks specifically, is that they enable overvalued firms to engage in M&A activity as a means of issuing overpriced stock and that acquirers are still better off despite negative stock returns when compared to not engaging in M&A (Savor & Lu, 2009). Finally, M&A's can be the result of managers' "empire building" rather than the result of a rational market decision. Jensen (1986) discusses this issue and highlights how managers are incentivized to grow firms past their optimal size due to various reasons stemming from the principal-agent problem.

General ESG Literature

There is a significant amount of literature investigating the relationship between ESG and corporate financial performance with most papers indicating that there is a positive relationship between ESG and corporate financial performance or at the very least, it is non-negative. A meta meta-study by Fulton et al. (2012) looks at 50 previous papers and 4 meta studies and reports the following results: 1) 100% of the academic studies investigated agree that companies with higher CSR and ESG scores have a lower cost of capital for both debt and equity, 2) 89% of studies show these companies exhibit market-based outperformance, and 3) 85% of studies show these companies exhibit accounting-based outperformance. Bannier et al. (2019) investigate the profitability of ESG investing in the US. They find that CSR offers an insurance-like protection to firms mitigating their downside risk and that capital markets price in this effect. Thus, firms with poor CSR must offer premiums to compensate for their higher risk. Giese et al. (2019) look for the specific transmission channels through which ESG affects firm value and

performance. They show that ESG effects are realized at firms both through their systematic risk profile, via lower costs of capital and higher valuations, and their idiosyncratic risk profile via, higher profitability and lower exposures to tail risk. On the market side, Naffa and Fain (2020) study whether investors sacrifice returns by aligning themselves along non-financial considerations. They create hypothetical ESG themed portfolios and find that most of them yield non-negative excess returns compared to a passive benchmark even after accounting for transaction costs.

ESG and M&A Literature

Firms are slowly incorporating ESG analysis into potential acquisitions. Gomes (2019) shows highly significant evidence that targets' CSR performance matters for acquirers engaging in M&A as early as 2003. Gomes also finds that CSR is positively related to the likelihood of being the subject of an M&A offer and also that target firms feature, on average, higher CSR scores than similar non-target firms. These results hold for each individual E, S, and G component as well. Leucht and Rydell (2020) interview various European financial professionals involved in M&A due diligence and identity 12 ESG factors that are considered in M&A due diligence such as risk, image, and management.

One possible reason for increased corporate interest in integrating ESG and M&A can be found in Bereskin et al. (2018). The authors investigate the effect of cultural similarity on mergers and acquisitions utilizing CSR as a proxy for corporate cultures and find that deals by firms with more similar CSR scores are 1) associated with higher combined announcement returns, 2) have higher odds of successfully completing, and 3)

close at a faster rate. And for acquirers, Bereskin et. al note that acquirers of similar CSR targets experience approximately a 3.7% increase in abnormal operating performance compared to low similarity targets. The key difference between their investigation and mine is that Bereskin et al. focus on CSR similarities between firms while I focus on firms' absolute level. Furthermore, the ESG data I use is focused exclusively on risks meaning that proxying it for cultural similarity is less sensible.

Another possible reason for corporate interest in ESG during M&A is that it can help generate upside. Aktas et al. (2011) investigate the effect of company social and environmental performance on announcement returns in global M&A deals. They find that acquirer abnormal returns are positively associated with targets' social and environmental performance. Another finding of note is that acquirer environmental and social performance increases on average following the acquisition of a high SRI target. One drawback of this investigation is that it is partially outdated as it focuses on SRI which is a precursor to ESG. Russo et al. (2018) provide a modern follow-up to Aktas et al. (2011). Russo et al. investigate companies' environmental and social performance as measured by their sustainability orientation, a unique metric created by the authors which focuses on companies' environmental and social aspects, and its effect on long-term global M&A performance. They find that acquirers with higher sustainability orientations as well as acquirers with the ability to focus on sustainability-related concerns increase their profitability following the acquisition. Continuing, the authors find that a company's greater alignment with the extent and latitude of sustainability-related topics translates into better M&A performance as measured through the

acquirer's three-year difference in return on assets. Russo et al. suggest that sustainability orientation, and implicitly ESG, enables companies to more smoothly complete M&A's. One difference between their investigation and mine is that I focus only on US M&A to mitigate the effects of regulatory and cultural differences across countries. Furthermore, I consider governance in addition to environmental and social risk.

Arouri et al. (2019), Gomes and Marsat (2018), and De la Bruslerie and Le Maux (2016) investigate the role of ESG as a risk mitigator in M&A transactions. Gomes and Marsat (2018) analyze if CSR is valued by acquirers in global M&A and find that target CSR is positively associated with acquirer bid premiums. They suggest that perhaps acquirers value targets' CSR involvement and may consider it to reduce information asymmetry and targets' specific risk. Gomes and Marsat focus on acquirer bid premiums, since they presume that buyers will be better informed and able to reveal ESG related risks in their target compared to the wider market. I find this to be a compelling argument and thus include both buyer valuations, implicitly through the use of implied enterprise value multiples, in addition to market valuations through the use of announcement returns. Arouri et al. (2019) investigate whether the CSR of acquirers impacts M&A completion uncertainty as novelistically measured via arbitrage spreads. Utilizing an international sample of 726 M&A operations spanning the 2004–2016 period, they find a negative association of 1.10 percentage points in arbitrage spreads for each standard deviation unit-increase in acquirers' CSR. Their investigation differs from mine in that their focus on arbitrage spreads is inherently short term focused and they do not consider the effect of the target's ESG. While not explicit in their investigation of ESG, De la

Bruslerie and Le Maux (2016) find that, utilizing a sample of 465 US M&A transactions between 2000 and 2014, the level of litigation risk, at the acquirer's level, has a positive and significant impact on the takeover premium. They go on to demonstrate that the source of the risk of litigation can be found in the firm's policies and in its management's operational or strategic decisions – items which can be thought of as the governance measure in ESG. This implicit focus on governance is notable and provides a different perspective in the ESG and M&A space.

One of the earliest and foundational papers in the ESG and M&A space is by Deng, Kang, and Low (2013). Utilizing probit and OLS analysis, they find that compared with low CSR acquirers, high CSR acquirers realize higher merger announcement returns, higher announcement returns on the value-weighted portfolio of the acquirer and the target, and larger increases in post-merger long-term cash flows. Furthermore, they find that mergers by high CSR acquirers take less time to complete and are less likely to fail than mergers by low CSR acquirers. While comprehensive, one drawback of this paper is that it uses an antiquated system to measure CSR which doesn't fully capture firms' metrics and isn't comparable across time – unlike newer ESG measures today. Furthermore, they do not consider the CSR/ESG of targets. Song (2016) extends the findings of Deng et al. by utilizing a new database, the MSCI ESG Research Intangible Value Assessment database. Song finds that targets' aggregate ESG performance has a positive, though not always significant, impact on the synergistic market returns 3 days around the announcement date of an acquisition. However, problems still remain concerning the diversity and thus generalizability of datapoints in the IVA database.

Lastly, Tampakoudis and Anagnostopoulou (2019) also build off of the work of Deng et al. Tampakoudis and Anagnostopoulou investigate the effects in Europe of buyers acquiring targets with higher ESG ratings. They find that the ESG performance of the acquirer increases in the post-merger stage following the acquisition of a target with higher ESG performance. Furthermore, the authors find that the post-merger market value of the acquirer increases following an increase in the acquirer's post-merger ESG. My investigation is similar to the one conducted by Tampakoudis and Anagnostopoulou in that we both examine the impacts of buyer and target ESG performance. However, there are some key differences. One setback of their paper is that the data sample utilized only includes 100 M&A transactions due to ESG data matching constraints. Furthermore, the authors focus on the European market, which is subject to different regulations and a different culture surrounding ESG, and they only investigate long-term post-merger performance. My investigation focuses on the US market and considers both short and long term M&A performance.

My investigation builds upon and updates the findings of Deng, Kang, and Low (2013). I also extend the work of Russo et al. (2018) by individually examining the effects of governance, as done by De la Bruslerie and Le Maux (2016), in addition to environmental and social. Lastly, I improve upon the limited sample size of Tampakoudis and Anagnostopoulou while focusing on the effects of target and acquirer ESG ratings on M&A performance in both the short term and long term in the US market from 2007-2020. This date range was chosen as it encompasses the entire period for which RepRisk, the data provider I am using for ESG risk, has available ESG ratings. For the

long-term performance analysis, I give a 3-year window to realize and measure effects meaning that I do not include any transactions after 2017 in my long run analysis. Use of a 3-year window has been previously explained in Bannier et al. (2020) and Russo et al. (2018) and was chosen because a three-year time span following the transaction provides enough time to realize the effects of a deal without the data being confounded by other potential variables. As previously noted, I will investigate which, if any, of the E, S, or G factors has the most significant contribution to M&A performance. To the best of my knowledge, this combination of analyses is a novel investigation and will contribute to the literature by providing answers to questions regarding both the short and long-term impact of ESG risk on M&A performance in the US market. These answers will enable firms and markets to make better informed, more profitable, and most importantly – more sustainable decisions when evaluating M&A.

III. Theoretical Framework

Two opposing theories have emerged regarding the impact of CSR activities by firms. The first idea is shareholder theory as discussed by Friedman (1970) and Jenson (2001) who propose that the firm's responsibility is to maximize profit and shareholder value. Firms are accountable only to profit-maximizing shareholders, and apart from their contractually determined obligations, have no responsibility to serve other stakeholders or society. Furthermore, any CSR actions to benefit external stakeholders come at the cost of shareholder value – CSR actions are in essence wealth transfers detrimental to shareholders. A few papers have reached findings that support the shareholder viewpoint such as Krueger (2015) who finds that investors respond negatively to both negative and positive CSR events, unless the firm has a history of poor CSR. A different study by Cellier and Chollet (2016) finds that some specific CSR dimensions are value enhancing, such as respect for human rights in working place, and others value destroying, such as community involvement. Many papers find evidence contrary to shareholder theory such as the one by Hoepner et al. (2017). The authors investigate whether pension funds violate their fiduciary duty by including ESG criteria in their investment decisions and find no evidence of detrimental effects in doing so.

The opposing idea to shareholder theory is stakeholder theory as discussed by Freeman (1984) and Porter & Kramer (2006) who posit that CSR can be much more than just a cost, constraint, or charitable deed. Approached strategically, CSR generates opportunity, innovation, and competitive advantage for corporations—while solving pressing social problems. Stakeholder theory ultimately believes that maximizing

stakeholder value will in turn maximize shareholder value. Stakeholder theory is the economic theory that undergirds ESG considerations and is relevant when firms consider whether they should implement initially costly policies such as achieving carbon neutrality, appointing a more diverse board, or enacting fair labor practices. Most research investigating the effect of CSR on firm value has supported the stakeholder view of CSR. For example, Bannier et al. (2020) find that firms with stronger ESG ratings have lower measures of risk on both the equity and debt side, and that they realize a higher firm value, as measured through Tobin's Q, after a 1–4 year time lag. Looking at Hoepner et al. (2017) again, they find that downside volatility is much lower for ESG investing. The papers mentioned previously in the literature review also contribute towards supporting a stakeholder theory view of CSR.

A different idea underpinning the impact of CSR on M&A is the theory of the firm as discussed by Jenson and Meckling (1976) and later built upon by Cornell and Shapiro (1987). Jenson and Meckling discuss the concept of agency and monitoring costs associated with structuring the relationship between principal and agent to provide incentives for the agent to make choices that will maximize the principal's welfare. They also claim that a firm is simply a "nexus for a set of contracting relationships." Cornell and Shapiro take the idea further saying that the firm's claimants go beyond stockholders and bondholders to include customers, suppliers, providers of complementary services and products, distributors, and employees. They believe that stakeholders other than investors and management play an important role in firm strategy because the market value of the firm depends on the price at which implicit, as well as explicit, claims can be

sold. As a result, management must consider how ESG information affects the prices of implicit claims. This theory is implicitly supported by the findings of Russo et al (2018). They note that their unique ESG metric, sustainability orientation, can help companies to face the increased anxiety accompanying the change process. More precisely, companies embedding sustainability into their organization possess greater flexibility and develop the ability to quickly respond to stakeholder concerns. This idea of implicit claims also ties into the information asymmetry facing firms and outsiders; stronger ESG allow firms to signal their commitment to claimants.

One common criticism of ESG research is that it is difficult to establish causality in the space. As Krueger (2015) argues, studies that regress annual measures of firm value, such as Tobin's q, on low-frequency annual measures of CSR cannot address the basic question of whether companies do well because they do good or whether they do good because they do well. Krueger's solution to this problem is to study solely short run events.

The above theories generate different predictions when applied to ESG and M&A performance. For shareholder theory, M&A's conducted by high-ESG acquirers should be characterized by more uncertainty than operations initiated by low-ESG acquirers because of increased risk of shareholder opposition. Furthermore, long term post-M&A performance should suffer due to increased agency costs as discussed by Krueger (2015). For stakeholder theory, ESG, and its preceding idea CSR, can be thought of as a firm's policies and behaviors towards its stakeholders. Thus M&A activities conducted by high-ESG acquirers should embed less uncertainty than operations initiated by low-ESG

acquirers, which should result in reduced completion uncertainty, as high CSR companies should benefit from stronger stakeholders' commitment thanks to an increased reputation for delivering on their implicit contracts. Furthermore, long term post-M&A performance should also improve due to an increase in the firm's price of implicit claims.

IV. Data

ESG Data Overview

This paper utilizes RepRisk for ESG data. To the best of my knowledge, this ESG data provider has not been utilized specifically for the M&A space. According to RepRisk, its goal is to systematically identify and assess material ESG risks utilizing an outside-in approach to ESG risks, by analyzing information from public sources and stakeholders and intentionally excluding company self-disclosures. Data is collected, aggregated, and analyzed from over 90,000 media, stakeholder, and other third-party sources using a combination of artificial intelligence (AI) and machine learning with human intelligence to systematically analyze public information and identify material ESG risks. Within the landscape of ESG research, RepRisk exclusively focuses on risks; it systematically captures and analyzes adverse ESG and business conduct information that can have a reputational, compliance, and financial impact on a company. RepRisk ESG coverage spans from 2007 to 2020 and is the limiting factor on the time period covered in this investigation. I download the entire US coverage database to maximize the likelihood of matching ESG data to companies engaged in M&A. RepRisk provides ESG scores by ISIN meaning that firms can have duplicate ESG scores for each month; I filter out duplicate observations such that each firm has one ESG rating per month. In total, the RepRisk dataset covers 3,826 US firms.

The main ESG variables in use are the RepRisk Rating (RRR) and RepRisk Index (RRI). RRR is a letter rating (AAA to D) that facilitates benchmarking and ESG integration. RRR combines a company's own ESG risk exposure with the ESG risk

exposure of the countries and sectors in which the company has been exposed to risks and can be thought of as a company's overall ESG risk. Since RRR is a letter grade, I convert it to a numerical scale in order to utilize it in regressions. I convert the highest grade, "AAA," to a 1, the next highest to a 2 and so on until all companies have an RRR numerical equivalent. On the other hand, RepRisk Index is a quantitative measure (0 to 100) of a company's reputational risk exposure to ESG issues with higher numbers indicating high exposure to reputational risk while a measure of 0 is attainable if a company has not had any ESG risk exposures within the last 2 years. The RepRisk Index differs from the Rating in that the index focuses specifically on reputational ESG risk. RepRisk provides a proportional breakdown of RRI indicating what percentage of the risk is contributed from E, S, and G. This breakdown enables my investigation of the significance and effect of E, S, and G taken separately though the results aren't fully generalizable as RRI is mainly focused on reputational risk exposure. The values for each individual percentage ranges from 0 to 1 and the E, S, and G percentages taken together sum to 1. To simplify the interpretation of the individual E, S, and G risk proportions, I convert them to risk-levels by multiplying the E, S, and G percentages by their respective RRI value. This is an imperfect conversion as RRI is not a linear measure of ESG risk, though it provides a more intuitive understanding of individual E, S, and G risk analysis compared to their proportional measurement as originally provided by RepRisk. This transformation does not remove the collinearity between the three measures, as they originally sum to 1, and any regressions can only contain at most two individual ESG risk components.

Table 1, below, provides further explanation of the ESG variables. Overall, my initial predicted effects are that higher ESG risk will cause buyers to pay more and targets to receive less. In the long run, I predict that higher ESG risk will reduce the acquirer's post-M&A performance.

Table 1: *ESG Variable Definitions & Predicted Effects*

Variable	Variable Type	Range of Values	Definition & Notes	SR Valuation Predicted Effect	LR Buyer Performance Predicted Effect
Buyer Rating	Ordinal Number	1-10	Buyer's RepRisk Rating at the time of the transaction. Represents overall ESG risk of firm. Lower values indicate less risk.	(+) Higher ESG risk buyers pay premiums.	(-) Higher ESG risk buyers perform worse.
Buyer RRI		0-100	Buyer's RepRisk Index at the time of transaction. Represents reputational risk exposure. Lower values indicate less risk.		
Buyer Environmental Risk		0-100	Buyer risk level from environmental factors. Lower values indicate less risk.		
Buyer Social Risk		0-100	Buyer risk level from social factors. Lower values indicate less risk.		
Buyer Governance Risk		0-100	Buyer risk level from governance factors. Lower values indicate less risk.		
Target Rating		1-10	Target's RepRisk Rating at the time of the transaction. Represents overall ESG risk of firm. Lower values indicate less risk.	(-) Higher ESG risk acquisitions reduce premiums.	(-) Higher ESG risk acquisitions reduce performance.
Target RRI		0-100	Buyer's RepRisk Index at the time of transaction. Represents reputational risk exposure. Lower values indicate less risk.		
Target Environmental Risk		0-100	Target risk level from environmental factors. Lower values indicate less risk.		
Target Social Risk		0-100	Target risk level from social factors. Lower values indicate less risk.		
Target Governance Risk		0-100	Target risk level from governance factors. Lower values indicate less risk.		

Transactions Data Overview

All transactions and company financials are pulled from Capital IQ – an industry standard provider of M&A data. The transaction dataset was screened using criteria utilized in many of the previously discussed papers. The criteria used included: Mergers/Acquisitions with total transaction values greater than $1 million between US companies with public financials from 2007-2020. This date range was chosen as RepRisk ESG coverage only dates back to 2007 and is the limiting factor for this investigation's time period. Lastly, any transactions involving financial companies or REIT's were excluded. The decision to exclude financial companies is standard, while the decision to exclude REIT's was to ensure that any transactions involving simply real estate asset transfers did not contaminate the sample. I differ again from previous papers in that I allow transactions involving private companies if they have publicly accessible financials; I do this because RepRisk provides partial coverage of private companies.

For each transaction, I pull the total transaction value, the M&A announcement date (including bids and letters of intent), industry classifications on the buyer and target, and the following five transaction valuation metrics: 1) Implied Enterprise Value/EBIT, 2) Implied Enterprise Value/EBITDA, 3) Implied Market/Book Value of Equity (MTB), 4) Target Stock Premium utilizing the 1-month prior price as the baseline, and lastly 5) Target Stock Premium utilizing the 1-week prior price as the baseline. These five valuation metrics serve as the dependent variables for my short run analysis. The use of stock premiums for deal valuation is standard and has been used previously in studies by Gomes and Marsat (2017); Deng, Kang, and Low (2013); La Bruslerie and Le Maux

(2018). I utilize implied enterprise value multiples to add the firm's perspective since Gomes (2019) and Leucht and Rydell (2020) find that buyers consider ESG factors when evaluating potential targets. As such, I utilize multiple measures of deal valuation to account for these different perspectives and since together they provide a more holistic view of a transaction's value. In total, I end up with an eligible set of 2,416 transactions before merging with the RepRisk dataset.

One interesting note about the Capital IQ dataset is that when two companies merge into one entity, the buyer in that transaction is listed as the combined entity rather than the other participating company. For example, the merger between Raytheon Company and United Technologies listed Raytheon as the target and Raytheon Technologies, the combined entity, as the buyer; the name "United Technologies" does not appear in the transaction. There is no loss of information, other than the buyer's name, from this convention. This is corroborated by the fact that RepRisk includes a note that Raytheon Technologies is formerly United Technologies for its ESG ratings.

Company Financials Data Overview

I also utilize Capital IQ to pull firm financial metrics to act as control variables. The initital financial controls for both buyer and target include: Revenue, Return on Assets(ROA), Total Debt/Total Equity, Levered Free Cash Flow(LFCF), Total Assets, and Market/Book Value of Equity (MTB). These controls are standard and were chosen because they account for firm factors such as: size, efficiency, leverage, profitability, and under/overvaluation that can affect M&A. For these metrics, I pull the most recent or last twelve months (LTM) data available for stock and flow variables, respectively, before the

M&A announcement date for both the buyer and target. I also pull LTM revenue 3 years before the announcement date for both buyer and target and calculate the compound annual growth rate for the revenues between (t_{-3} to t_0) with t_0 representing the M&A announcement date and t_{-3} representing 3 years before announcement. I refer to this variable as Buyer/Target Growth.

For only the buyers whose M&A announcement date is 2017 or earlier, and thus eligible for long-run analysis 3 years after transaction, I pull their financials again three years after the announcement date. For my long-run analysis, I measure the change in buyer financial metrics three years after announcement to determine the impacts of ESG risk on post-M&A firm financial performance. As discussed in the literature review, three years is the optimal period to observe the long-term effects of an M&A while minimizing the chance of confounding by other events.

I utilize four LR dependent variables: 1) Buyer Δ Growth, 2) Buyer Δ Return on Assets, 3) Buyer Δ Levered Free Cash Flow, and 4) Buyer Δ Market to Book Ratio. Variables 2-4 are calculated by taking the respective buyer metric three years after M&A announcement and subtracting the value at announcement. Thus, a positive Δ indicates that the metric of interest has increased in the last three years. Variable 1: Buyer Δ Growth is the difference in CAGR between revenue growth three years after transaction compared to three years before. These metrics were chosen as they each provide a different perspective to analyze long-term M&A financial performance as there is no consensus on which metric is best. For example, Deng, Kang, and Low (2013) use Δ Operating Cash Flow, while Tampakoudis and Anagnostopoulou (2019) use Δ Tobin's Q,

and Russo et al. (2018) use Δ ROA. Therefore, I utilize four, as opposed to one, dependent variables for my long run analysis since it is unclear which variable I should preference, and since together they provide a holistic view of company operating performance. Further description of this dataset is provided in the following subsection.

Combined Dataset Overview

The first iteration of the merged dataset contained 227 transactions representing over $2.1 trillion in total transaction value. This was created through direct name matches between the buyers/targets and companies in the RepRisk ESG dataset. I then utilized a fuzzy matching algorithm provided by Microsoft Research for use in Microsoft Excel to further increase the sample size. With fuzzy matching, I was able to catch transactions such as the 2019 mega acquisition of 21st Century Fox by Disney that otherwise would have been missed through direct matching alone. For that transaction specifically, 21st Century Fox had been coded as "TFCF Corp" by Capital IQ and "Twenty First Century Fox" by RepRisk. Other common cases that were caught involved instances where the words in a company's name were in different orders or where the names were slightly different from each other. I made sure to check all potential fuzzy matches to ensure that different entities were not falsely matched.

The final merged dataset contains 341 distinct M&A's where RepRisk ESG data is available for both the buyer and target representing $3.13 trillion in total transaction value. Many of the ESG variables are densely situated on '0' values. Put another way, many of the firms observed in this investigation have low ESG risk as measured by RepRisk and have not had any reputation risk exposures in the last two years. As a result,

25% of the buyer RRI and 50% of the target RRI distribution has a value of '0'. Because E, S, and G risk depends on RRI being non-zero, any '0' RRI observations necessarily lead to '0' values for the corresponding E, S, and G risk values. Looking at RepRisk Rating, the "average" score for buyers is an 'A' while the "average" score for targets is between a 'AA' and 'A'. As such, variability of the ESG data is a limitation of this investigation. Despite this limited variability, I still find significance for ESG risk across the board suggesting that it has practical implications for M&A.

Looking at tables 2a and 2b below, there is a significant statistical difference between buyers' and targets' overall and reputational ESG risk exposures. This confirms the initial observation that buyers are acquiring targets with statistically better ESG risk ratings. This also lends credibility to examining the effects of both buyer and target ESG risks.

Table 2a: *Two-Sample t-Test w/ Unequal Variances Between Buyer and Target RRR*

Variable	Obs.	Mean	Std. Error	Std. Dev	[95% Conf. Interval]	
BuyerRating	341	3.11	0.082	1.52	2.95	3.28
TargetRating	341	2.44	0.053	0.97	2.34	2.54
combined	682	2.78	0.050	1.32	2.68	2.88
diff		0.67	0.098		0.48	0.87
diff = mean(BuyerRating) - mean(TargetRating)				t = 6.9166		
H_a: diff != 0				H_a: diff > 0		
Pr(|T| > |t|) = 0.0000				Pr(T > t) = 0.0000		

Table 2b: *Two-Sample t-Test w/ Unequal Variances Between Buyer and Target RRI*

Variable	Obs.	Mean	Std. Error	Std. Dev	[95% Conf. Interval]	
Buyer RRI	341	16.33	.807	14.90	14.74	17.92
Target RRI	341	8.32	.635	11.73	7.07	9.57
combined	682	12.33	.536	13.99	11.27	13.38
diff		8.01	1.027		5.99	10.03
diff = mean(Buyer RRI) - mean(Target RRI)				t = 7.8006		
H_a: diff != 0				H_a: diff > 0		
Pr(|T| > |t|) = 0.0000				Pr(T > t) = 0.0000		

Over half the transactions in the sample are under $3 billion in total value and over three-fourths are under $8.5 billion in total value. The right tail of the distribution increases rapidly with value doubling from the 90th to 95th percentile and doubling again by the 99th percentile. To mitigate the effects of the sizable right tail, I take the natural log of transaction value when regressing. Of the 341 transactions, there are: 211 one-time buyers, 36 two-time buyers, 12 three-time buyers, 4 four-timer buyers, and 1 six-time buyer. The transactions are evenly distributed by broad industry. Furthermore, same broad industry M&A comprises the vast majority of transactions at around 89% of all transactions

Moving onto the financial controls, I first examine pairwise correlations between variables and find that buyer: revenue, LFCF, and total assets are highly positively correlated with each other and the ESG variables. This is interesting, because it suggests that larger firms are exposed to more ESG risk though it is unclear whether this is because they are more complex or simply because they have more visibility. To address this potential multicollinearity, I drop buyer LFCF and buyer assets from my set of financial controls; I am able to adjust buyer revenue by dividing by total assets and remove its multicollinearity concerns. I refer to this variable as buyer adj. revenue. After I examine the target variables, I drop target revenue as it is moderately correlated with the ESG variables and other financial controls and I am unable to reduce the correlation even after adjusting it. I also examine correlations across buyers and targets and do not find any that would cause additional multicollinearity concerns.

Table 3: *Transaction Controls Descriptive Statistics*

Control Variable	N	Mean	Variance	Std. Dev	Skewness	Kurtosis	Sum	Min	Max	Value at n^{th} Percentile								
										1	5	10	25	50	75	90	95	99
Buyer Adj. Revenue (x)	337	0.842	0.573	0.757	2.127	8.068	283.78	0.037	4.40	0.044	0.164	0.216	0.371	0.596	1.01	1.83	2.55	3.83
Buyer Growth (t_{-3}-t_0) (%)	331	13.49	8.90	29.83	3.82	22.08	45	-41.66	191.1	-38.25	-9.97	-3.12	1.59	6.54	16.20	33.91	55.84	191.1
Buyer ROA (%)	333	6.281	18.668	4.321	0.90	5.04	2,091	-6.82	25.79	-2.35	0.13	1.95	3.47	5.43	8.42	11.76	13.36	19.83
Buyer Debt/Equity (%)	309	108.34	17786	133	4.53	31.07	33,476	0.18	1,285	0.27	11.8	22.6	43.2	71.4	129.5	207.0	275.7	723.5
Buyer MTB (x)	305	3.386	21.891	4.679	1.34	17.03	1,033	-22.86	31.51	-10.38	0.50	0.93	1.55	2.43	4.12	7.78	10.23	21.26
Target Growth (t_{-3}-t_0) (%)	324	13.16	8.08	28.42	2.99	14.35	43	-35.66	190.9	-24.58	-13.55	-7.70	0.23	6.65	17.89	31.71	63.05	126B
Target ROA (%)	314	4.030	25.797	5.079	-1.17	6.98	1,265	-19.92	18.74	-14.8)	-5.07	-0.89	2.07	4.34	6.81	9.34	10.91	15.29
Target Debt/Equity (%)	264	94.98	6594	81	1.36	4.75	25,075	0.02	391.3	0.13	5.8	11.3	35.6	75.2	128.1	210.8	280.5	352.1
Target LFCF ($mm)	330	190	1,162,393	1,078	4.86	44.16	62,827	-4,520	11.1B	-1,795	-513	-213	-12	44	174	525	1,152	5,471
Target Assets ($mm)	338	7288	227,389B	15,079	4.47	29.33	2,463B	0.42	1412B	2.64	102	216	664	1,959	6,547	18.4B	36.2B	78.6B
Target MTB (x)	299	3	11	3	0.38	9.82	852	-12.47	18.25	-9.79	0.22	0.76	1.37	2.26	3.86	7.28	8.45	16.03
i. Same Generic Industry	341	0.889	0.099	0.315	-2.470	7.099	303	0	1	0	0	0	1	1	1	1	1	1
i. Same Specific Industry	341	0.645	0.230	0.479	-0.607	1.368	220	0	1	0	0	0	0	1	1	1	1	1

Table 3, above, displays the descriptive statistics of my final transaction controls. I partially normalized ROA, Debt/Equity, and MTB by trimming the 5 largest values. This partially accounts for why ratio variables such as Debt/Equity and MTB have n < 341. For Debt/Equity, recorded as a percent, I drop any values that are negative or zero and for MTB some firms do not have data for market value of equity which is why MTB n < 341. Buyers and targets appear to have similar growth rates and debt to equity ratios. The size of buyers becomes apparent when examining flows or stocks. For example, buyer assets, not shown in table 3, average around $31.4B while targets average around $7.3B in assets. The last two variables in table 3, 'i. Same Broad Industry' and 'i. Same Specific Industry' are indicator variables equal to 1 if the buyer and target operate in the same industries as defined by Capital IQ. A value of 1 for 'i. Same Specific Industry' necessarily indicates a 1 for 'i. Same Broad Industry' as well. This is my way of capturing horizontal deals. There are nine broad industry classifications: communication services, consumer discretionary, consumer staples, energy, health care, industrials, information technology, materials, and utilities. There are 100 specific industries as defined by Capital IQ. One limitation of these controls is that I do not account for other deal factors such as whether a deal is friendly or hostile.

Table 4, below, displays the descriptive statistics of the dependent variables. For the valuation metrics, I drop the 10 largest values to account for outliers. For my long run analysis, 275 transactions are eligible by having a date of 2017 or earlier which is why the n for the Δ variables is lower. The market measures of deal valuation have larger

variances than those from the firm perspective which is sensible given the volatility of markets. Overall targets are paid well enjoying a 26 percentage point increase to their shares when bought. Looking at the buyer Δ operating metrics, buyers appear to enjoy higher rates of growth in the 3 years after transaction compared to the 3 years before transaction. They also generate more profits, though it appears to come at the cost of efficiency suggesting that most increases come from simply absorbing the target's assets rather than merger synergies or gains from scale.

Table 4: *Short and Long Run Dependent Variable Descriptive Statistics*

Dependent Variable	N	Mean	Var.	Std. Dev	Skewness	Kurtosis	Sum	Min	Max	Value at n^{th} Percentile								
										1	5	10	25	50	75	90	95	99
EV/EBIT (x)	272	21.6	165.0	12.84	1.68	6.34	5,877	1.71	76.98	2.98	8.55	10.0	13.2	17.7	26.5	37.4	47.1	69.6
EV/ EBITDA (x)	281	13.7	58.30	7.64	1.78	7.22	3,850	1.11	48.88	2.59	5.13	6.77	8.87	11.9	16.6	22.0	28.0	43.5
MV/BV of Equity (x)	298	3.84	8.20	2.86	1.48	4.59	1,144	0.23	14.10	0.53	1.00	1.21	1.93	2.93	4.64	8.65	10.3	13.1
1M Stock Premium (%)	304	29.8	524.0	22.89	0.38	3.81	9,052	-45.8	99.45	-16	-2.6	4.41	15.3	27.3	40.9	59.5	74.9	89.4
1W Stock Premium (%)	299	26.0	399.3	19.98	0.33	3.68	7,761	-44.6	81.81	-19	-1.3	2.75	11.4	25.5	36.8	51.1	63.1	80.1
Δ Growth (%)	262	5.94	10.69	32.69	156.1	1,471	1,556	-158	177	-97	-30	-17	-6.3	3.30	12.6	29.7	52.7	177
Δ ROA (%)	262	-1.42	10.75	3.28	-0.44	5.08	-373	-14.8	10.37	-12	-7.0	-6.0	-2.9	-1.0	0.56	1.87	2.83	7.98
Δ LFCF ($mm)	261	537	7,894B	2,810	2.59	18.40	140B	-12.2B	17.6B	-5.0B	-2.5B	-1.3B	-168	186	764	2.2B	4.7B	16B
Δ MTB (x)	225	-0.47	17.10	4.14	-1.18	19.65	-106	-28.10	22.58	-18	-4.7	-2.6	-1.1	-0.3	0.45	1.77	4.09	13.3

V. Empirical Methodology & Results

Short Run Valuation Analysis

My empirical analysis is divided into short and long-run analysis. In the short-run, I investigate the impact of buyer and target ESG risks on the ultimate deal valuation while controlling for each firm's financial characteristics. The general OLS short-run regression equation is shown below:

$$M\&A\ Valuation = \beta_0 + \beta_1 Buyer\ ESG\ Risk + \beta_2 Target\ ESG\ Risk +$$
$$\beta_3 Buyer\ Financial\ Controls + \beta_4 Target\ Financial\ Controls +$$
$$\beta_5\ i.Same\ Industry\ Indicators + \beta_6 \ln(Total\ Transaction\ Value) + \varepsilon$$

I regress five different measures of M&A valuation: 1) Implied Enterprise Value/EBIT, 2) Implied Enterprise Value/EBITDA, 3) Implied Market/Book Value of Equity (MTB), 4) Target Stock Premium 1-Month Prior, and 5) Target Stock Premium 1-Week Prior. For each valuation measure, I regress them against five linear combinations of the available ESG variables with each combination representing one set of buyer and target ESG risk variables. These five combinations look at ESG risk from an overall and individual component level. In addition to the five linear ESG combinations, I run ESG combinations to test for non-linearity in the overall ESG risk measures. The ESG variable combinations are listed below in table 5. I utilize a constant set of financial controls which consist of both buyer and target: Adj. revenue (buyer only), 3 Years Prior to Present Revenue CAGR, ROA, Debt/Equity Ratio, LFCF, Assets (target only), and MTB. For the implied market to book value of equity regressions only(MTB), I drop target MTB from the set of

controls to avoid multicollinearity issues. I run all regressions allowing for robust standard errors using the Stata command "vce(robust)".

Table 5: *Buyer and Target ESG Risk Combinations*

Linear ESG Risk Combination (Both Buyer & Target)	Regression Number
RRR	1
RRI	2
Individual E and S Risk	3
Individual E and G Risk	4
Individual S and G Risk	5
Additional Tests for Overal ESG Risk Non-Linearity	
lnRRR	6
lnRRI	7
RRR & RRR^2	8
RRI & RRI^2	9
No ESG – Control Regression	10

I will present my findings as patterns and aggregated results rather than individually go through each regression. Full regression results are available upon request. Overall, ESG risk and its individual components are significant determinants of deal valuations. I show the linear ESG regression results for EV/EBIT, below in table 6, and the target 1-month prior stock premium, below in table 7, as they showcase the ESG risk findings I wish to unpack – they also show significance for the overall ESG risk ratings which does not show in the EV/EBITDA and implied MTB multiples. For implied EV/EBIT, acquirers appear to place a penalty on target reputational risk exposure with a one standard deviation increase in target RRI reducing the multiple paid by about 1.86x. This finding is in line with previous literature which notes that targets with high CSR (i.e. low risk) receive premiums.

Table 6: *Implied Enterprise Value/EBIT Linear ESG Regressions w/ Robust Std. Errors*

Implied Enterprise Value/EBIT Multiple (x)	RRR		RRI		E and S		E and G		S and G		Control	
	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
BuyerRating	-0.399	(0.456)	.	.	.	.	.	.	.	.	.	.
BuyerRRI	.	.	-0.063	(0.042)	.	.	.	.	.	.	.	.
BuyerEnvironmentalRisk	.	.	.	.	-0.086	(0.072)	-0.14 **	(0.067)	.	.	.	.
BuyerSocialRisk	.	.	.	.	-0.245 ***	(0.07)	.	.	-0.276 ***	(0.074)	.	.
BuyerGovernanceRisk	.	.	.	.	.	.	0.229 *	(0.131)	0.277 **	(0.129)	.	.
TargetRating	-0.308	(0.885)	.	.	.	.	.	.	.	.	.	.
TargetRRI	.	.	-0.159 **	(0.07)	.	.	.	.	.	.	.	.
TargetEnvironmentalRisk	.	.	.	.	-0.144	(0.103)	-0.138	(0.096)	.	.	.	.
TargetSocialRisk	.	.	.	.	0.006	(0.088)	.	.	-0.047	(0.101)	.	.
TargetGovernanceRisk	.	.	.	.	.	.	-0.311 ***	(0.11)	-0.321 ***	(0.114)	.	.
BuyerAdj.Revenue	-1.649	(1.11)	-1.233	(0.974)	-1.775 *	(0.922)	-1.083	(0.978)	-1.217	(0.932)	-1.64 *	(0.936)
BuyerGrowth (t_{-3}-t_0)	-0.086 **	(0.042)	-0.077 *	(0.042)	-0.087 **	(0.043)	-0.057	(0.044)	-0.063	(0.041)	-0.085 **	(0.041)
BuyerROA	0.056	(0.184)	0.013	(0.182)	0.117	(0.172)	0.137	(0.192)	0.27	(0.19)	0.071	(0.188)
BuyerDebtEquity	-0.024 **	(0.01)	-0.024 **	(0.01)	-0.02 **	(0.009)	-0.015 *	(0.009)	-0.017 **	(0.008)	-0.023 **	(0.01)
BuyerMTB	0.529 **	(0.224)	0.546 **	(0.225)	0.477 **	(0.19)	0.373	(0.235)	0.418 **	(0.198)	0.495 **	(0.231)
TargetGrowth (t_{-3}-t_0)	0.093 **	(0.046)	0.087 *	(0.046)	0.089 **	(0.045)	0.079 *	(0.046)	0.079 *	(0.044)	0.094 **	(0.046)
TargetROA	-2.965 ***	(0.392)	-2.922 ***	(0.372)	-2.922 ***	(0.361)	-2.943 ***	(0.374)	-2.957 ***	(0.356)	-2.981 ***	(0.387)
TargetDebtEquity	-0.042 ***	(0.007)	-0.042 ***	(0.007)	-0.044 ***	(0.006)	-0.042 ***	(0.006)	-0.044 ***	(0.006)	-0.041 ***	(0.007)
TargetLFCF	0	(0)	-0.001	(0)	-0.001	(0.001)	-0.001 *	(0)	0	(0)	0	(0)
TargetAssets	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
TargetMTB	2.881 ***	(0.398)	2.82 ***	(0.397)	2.761 ***	(0.374)	2.771 ***	(0.412)	2.676 ***	(0.39)	2.892 ***	(0.409)
i.SameBroadIndustry	5.387 **	(2.394)	5.388 **	(2.277)	5.886 **	(2.276)	5.395 **	(2.228)	5.48 **	(2.148)	5.235 **	(2.242)
i.SameSpecificIndustry	-4.209 **	(1.893)	-4.191 **	(1.863)	-4.723 **	(1.921)	-3.983 **	(1.823)	-4.074 **	(1.752)	-3.901 **	(1.956)
lnTransactionValue	0.83	(0.648)	1.355 *	(0.693)	1.245 *	(0.703)	1.072	(0.673)	1.266 *	(0.685)	0.678	(0.676)
Announcement Date	0.001 *	(0)	0.001 **	(0)	0.001 *	(0)	0.001	(0.001)	0.001 *	(0)	0.001 *	(0.001)
Constant	11.764	(10.314)	4.788	(10.43)	10.362	(10.643)	12.421	(10.628)	7.1	(10.333)	11.308	(10.088)
R-Squared	0.5448		0.5683		0.5831		0.5859		0.6066		0.5412	

Note: '***' indicates significance at p <= 0.01, '**' → p <= 0.05, '*' → p <= 0.10. '.' indicates that the ESG variable was not included in the specific regression. Each column represents an individual regression corresponding to table 5 above.

For the target stock premiums, investors appear to care about the buyer's overall ESG risk especially when looking at the 1-week window where both buyer RRR and RRI are significant at a 5% level. Qualitatively, the signs of the coefficients suggest that higher risk buyers pay more, though this interpretation is unclear in the context of target stock premiums given by markets.

Moving onto the effects of the individual environmental, social, and governance components of ESG risk, environmental risk exposure is the least significant component when examining deal valuations, though it is significant when looking at EV/EBIT and the target 1-month prior stock premium, which are displayed in the paper. Interestingly, the effect direction and which transactor it is significant for changes between the two-valuation metrics. For EV/EBIT, environmental risk is only significant for the buyer with a standard deviation increase leading to a 0.94x decrease in price paid. For the target 1-month prior stock premium, environmental risk is only significant for the target with a standard deviation increase reducing their share price premium by 4.09 percentage points. This effect direction makes sense as environmental risk exposure is generally seen as a pure risk with little upside, and this result is qualitatively similar to that by Song (2016). For EV/EBIT, the interpretation and implications for environmental risk are unclear, as this goes against economic intuition which struggles to find the upside in the exposure of say real assets to climate risk or of environmental regulation exposure.

Unlike environmental, governance risk exposure consistently appears to be a pure risk and is significant for both parties – higher governance risk causes buyers to pay more and targets to receive less.

Table 7: *Target Stock Premium 1-Month Prior Linear ESG Regressions w/ Robust Std. Errors*

Target Stock Premium 1-Month Prior (%)	RRR		RRI		E and S		E and G		S and G		Control	
	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
BuyerRating	2.141 *	(1.203)	.	.	.	.	.	.	.	.	.	.
BuyerRRI	.	.	0.228 *	(0.12)	.	.	.	.	.	.	.	.
BuyerEnvironmentalRisk	.	.	.	.	0.268	(0.271)	0.3	(0.257)	.	.	.	.
BuyerSocialRisk	.	.	.	.	0.036	(0.214)	.	.	0.098	(0.203)	.	.
BuyerGovernanceRisk	.	.	.	.	.	.	0.345	(0.247)	0.284	(0.258)	.	.
TargetRating	2.073	(2.161)	.	.	.	.	.	.	.	.	.	.
TargetRRI	.	.	0.052	(0.182)	.	.	.	.	.	.	.	.
TargetEnvironmentalRisk	.	.	.	.	-0.774 **	(0.383)	-0.444	(0.35)	.	.	.	.
TargetSocialRisk	.	.	.	.	0.741 ***	(0.284)	.	.	0.541 *	(0.278)	.	.
TargetGovernanceRisk	.	.	.	.	.	.	0.091	(0.314)	0.115	(0.28)	.	.
BuyerAdj.Revenue	1.365	(2.643)	1.424	(2.646)	1.453	(2.613)	1.496	(2.804)	1.141	(2.616)	1.268	(2.591)
BuyerGrowth (t_{-3}-t_0)	-0.176 *	(0.091)	-0.156	(0.095)	-0.151	(0.094)	-0.138	(0.097)	-0.167 *	(0.09)	-0.165 *	(0.089)
BuyerROA	0.541	(0.655)	0.573	(0.66)	0.423	(0.66)	0.565	(0.659)	0.545	(0.68)	0.535	(0.641)
BuyerDebtEquity	-0.008	(0.023)	-0.007	(0.023)	-0.006	(0.021)	-0.006	(0.023)	-0.005	(0.022)	-0.01	(0.024)
BuyerMTB	-0.037	(0.6)	0.034	(0.581)	0.099	(0.549)	0.037	(0.588)	0.01	(0.604)	0.134	(0.543)
TargetGrowth (t_{-3}-t_0)	0.006	(0.056)	-0.009	(0.059)	-0.016	(0.054)	-0.018	(0.06)	-0.006	(0.055)	-0.01	(0.057)
TargetROA	-1.035 *	(0.603)	-1.038 *	(0.602)	-0.978	(0.601)	-1.027 *	(0.604)	-0.903	(0.605)	-1.06 *	(0.589)
TargetDebtEquity	0.011	(0.024)	0.009	(0.024)	0.01	(0.023)	0.008	(0.025)	0.011	(0.024)	0.009	(0.024)
TargetLFCF	0.001	(0.002)	0.001	(0.001)	0	(0.001)	0	(0.001)	0.001	(0.002)	0.001	(0.001)
TargetAssets	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
TargetMTB	0.396	(1.052)	0.38	(1.063)	0.149	(1.055)	0.14	(1.064)	0.182	(1.016)	0.364	(1.061)
i.SameBroadIndustry	-7.499	(5.773)	-7.24	(5.554)	-5.279	(5.647)	-6.299	(5.479)	-5.528	(5.512)	-7.305	(5.596)
i.SameSpecificIndustry	3.571	(4.54)	2.538	(4.418)	1.423	(4.399)	1.625	(4.4)	1.778	(4.416)	1.524	(4.33)
lnTransactionValue	-1.403	(1.641)	-1.298	(1.711)	-0.911	(1.583)	-0.515	(1.669)	-1.648	(1.72)	-0.437	(1.707)
Announcement Date	-0.002	(0.001)	-0.002	(0.001)	-0.002	(0.002)	-0.002	(0.002)	-0.002	(0.002)	-0.002	(0.001)
Constant	66.515 **	(33.642)	78.176 **	(32.95)	79.948 **	(33.76)	76.015 **	(34.553)	84.562 **	(34.098)	70.33 **	(33.079)
R-Squared	0.1178		0.1081		0.1349		0.1134		0.1258		0.0891	

Note: '***' indicates significance at p <= 0.01, '**' → p <= 0.05, '*' → p <= 0.10. '.' indicates that the ESG variable was not included in the specific regression. Each column represents an individual regression corresponding to table 5 above.

Governance risk is significant when regressing EV/EBIT, MTB, and is weakly significant for the target 1-week prior stock premium. For EV/EBIT specifically, a standard deviation increase in governance risk leads buyers to pay a 2.23x higher and targets to receive a 1.83x lower multiple, respectively. This result has sensible explanations. From the acquirer point of view, their willingness to pay might be reduced if they know that they are acquiring a poorly managed target which could potentially be difficult to integrate and clean up. From the target point of view, they might be less willing to give themselves up to a poorly managed buyer and thus demand a higher price as compensation. This result qualitatively supports the findings of De la Bruslerie and Le Maux (2016) who find that litigation risk, which can be proxied by governance risk, increases deal premiums. Notably, strong significance of governance disappears when evaluating target stock premiums. This is surprising considering that of the three ESG components, governance presumably has the largest and most direct impact on M&A performance, and investors would also want the best and most disciplined management team possible to execute their deals. Perhaps investors and markets do value governance in the context of M&A, but they show it mainly through changes in the buyer's stock price – a variable that I do not consider in this investigation.

Lastly, social is the most interesting of the three ESG components. Social risk is significant for both buyers and targets. For buyers, social risk is significant when examining both implied enterprise value as well as MTB multiples and for targets, social risk is significant when examining target stock premiums. Social risk consistently appears to be an opportunity with respect to deal valuations. For a standard deviation increase in

buyer social risk, buyers can expect to pay a 2.06x *lower* EV/EBIT multiple. Looking at the target 1-week stock premium, for a standard deviation increase in target social risk, targets can expect to receive a 4.5 percentage point *increase* in the premium to their 1-week prior stock price. Social risk is the only component to be significant across all measures of deal valuation for either the buyer or target or both. This result is surprising given that social is presumably the hardest component to measure across firms consistently and quantitatively. Why social risk is treated as an opportunity by both firms and markets is unclear. This finding goes against that of Russo et. al (2018) who investigate social risk as part of firms' sustainability orientation finding lower risk to be a value creator. They also investigate social risk by itself though they don't find it to be significant. Perhaps both firms and markets view social risk as the easiest of the three ESG components to rectify and address. Thus, high social risk targets present valuable opportunities for quick fixups. This, however, would not explain why buyers also experience social risk as an opportunity. Perhaps this finding is simply a quirk of RepRisk's ESG methodology or measurement – this is entirely possible given their limitedness in explaining how scores are generated.

Overall ESG risk appears to have some non-linear effects on M&A valuations though it is sporadic. These non-linearities are most apparent in the market-based measures of deal valuations which had the least amount of significance for linear ESG measures. I showcase the non-linear ESG regressions for the target 1-month prior stock premium below in table 8 as it has the most significant results. For the stock premiums, overall buyer ESG risk appears to behave logarithmically.

Table 8: *Target 1-Month Prior Stock Premium Non-Linear ESG Regressions w/ Robust Std. Errors*

Target Stock Premium 1-Month Prior (%)	RRR		lnRRR		RRR & RRR²		RRI		lnRRI		RRI & RRI²		Control	
	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.	Coef.	Std.
BuyerRating	2.141 *	(1.203)	.	.	8.208 **	(4.166)	.	.	.	.	.	.	.	.
Buyercurrent_RRI	.	.	.	.	.	.	0.228 *	(0.12)	.	.	0.625 **	(0.267)	.	.
TargetRating	2.073	(2.161)	.	.	2.114	(7.887)	.	.	.	.	.	.	.	.
Targetcurrent_RRI	.	.	.	.	.	.	0.052	(0.182)	.	.	-0.655 *	(0.375)	.	.
BuyerRating²	.	.	.	.	-0.744	(0.463)	.	.	.	.	.	.	.	.
TargetRating²	.	.	.	.	0.002	(1.194)	.	.	.	.	.	.	.	.
BuyerRRI²	.	.	.	.	.	.	.	.	.	.	-0.01 *	(0.006)	.	.
TargetRRI²	.	.	.	.	.	.	.	.	.	.	0.021 *	(0.011)	.	.
lnBuyerRating	.	.	8.381 **	(3.703)	.	.	.	.	.	.	.	.	.	.
lnTargetRating	.	.	5.814	(5.709)	.	.	.	.	.	.	.	.	.	.
lnBuyerRRI	.	.	.	.	.	.	.	.	3.039 ***	(1.102)	.	.	.	.
lnTargetRRI	.	.	.	.	.	.	.	.	-0.606	(1.321)	.	.	.	.
BuyerAdj.Revenue	1.365	(2.643)	1.683	(2.67)	1.733	(2.745)	1.424	(2.646)	1.677	(2.579)	1.56	(2.674)	1.268	(2.591)
BuyerGrowth3B	-0.176 *	(0.091)	-0.173 *	(0.092)	-0.178 *	(0.093)	-0.156	(0.095)	-0.133	(0.094)	-0.149	(0.095)	-0.165 *	(0.089)
BuyerROAT	0.541	(0.655)	0.47	(0.648)	0.461	(0.655)	0.573	(0.66)	0.485	(0.648)	0.327	(0.636)	0.535	(0.641)
BuyerDebtEquityT	-0.008	(0.023)	-0.008	(0.023)	-0.007	(0.023)	-0.007	(0.023)	-0.007	(0.024)	-0.007	(0.024)	-0.01	(0.024)
BuyerMTBT	-0.037	(0.6)	0.001	(0.58)	0.009	(0.589)	0.034	(0.581)	0.107	(0.557)	0.308	(0.553)	0.134	(0.543)
TargetGrowth	0.006	(0.056)	0.006	(0.057)	0.008	(0.057)	-0.009	(0.059)	-0.016	(0.062)	-0.013	(0.061)	-0.01	(0.057)
TargetROA	-1.035 *	(0.603)	-1.016 *	(0.599)	-1.001 *	(0.601)	-1.038 *	(0.602)	-1.007 *	(0.583)	-0.887	(0.594)	-1.06 *	(0.589)
TargetDebtEquity	0.011	(0.024)	0.011	(0.024)	0.01	(0.024)	0.009	(0.024)	0.009	(0.024)	0.012	(0.024)	0.009	(0.024)
TargetLFCF	0.001	(0.002)	0.001	(0.001)	0.001	(0.002)	0.001	(0.001)	0.001	(0.001)	0.001	(0.001)	0.001	(0.001)
TargetAssets	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
TargetMTB	0.396	(1.052)	0.361	(1.046)	0.271	(1.052)	0.38	(1.063)	0.221	(1.073)	-0.005	(1.076)	0.364	(1.061)
i.SameGenericIndustry	-7.499	(5.773)	-7.659	(5.731)	-7.365	(5.818)	-7.24	(5.554)	-8.207	(5.558)	-6.605	(5.303)	-7.305	(5.596)
i.SameSpecificIndustry	3.571	(4.54)	3.243	(4.507)	2.747	(4.504)	2.538	(4.418)	2.123	(4.37)	1.34	(4.33)	1.524	(4.33)
lnTotalTransactionValue	-1.403	(1.641)	-1.377	(1.635)	-1.274	(1.632)	-1.298	(1.711)	-0.945	(1.716)	-0.84	(1.683)	-0.437	(1.707)
Announcement Date	-0.002	(0.001)	-0.002	(0.001)	-0.002	(0.002)	-0.002	(0.001)	-0.002	(0.001)	-0.002	(0.001)	-0.002	(0.001)
Constant	66.515 **	(33.642)	67.918 **	(33.278)	60.121 *	(35.181)	78.176 **	(32.95)	81.732 **	(32.809)	74.259 **	(33.003)	70.33 **	(33.079)
R^2	0.1178		0.1226		0.1258		0.1081		0.1190		0.1375		0.0891	

Note: '***' indicates significance at p <= 0.01, '**' → p <= 0.05, '*' → p <= 0.10. '.' indicates that the ESG variable was not included in the specific regression. Each column represents an individual regression corresponding to table 5 above.

Interestingly, when regressing RRR and RRI with a squared term, the squared terms are insignificant but the coefficients on the levels are much larger. For table 8 above, the coefficient on buyer rating increases from 2.14 to 8.21 and buyer RRI increases from 0.23 to 0.65. Both coefficients also become more significant. This result perhaps appears because ESG data is only ordinal rather than cardinal and thus different scales might yield better analysis.

Long Run Analysis

In the long-run, I investigate the impact of buyer and target ESG risks on the buyer's post-M&A financial metrics while controlling for each firm's financial characteristics. The general long-run regression equation is shown below:

$$Buyer\ \Delta\ Financial\ Metric = \beta_0 + \beta_1 Buyer\ ESG\ Risk + \beta_2 Target\ ESG\ Risk +$$
$$\beta_3 Buyer\ Financial\ Controls + \beta_4 Target\ Financial\ Controls +$$
$$\beta_5\ i.Same\ Industry\ Indicators + \beta_6 \ln(Total\ Transaction\ Value) + \varepsilon$$

I regress four different measures of buyer financial performance: 1) Buyer Δ Growth, 2) Buyer Δ Return on Assets, 3) Buyer Δ Levered Free Cash Flow, and 4) Buyer Δ Market to Book Ratio. Similar to the short run methodology, for each financial metric, I regress them against five linear combinations of the available ESG variables with each combination representing one set of buyer and target ESG risk variables. These five combinations look at ESG risk from an overall and individual component level. In addition to the five linear ESG combinations, I run ESG combinations to test for non-linearity in the overall ESG risk measures. The ESG variable combinations are listed above in table 5. I utilize a set of

financial controls similar to the ones in the short-run analysis consisting of both buyer and target: Adj. revenue (buyer only), 3 Years Prior to Present Revenue CAGR, ROA, Debt/Equity Ratio, LFCF, Assets (target only), and MTB. However, since the dependent variable is the change in buyer financial performance, I omit the one respective control that overlaps with each financial metric when it is regressed. For example, when I regress Δ ROA as the dependent variable, I drop buyer ROA from the set of controls for all Δ ROA regressions.

Looking at the linear ESG results, there are two shifts when examining post-M&A performance and changes in buyer operating metrics. The first shift is that acquirer ESG risk becomes more important relative to the ESG risk of the target. Put simply, target ESG risk is rarely a significant determinant of long run acquirer performance post M&A. This supports the idea that the buyer in M&A's truly subsumes and incorporates the target's assets – the target's ESG risks simply get absorbed as well. The second shift is that ESG risk generally appears to be an opportunity in the long run with the exception of environmental risk. Below, I display the regression results for buyer Δ MTB and Δ Growth in table 9 and table 10, respectively. I showcase these metrics as they reveal the different effects of ESG risk in the long run. Δ ROA behaves qualitatively similarly to Δ MTB while Δ LFCF doesn't pick up any significant linear ESG risk. A possible reason why Δ LFCF has no significance is that buyer LFCF at transaction was highly correlated with other buyer variables; thus, when regressing the change, it is difficult to detect significant independent effects.

Table 9: *Buyer Δ MTB Linear ESG Regressions w/ Robust Std. Errors*

Buyer Δ MTB (x)	RRR		RRI		E and S		E and G		S and G		Control	
	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
BuyerRating	0.352 **	(0.161)	.	.	.	.	.	.	.	.	.	.
BuyerRRI	.	.	0.052 ***	(0.018)	.	.	.	.	.	.	.	.
BuyerEnvironmentalRisk	.	.	.	.	-0.011	(0.023)	0.021	(0.021)	.	.	.	.
BuyerSocialRisk	.	.	.	.	0.069 **	(0.034)	.	.	0.055 *	(0.032)	.	.
BuyerGovernanceRisk	.	.	.	.	.	.	0.12 ***	(0.04)	0.109 ***	(0.039)	.	.
TargetRating	0.097	(0.267)	.	.	.	.	.	.	.	.	.	.
TargetRRI	.	.	-0.012	(0.016)	.	.	.	.	.	.	.	.
TargetEnvironmentalRisk	.	.	.	.	0.028	(0.049)	0.03	(0.042)	.	.	.	.
TargetSocialRisk	.	.	.	.	0.01	(0.048)	.	.	0.01	(0.038)	.	.
TargetGovernanceRisk	.	.	.	.	.	.	-0.066	(0.041)	-0.068 *	(0.04)	.	.
BuyerAdj.Revenue	-0.482	(0.368)	-0.448	(0.336)	-0.508	(0.358)	-0.418	(0.304)	-0.385	(0.296)	-0.525	(0.383)
BuyerGrowth (t_{-3}-t_0)	-0.015	(0.014)	-0.012	(0.013)	-0.017	(0.013)	-0.013	(0.013)	-0.011	(0.012)	-0.015	(0.013)
BuyerROA	-0.217 **	(0.089)	-0.204 **	(0.093)	-0.223 **	(0.094)	-0.166 *	(0.095)	-0.202 **	(0.092)	-0.2 **	(0.096)
BuyerDebtEquity	-0.003	(0.006)	-0.003	(0.006)	-0.003	(0.006)	-0.002	(0.006)	-0.002	(0.006)	-0.003	(0.006)
BuyerMTB	.	.	.	.	.	.	.	.	.	.	.	.
TargetGrowth (t_{-3}-t_0)	0.01	(0.015)	0.009	(0.015)	0.01	(0.015)	0.006	(0.014)	0.005	(0.013)	0.01	(0.016)
TargetROA	0.015	(0.068)	0.007	(0.062)	0.008	(0.069)	0.027	(0.064)	0.024	(0.062)	0.015	(0.071)
TargetDebtEquity	-0.006	(0.004)	-0.007	(0.004)	-0.006	(0.005)	-0.007 *	(0.004)	-0.007	(0.004)	-0.007	(0.004)
TargetLFCF	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
TargetAssets	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
TargetMTB	-0.198	(0.156)	-0.2	(0.145)	-0.186	(0.161)	-0.282 *	(0.152)	-0.258	(0.157)	-0.215	(0.154)
i.SameBroadIndustry	-0.171	(0.634)	-0.126	(0.634)	-0.125	(0.632)	-0.133	(0.616)	-0.192	(0.627)	-0.002	(0.654)
i.SameSpecificIndustry	0.153	(0.614)	0.115	(0.576)	-0.004	(0.613)	0.057	(0.575)	0.152	(0.565)	-0.172	(0.619)
lnTransactionValue	-0.5 *	(0.297)	-0.542 *	(0.303)	-0.476	(0.296)	-0.504 *	(0.288)	-0.528 *	(0.292)	-0.364	(0.29)
Announcement Date	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
Constant	4.508	(5.865)	6.421	(6.093)	5.422	(6.028)	6.732	(6.466)	8.334	(6.527)	3.665	(5.864)
R-Squared	0.2274		0.2438		0.2279		0.2688		0.2803		0.2003	

Note: '***' indicates significance at p <= 0.01, '**' → p <= 0.05, '*' → p <= 0.10. '.' indicates that the ESG variable was not included in the specific regression. Each column represents an individual regression corresponding to table 5 above.

Starting with overall ESG risk, both buyer RRR and RRI are significant when regressing Δ MTB and Δ ROA. Looking at table 9 above, the coefficients for buyer rating and buyer RRI are both positive suggesting that a riskier buyer performs better post M&A. This result appears to support shareholder theory. One practical limitation to this result is that there is generally limited variability in buyer ESG scores meaning that the gains to this potential effect are limited. As noted earlier, target ESG risk is an insignificant determinant of acquirer post M&A performance.

Moving on to the individual ESG risk components, governance is still a significant factor – though in the longer run it appears to act as an opportunity rather than as the pure risk it appears to be for deal valuations. Looking at table 9 above, a standard deviation increase in a buyer's governance risk can generate a 0.95x increase in their MTB ratio by their third year after transacting. For Δ ROA, buyers can expect a 0.93 percentage point increase in ROA by their third year after transacting for the same standard deviation increase in governance risk. One possible interpretation of this result is that if governance risk is interpreted as stronger corporate control, then greater agility and ability to act decisively post-M&A can be beneficial for an acquirer. RepRisk does not disclose many specifics on their score generation so I cannot test this hypothesis unfortunately.

Environmental risk continues to act as a pure risk post M&A though it is only significant when regressing Δ growth, shown below in table 10. A standard deviation increase in buyer environmental risk leads to a 4.35 percentage point lower buyer compound annual revenue growth for each of the next three years.

Table 10: *Buyer Δ Growth Linear ESG Regressions w/ Robust Std. Errors*

Buyer Δ Growth (%)	RRR		RRI		E and S		E and G		S and G		Control	
	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
BuyerRating	-1.68	(1.48)	.	.	.	.	.	.	.	.	.	.
BuyerRRI	.	.	-0.283 *	(0.153)	.	.	.	.	.	.	.	.
BuyerEnvironmentalRisk	.	.	.	.	-0.611 **	(0.291)	-0.684 **	(0.277)	.	.	.	.
BuyerSocialRisk	.	.	.	.	-0.19	(0.279)	.	.	-0.414	(0.26)	.	.
BuyerGovernanceRisk	.	.	.	.	.	.	-0.031	(0.237)	0.059	(0.235)	.	.
TargetRating	-2.347	(2.185)	.	.	.	.	.	.	.	.	.	.
TargetRRI	.	.	0.022	(0.204)	.	.	.	.	.	.	.	.
TargetEnvironmentalRisk	.	.	.	.	0.229	(0.406)	0.228	(0.409)	.	.	.	.
TargetSocialRisk	.	.	.	.	-0.105	(0.272)	.	.	-0.023	(0.281)	.	.
TargetGovernanceRisk	.	.	.	.	.	.	0.175	(0.358)	0.131	(0.308)	.	.
BuyerAdj.Revenue	-2.32	(1.683)	-2.86 *	(1.637)	-2.717 *	(1.532)	-2.838 *	(1.7)	-2.84 *	(1.705)	-2.414	(1.615)
BuyerGrowth (t_{-3}-t_0)	.	.	.	.	.	.	.	.	.	.	.	.
BuyerROA	0.056	(0.569)	0.065	(0.575)	0.087	(0.596)	0.006	(0.636)	0.205	(0.639)	0.099	(0.626)
BuyerDebtEquity	-0.01	(0.009)	-0.011	(0.009)	-0.009	(0.008)	-0.008	(0.008)	-0.01	(0.009)	-0.008	(0.008)
BuyerMTB	1.276 **	(0.54)	1.209 **	(0.515)	1.067 **	(0.488)	0.993 **	(0.48)	1.181 **	(0.514)	1.092 **	(0.518)
TargetGrowth (t_{-3}-t_0)	-0.561 **	(0.218)	-0.561 **	(0.232)	-0.563 **	(0.231)	-0.56 **	(0.237)	-0.553 **	(0.229)	-0.552 **	(0.222)
TargetROA	-0.101	(0.556)	-0.036	(0.565)	0.046	(0.561)	0.086	(0.557)	0.001	(0.556)	-0.072	(0.548)
TargetDebtEquity	-0.009	(0.021)	-0.007	(0.021)	-0.003	(0.021)	0.001	(0.02)	-0.008	(0.021)	-0.005	(0.021)
TargetLFCF	0	(0.002)	0.001	(0.001)	0	(0.002)	0	(0.002)	0	(0.001)	0	(0.001)
TargetAssets	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)	0	(0)
TargetMTB	-2.018 **	(0.813)	-2.041 **	(0.84)	-2.1 ***	(0.745)	-2.07 ***	(0.761)	-2.229 ***	(0.818)	-2.039 **	(0.86)
i.SameBroadIndustry	1.588	(5.161)	1.905	(4.968)	2.08	(5.113)	2.402	(5.17)	3.059	(5.043)	1.795	(4.851)
i.SameSpecificIndustry	3.778	(3.858)	4.221	(3.744)	4.222	(3.707)	4.424	(3.592)	4.488	(3.844)	5.51	(3.852)
lnTransactionValue	3.579 **	(1.806)	3.479 *	(1.833)	3.561 **	(1.727)	3.162 *	(1.735)	2.92	(1.771)	2.539	(1.664)
Announcement Date	0.001	(0.002)	0.001	(0.001)	0	(0.002)	0	(0.002)	0	(0.002)	0	(0.002)
Constant	-15.215	(31.973)	-28.818	(31.559)	-19.043	(31.915)	-11.618	(31.913)	-19.395	(33.236)	-14.161	(31.97)
R-Squared	0.3061		0.3083		0.3260		0.3224		0.3003		0.2821	

Note: '***' indicates significance at p <= 0.01, '**' → p <= 0.05, '*' → p <= 0.10. '.' indicates that the ESG variable was not included in the specific regression. Each column represents an individual regression corresponding to table 5 above.

These results hold even after controlling for buyer E risk three years later. This finding goes against the findings of Tampakoudis and Anagnostopoulou (2019) who imply that the change in buyer ESG is the driver of the changes in buyer performance. It is interesting that environmental risk is only significant for Δ growth. One possible interpretation of this is that if environmental risk is taken to proxy for sustainability, then a firm cannot achieve sustainable growth at the cost of the environment. This interpretation would directly support the ideas behind stakeholder theory. Overall, these results reinforce the idea that environmental risks are pure risks in M&A's with no upside regardless of the timeframe analyzed.

Social risk is only significant for buyer Δ MTB. This contrasts against social risk being significant in some form for all deal valuation metrics. A likely explanation of this is that social is the hardest component of ESG to measure quantitively and consistently across firms. Thus, when examining social risk post M&A, the noise in the measurements dominates any true differences that might exist between firms.

When looking at overall ESG risk non-linearities in the long run, Δ LFCF, shown below in table 11, has the most significance interestingly. Both measures of buyer overall ESG risk, RRR and RRI, appear to have a significant exponential impact on Δ LFCF. Furthermore, the level measures of RRR and RRI become significant as well. The shape of the buyer RRI effect on Δ LFCF suggests that firms with scores of '0' see benefits to their LFCF. Firms around the 50th percentile of buyer RRI perform the worst with regards to LFCF; they are neither risk free nor risky enough to leverage it as an opportunity. For firms in the 90th percentile and above, they begin to see benefits to LFCF again suggesting that extreme ESG risk on either end is what is important rather one side of the distribution or the other.

Table 11: *Buyer Δ Levered Free Cash-Flow Non-Linear ESG Regressions w/ Robust Std. Errors*

Buyer Δ LFCF ($mm)	RRR		lnRRR		RRR & RRR²		RRI		lnRRI		RRI & RRI²		Control	
	Coef.	Std. Error	Coef.	Std. Dev	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error	Coef.	Std. Error
BuyerRating	220.62	(167.43)	.	.	-1190 ***	(417.113)	.	.	.	.	.	.	.	.
Buyercurrent_RRI	.	.	.	.	.	.	21.297	(19.982)	.	.	-80.641 **	(39.603)	.	.
TargetRating	171.54	(313.511)	.	.	-1070	(1286.241	.	.	.	.	.	.	.	.
Targetcurrent_RRI	.	.	.	.	.	.	-6.203	(20.738)	.	.	60.476	(49.092)	.	.
BuyerRating²	.	.	.	.	169.24 ***	(56.338)	.	.	.	.	.	.	.	.
TargetRating²	.	.	.	.	184.695	(227.296)	.	.	.	.	.	.	.	.
BuyerRRI²	.	.	.	.	.	.	.	.	.	.	2.426 **	(1.207)	.	.
TargetRRI²	.	.	.	.	.	.	.	.	.	.	-1.944	(1.434)	.	.
lnBuyerRating	.	.	445.248	(495.65)	.	.	.	.	.	.	.	.	.	.
lnTargetRating	.	.	414.403	(617.396)	.	.	.	.	.	.	.	.	.	.
lnBuyerRRI	.	.	.	.	.	.	.	.	34.76	(112.131)	.	.	.	.
lnTargetRRI	.	.	.	.	.	.	.	.	33.934	(132.871)	.	.	.	.
BuyerAdj.Revenue	302.267	(202.493)	295.063	(200.087)	234.421	(200.584)	327.146	(210.849)	275.299	(197.528)	358.687 *	(185.198)	282.385	(191.062)
BuyerGrowth3B	4.334	(11.366)	4.537	(11.757)	3.471	(11.072)	7.278	(12.397)	5.618	(12.426)	4.354	(10.62)	5.645	(11.775)
BuyerROAT	-151.93	(94.207)	-154.181	(99.758)	-122.105	(82.104)	-150.724	(99.745)	-151.135	(103.889)	-102.783	(69.498)	-152.127	(102.777)
BuyerDebtEquityT	-1.317	(1.628)	-1.41	(1.703)	-1.259	(1.323)	-1.306	(1.666)	-1.485	(1.782)	-1.18	(1.273)	-1.533	(1.793)
BuyerMTBT	195.807	(126.063)	205.73	(135.196)	159.443 *	(92.236)	208.127	(134.623)	213.005	(145.755)	146.523 *	(88.328)	215.2	(144.182)
TargetGrowth	8.664	(9.44)	8.259	(9.935)	8.46	(8.872)	7.142	(10.031)	7.435	(10.422)	6.663	(8.995)	7.134	(10.201)
TargetROA	-27.458	(48.303)	-25.727	(48.887)	-40.037	(45.743)	-33.631	(47.883)	-27.977	(48.911)	-61.672	(46.147)	-29.383	(48.63)
TargetDebtEquity	-3.667 *	(2.043)	-3.845 *	(2.098)	-3.173 *	(1.876)	-4.046 *	(2.182)	-4.089 *	(2.186)	-3.779 *	(1.989)	-4.118 *	(2.164)
TargetLFCF	0.796 **	(0.382)	0.804 **	(0.374)	0.828 **	(0.403)	0.779 **	(0.37)	0.816 **	(0.369)	0.754 **	(0.307)	0.811 **	(0.364)
TargetAssets	0.007	(0.024)	0.008	(0.024)	0.002	(0.025)	0.011	(0.023)	0.01	(0.024)	-0.003	(0.026)	0.011	(0.023)
TargetMTB	60.884	(76.862)	55.969	(78.874)	91.537	(70.563)	58.438	(75.82)	57.765	(81.156)	110.906	(68.884)	58.698	(78.61)
i.SameGenericIndustry	-955.244	(645.203)	-912.234	(688.144)	-833.499	(558.767)	-947.386	(728.062)	-905.187	(734.898)	-899.53	(642.8)	-914.452	(723.083)
i.SameSpecificIndustry	-442.783	(424.078)	-557.102	(417.092)	-254.445	(441.726)	-547.356	(420.859)	-638.081	(419.191)	-272.906	(437.13)	-645.967	(417.784)
lnTotalTransactionValue	378.425 **	(168.332)	411.754 **	(165.08)	380.226 **	(172.316)	426.646 **	(175.329)	455.046 **	(177.457)	413.133 ***	(150.627)	481.615 ***	(177.608)
Announcement Date	-0.084	(0.14)	-0.073	(0.139)	-0.035	(0.136)	-0.095	(0.138)	-0.064	(0.136)	-0.081	(0.14)	-0.049	(0.133)
Constant	-653.035	(2870.736	-780.455	(2825.523	2223.732	(2796.381	8.985	(2770.805	-574.492	(2743.693	-185.777	(2790.794	-944.411	(2735.423
R^2	0.3972		0.3850		0.4463		0.3867		0.3762		0.4573		0.3755	

Note: '***' indicates significance at p <= 0.01, '**' → p <= 0.05, '*' → p <= 0.10. '.' indicates that the ESG variable was not included in the specific regression. Each column represents an individual regression corresponding to table 5 above.

Limitations

This study is not without its limitations. The most significant limitation to this study is that the components of ESG risk provided by RepRisk are focused on reputational ESG risk exposure rather than general ESG risk which limits the generalizability of results. Furthermore, since they are originally provided as proportions, it is not clear that my conversion of them to "risk levels "reflects the true levels of E, S, or G risk that firms may face. This is also compounded by the fact that RepRisk notes that RRI is not perfectly linear.

Another major limitation to this study is the limited variability of ESG scores for sampled firms. I can not discern if this is a result of my sampling procedure, RepRisk's scoring methodology, or simply reflective of the possibility that firms are not really differentiated in terms of ESG risk exposure. Fortunately, I still consistently find significance for my ESG variables.

A final limitation of this investigation is that I simplify portions of my analysis due to complexity and time constraints. For example, most previous papers calculate cumulative abnormal returns to measure stock returns, while I pull stock premium values generated by Capital IQ. I also do not include some common transaction controls such as a competitiveness measure, friendly/hostile merger measure, nor do I account for how transactions are financed. I cannot tell if these measures and controls would result in significantly different findings.

VI. Conclusion

In this investigation, I analyze the effects of buyer and target ESG risk on US M&A performance in both the short and long run as measured by deal valuations and changes in buyer operating metrics, respectively, and find that ESG risk is a significant determinant of M&A performance. When analyzing deal valuations, higher ESG risk is generally a detriment. Post-M&A, target ESG risk is insignificant; this alone has important implications for acquirers and investors when evaluating the ESG aspects of potential deals – perhaps more emphasis should be placed on the buyer themself rather than what they are buying. More importantly, I find that the individual components of ESG risk are the significant drivers of these effects – rarely is the overall ESG score alone significant. This implies that firms and markets may be leaving money on the table if they use a one size fits all overall ESG score during M&A and that the value-add of ESG is hidden within its individual components. This is doubly true given my different findings for each component. Environmental risk generally appears be a pure risk with very little upside; thus M&A participants should aim to mitigate this. Social risk could potentially have upside in deal valuations. Lastly, governance displays aspects of being a pure and opportunistic risk depending on the context analyzed.

I have advanced the ESG and M&A literature space forward by 1) examining both mergers and acquisitions, 2) breaking down ESG into its individual E, S, and G components, 3) including private firms that have publicly accessible financials, and lastly 4) being among the first studies to use RepRisk ESG scores in the M&A space.

More research still needs to be done in this nascent space. Further papers should investigate other measures and providers of individual E, S, and G risks for firms and incorporate more diverse transaction samples to generate more robust and generalizable insights into the impacts of each component of ESG risk on M&A. This could potentially generate promising and practical implications for M&A participants and help clear up the conflicts with previous research that some of my results bring up. Finally, novel regression and analytical techniques need to be developed that can account for the non-standardized nature of ESG scores and the issues this generates.

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