LUISS

Department of Economics and Finance

Master's Degree in Finance

Chair of Advanced Corporate Finance

Environmental Risk and Acquisition Premiums

Evidence from Target GHG Intensity and Country EPI Gaps

Supervisor

Saverio Massi Benedetti

Co-Supervisor

Joao Miguel Da Costa Monteiro

Candidate

Pasquale Turco

ACADEMIC YEAR 2024/2025

Abstract

This thesis investigates whether environmental exposure is reflected in acquisition premiums in mergers and acquisitions. While a growing literature documents that carbon intensity and climate policy risk affect stock returns and firm valuation in secondary markets, less is known about whether environmental risk influences the negotiated price of corporate control. The market for corporate control provides a demanding setting in which valuation is explicit, forward-looking, and non-diversifiable.

Using a sample of M&A transactions matched with firm-level greenhouse gas (GHG) emissions data and country-level Environmental Performance Index (EPI) measures, this study examines the association between target carbon intensity, environmental institutional distance (ΔEPI), and acquisition premiums. Baseline regressions control for standard firm and deal characteristics and are estimated for both the full sample and a subsample of emission-intensive industries.

The results indicate that target carbon intensity is negatively associated with acquisition premiums, particularly in emission-intensive sectors, where a one standard deviation increase in emissions corresponds to an economically meaningful reduction in the one-month premium. More robustly, environmental institutional distance is significantly related to premiums. Because ΔEPI is defined as the target-country EPI minus the acquirer-country EPI, the negative coefficient implies that premiums are higher when acquirers originate from relatively higher-EPI environments and purchase targets headquartered in lower-EPI countries. This pattern is consistent with a view in which cross-country environmental asymmetry matters for takeover pricing, potentially through strategic valuation of market entry and regulatory conditions and opportunity, rather than operating purely as a harmonization "cost" discount or as friction between the institutional environments.

Overall, the thesis finds that while carbon intensity is weakly associated with lower control premiums, directional environmental asymmetry significantly shapes valuation. Specifically, premiums are higher when acquirers from more stringent

environmental regimes acquire targets in less stringent countries. This suggests that environmental misalignment affects pricing not only through expected compliance costs, but also through strategic considerations and surplus allocation in cross-border transactions

Contents

Chapter 1

Introduction

Financial markets rarely change overnight. They absorb new risks gradually, through adjustment, reinterpretation, and incorporation into existing valuation frameworks. Climate risk is no exception. Over the past decade, what was once considered a peripheral ethical concern has increasingly been recognized as an economic variable with measurable implications for asset pricing, firm performance, and capital allocation.

A growing body of literature shows that firms' exposure to carbon emissions and environmental regulation affects expected returns, risk premia, and cost of capital. Carbon-intensive firms appear to earn higher expected returns (the so-called "brown stock"), consistent with compensation for transition risk (Bolton and Kacperczyk, 2021). Climate policy exposure influences stock performance and downside risk (Pankratz, 2021). Regulatory uncertainty is reflected in valuation metrics. These findings suggest that environmental exposure is not a narrative framework on markets, it is a component of financial risk.

Yet most of this evidence comes from secondary markets, where investors trade marginal claims and diversify exposure across stocks and portfolios. In such markets, risk can be priced without being directly internalized. A shareholder can hold a carbon-intensive firm to earn a higher return. A portfolio can rebalance.

When a firm acquires another, it does not always purchase a marginal claim (minority acquisition). When a firm goes for the control stake, it assumes ownership of operating assets, regulatory liabilities, compliance obligations, and long-term strategic exposure. The acquisition premium is not simply a reaction to news. It is the outcome of a forward-looking valuation exercise in which bidders assess synergies, integration costs, regulatory constraints, and expected cash flows. The bidder cannot diversify away the target's environmental exposure. It must incorporate it.

This observation motivates the central question of this thesis:

Is environmental exposure priced in acquisition premiums?

More precisely, do target greenhouse gas (GHG) emissions and environmental regulatory asymmetry between acquirer and target countries influence the premium paid for corporate control?

The question is deliberately focused. It does not ask whether ESG "matters" in a broad or normative sense. It asks whether measurable environmental exposure and institutional distance enter the economic computations of takeover pricing.

This distinction matters. If environmental risk affects stock returns, that may reflect portfolio pricing of systematic exposure. If it affects acquisition premiums, it suggests that climate-related considerations influence real corporate decisions about ownership and control.

1.1 Motivation

Beyond its empirical contribution, this thesis is motivated by a broader intellectual curiosity about how markets adapt to structural change and how management is adapting to the cutting-edge updates of finance. Climate transition is often discussed in sweeping terms, as if it were either fully priced or completely ignored. Yet financial markets rarely operate in such binary ways. They incorporate new risks gradually, unevenly, and often imperfectly. Understanding where and how this incorporation occurs is as important as documenting that it exists.

The market for corporate control provides a particularly revealing setting. Unlike secondary markets, where investors can adjust exposure at the margin, takeover transactions require firms to make concentrated, long-term commitments. When a bidder decides how much to pay for control, it must translate expectations about regulation, technology, and environmental constraints into a single number. That number, the premium, encapsulates judgment and vision under uncertainty.

The motivation of this thesis is therefore not to demonstrate that environmental risk matters in an abstract sense, but to observe whether it enters this concrete moment of valuation. If climate exposure is reflected in acquisition premiums, then environmental risk is not only discussed but internalized in one of the most consequential financial decisions firms make.

1.2 Why the Market for Corporate Control Matters

The market for corporate control is a central mechanism of capital reallocation in modern economies. Through mergers and acquisitions, assets are transferred to new owners who expect to manage them more efficiently, extract synergies, or reposition them strategically. Acquisition premiums reflect this expectation. They incorporate assessments of target quality, bargaining power, competition, and future performance.

The determinants of acquisition premiums have been extensively studied. Prior research documents the role of target size, profitability, growth opportunities, payment method, deal competition, and bidder characteristics (Betton, Eckbo, and Thorburn, 2008; Moeller, Schlingemann, and Stulz, 2004). In cross-border settings, institutional differences, such as legal origin, governance standards, and investor protection, have been shown to shape transaction pricing and outcomes (Rossi and Volpin, 2004; Bris and Cabolis, 2008; Erel, Liao, and Weisbach, 2012).

Environmental exposure, however, has received comparatively limited attention as a determinant of acquisition premiums. While ESG performance has been linked to firm valuation and cost of capital, the extent to which environmental risk shapes negotiated takeover pricing remains underexplored.

Environmental regulation affects operating costs, capital expenditures, and risk profiles. Cross-border regulatory asymmetry can generate compliance and integration frictions or opportunities, such as market entrance. If these considerations are economically meaningful, they should be reflected in the premium that a bidder is willing to pay.

In this sense, the takeover premium offers a uniquely transparent setting in which to test whether environmental exposure is internalized in valuation decisions.

1.3 Two Channels: Exposure and Asymmetry

This thesis approaches the question along two complementary dimensions.

First, it examines firm-level carbon intensity, proxied by Greenhouse Gas Scope 1+2 emissions. Carbon intensity captures operational exposure to transition risk. Higher emissions may imply greater vulnerability to carbon pricing, tighter environmental standards, stranded assets, or reputational and regulatory pressure. In valuation terms, this may translate into lower expected cash flows or higher perceived risk.

Second, it introduces environmental institutional distance between the target and acquirer countries, measured as the difference in Environmental Performance Index (ΔEPI). This variable is thought to capture regulatory asymmetry. When firms operate under materially different environmental regimes, integration may require harmonizing standards, upgrading compliance systems, or managing uncertainty about enforcement. Conversely, integration may also create strategic opportunities when the target country is subject to less stringent environmental regulation, potentially reducing compliance costs and expanding operational discretion. These expected adjustment costs represent transaction-specific frictions or opportunities.

Distinguishing between operational exposure and institutional distance allows the analysis to separate firm-level environmental intensity from cross-border regulatory misalignment. The former reflects how exposed a target is. The latter reflects how difficult or how easy it may be to reconcile the target's regulatory environment with that of the acquirer.

1.4 What Would It Mean for Environmental Risk to Be Priced?

The term "priced", in asset pricing, typically refers to a systematic relationship between risk exposure and expected returns. In the context of takeover premiums, pricing has a different meaning.

Here, in this thesis, pricing refers to the incorporation of environmental exposure into the negotiated value of control. If higher carbon intensity or greater regulatory asymmetry leads to lower acquisition premiums, this suggests that bidders adjust their valuation models to account for expected environmental costs or frictions.

This adjustment need not be dramatic to be meaningful. Even moderate percentage changes in premiums can represent substantial value in absolute terms. In emission-intensive industries, where environmental constraints are more binding, such adjustments may be particularly relevant.

Importantly, the hypothesis is asymmetric. The analysis does not presume that strong environmental performance generates a positive premium. Instead, it tests whether environmental exposure and regulatory misalignment generate discounts consistent with expected cost and uncertainty.

1.5 Empirical Approach and Preview of Results

Using a sample of M&A transactions for which firm-level emissions data and country-level environmental performance measures are available, this thesis estimates the association between environmental variables and acquisition premiums. The analysis controls for standard firm and deal characteristics and examines both the full sample and a subsample of emission-intensive industries.

The results reveal a consistent pattern. Target carbon intensity shows negative point estimates associated with acquisition premiums, particularly in emission-intensive sectors, where the economic magnitude of the effect is meaningful relative to the median premium. Environmental institutional distance exhibits a more robust negative relationship with premiums, suggesting that regulatory asymmetry functions as a measurable regulatory opportunity for the acquirer.

The findings are sensitive to the premium window used. Broader measures of the control premium yield clearer results than narrower announced premiums, consistent with the gradual incorporation of environmental considerations into deal pricing.

While the analysis remains subject to measurement and identification limitations, the evidence indicates that environmental exposure is not external to takeover valuation. It appears to be incorporated, at least partially, into the pricing of corporate control.

1.6 Research Question and Hypotheses

The empirical analysis is organized around a set of hypotheses that map directly into the regression design implemented in this thesis. A practical issue in takeover studies is that the bid premium is not a uniquely defined object. Depending on the event window, the measured premium may contain higher or lower pre-bid market anticipation (the run-up). Because the same underlying valuation mechanism can therefore manifest differently across premium windows, the thesis formulates predictions in terms of expected signs and stability across alternative premium definitions, rather than assuming a single "true" premium measure.

The first prediction is a "brown discount" hypothesis: holding target fundamentals and deal characteristics constant, higher target carbon intensity is expected to be associated with lower acquisition premiums. Economically, greater emissions exposure can translate into higher expected compliance and adjustment costs, and into greater perceived transition risk, both of which compress the bidder's willingness to

pay. The second prediction shifts from firm-level exposure to cross-border frictions. Environmental institutional distance between target and acquirer countries, proxied by ΔEPI, captures the asymmetry in environmental regulatory quality across jurisdictions. Prior literature on institutional distance suggests that greater regulatory divergence may generate integration and harmonization costs, as well as additional uncertainty regarding post-merger compliance requirements. Under this friction-based view, a larger and positive environmental distance would be expected to reduce acquisition premiums.

However, environmental asymmetry may also operate through a different channel. When acquirers originate from jurisdictions with stronger environmental performance and acquire targets located in relatively lower-EPI countries, the transaction may entail strategic flexibility, regulatory arbitrage opportunities, or access to less stringent operating environments. In this case, institutional distance does not necessarily represent a cost, but may instead affect the distribution of expected surplus. For this reason, while the friction-based mechanism would predict a positive association, because of how it has been built, between ΔEPI and premiums, the net effect of environmental institutional distance remains ultimately an empirical question.

In addition to these environmental variables, the empirical specification preserves the standard set of takeover pricing determinants. In particular, cash offers are expected to be associated with higher premiums, reflecting commitment and information considerations documented in the M&A literature, and cross-border status is included as a control with a theoretically ambiguous sign because it may reflect both higher integration costs and strategic value in international expansion.

Importantly, directional differences in environmental stringency may generate two opposing forces. On the one hand, regulatory misalignment may increase harmonization and compliance costs. On the other hand, acquirers from more stringent regimes may perceive strategic opportunities when investing in less regulated environments, potentially extracting value through operational flexibility, cost arbitrage, or bargaining advantages. Our empirical analysis tests which of these mechanisms dominates in the market for corporate control.

Finally, because environmental exposures are likely to be economically more salient when emissions are central to operations, the thesis gives particular attention to a "heavy industry" subsample, where both carbon intensity and environmental institutional frictions are expected to be more valuation-relevant. Chapter 2 formally develops these hypotheses and their empirical implementation, while the subsequent chapters test them within the data.

1.7 Contributions

This thesis contributes to three strands of literature.

First, it extends climate finance research by moving beyond secondary market pricing and examining environmental exposure in the context of strategic corporate transactions.

Second, it enriches the M&A literature by introducing environmental institutional distance as a determinant of acquisition premiums, complementing prior work on legal and governance distance.

Third, it provides evidence that climate-related risk influences not only portfolio returns but also real capital allocation decisions through the market for corporate control.

1.8 Roadmap

The remainder of the thesis proceeds as follows. Chapter 2 reviews the relevant literature on takeover premiums, cross-border institutional distance, and climate-related financial risk. Chapter 3 describes the data and empirical methodology. Chapter 4 presents the main results and robustness analyses. Chapter 5 discusses the findings, limitations, and implications, concluding with a broader reflection on the evolving integration of environmental exposure into corporate finance.

Chapter 2

Literature Review

2.1 The Pricing of Corporate Control and the Bid Premium

In M&A research, the bid premium is best understood as the equilibrium outcome of bargaining over two objects: the target's standalone value and the bidder's expected net gains from control. In standard corporate finance terms, a rational bidder's willingness to pay is capped by the present value of expected synergies, net of transaction and integration costs, and adjusted for risk. So, premiums are not just "valuation multiples." They embed information asymmetry, strategic motives, financing constraints, and crucially, how risk is allocated between bidder and target shareholders.

A large empirical literature studies what drives takeover premiums. Betton, Eckbo, and Thorburn (2009) synthesize evidence showing that competition, deal design, and target characteristics systematically affect pricing. Agency-based explanations also matter. Jensen (1986) argues that free cash flow can fuel value-destroying "empire building," while Jensen and Meckling (1976) formalize how agency conflicts can distort investment decisions. Consistent with these ideas, empirical work links bidder governance and managerial incentives to acquisition outcomes and pricing. Market-wide conditions can shape both deal activity and pricing too: Harford (1999) emphasizes cash holdings and liquidity in takeover waves, and Moeller and Schlingemann (2005) discuss how international diversification interacts with acquisition outcomes.

One of the most robust determinants of the premium is the method of payment. Cash offers tend to carry higher premiums than stock offers, consistent with signaling and risk-sharing stories (Hubbard and Palia, 1999; Betton et al., 2009). In a cash

deal, the bidder concentrates post-merger risk on its own shareholders; in a stock deal, some of that uncertainty is shared with target shareholders. This distinction becomes especially relevant when the target's fundamentals are exposed to policy risk or when synergy realization is uncertain.

These classic insights are directly relevant to climate-related variables. Environmental exposures can alter both expected future cash flows and discount rates. If that is true, climate risk should not be treated as a purely reputational attribute, it should matter for the price of corporate control.

2.2 Carbon Emissions as a Valuation-Relevant Risk Exposure

A growing body of work in corporate finance and accounting documents shows that environmental performance, especially carbon emissions, has valuation implications. Early evidence points to level effects: firms with higher emissions tend to trade at valuation discounts, consistent with anticipated future costs and uncertainty. Matsumura, Prakash, and Vera-Muñoz (2014) show that higher carbon emissions are associated with lower firm value, suggesting that investors incorporate the expected economic consequences of emissions. Clarkson et al. (2015) also find that environmental performance is value relevant and is reflected in market valuation. Related work argues that carbon exposures map into financial risk and valuation outcomes in ways consistent with markets anticipating policy and transition dynamics (e.g., Griffin et al., 2017).

Asset pricing research strengthens this interpretation by treating carbon exposure as a priced risk factor. Bolton and Kacperczyk (2021) document that high-emission firms earn higher expected returns, consistent with a carbon risk premium: investors require compensation for holding assets exposed to transition risk and regulatory tightening. Krueger, Sautner, and Starks (2020) show that investor beliefs and institutional attention to climate risk are economically meaningful, which supports the idea that climate risk can affect prices through cash-flow and discount-rate channels.

Importantly, the pricing of climate exposure is not limited to equities. Evidence from fixed-income markets suggests that climate risk can affect credit spreads and financing conditions (e.g., Seltzer, Starks, and Zhu, 2022). This matters for M&A because the premium a bidder can rationally pay depends on financing costs, debt capacity, and the post-merger capital structure. If climate exposure raises the cost

of capital or tightens financing constraints, it can mechanically reduce willingness to pay.

2.2.1 Construct validity: why Greenhouse Gas intensity (GHG/revenues) is useful

Empirically, this thesis uses Greenhouse gas emissions (in tons) per million$ of revenues (GHG intensity) as a proxy for environmental exposure. This scaling is common because it captures operational carbon efficiency and allows comparisons across firms of different sizes. Relative to emissions levels, intensity is more closely tied to margins and unit economics: firms that emit more per unit of output are plausibly more exposed to cost pass-through constraints and compliance upgrades.

At the same time, intensity measures come with measurement caveats. Revenues can be cyclical and volatile, and emissions comparability depends on boundaries (Scope 1+2 vs. Scope 3). Prior work highlights that results can vary with measurement choices and disclosure quality (Matsumura et al., 2014; Clarkson et al., 2015). For these reasons, GHG intensity should be read as a risk-exposure proxy inside a valuation framework, not as a "sustainability score" in a broad sense.

2.3 From public-market pricing to takeover pricing: why emissions should affect premiums

While climate finance research often studies how carbon exposure affects public market valuation and returns, there is less direct evidence on whether the same exposures are capitalized into the price of corporate control (bid premiums). The premium reflects the bidder's valuation of the target conditional on future policy, technology, management, and demand patterns. Carbon intensity can influence premiums through at least three mechanisms:

i. **Cash-flow channel.** Higher carbon intensity implies higher expected compliance costs under carbon pricing, regulatory mandates, and capital expenditures needed for upgrades. These expected costs reduce post-acquisition free cash flows and should lower the maximum rational premium;

ii. **Discount-rate channel.** If carbon exposure represents systematic transition risk, cash flows tied to high-emission operations may be discounted at higher required returns. This aligns with evidence that carbon exposure is priced

as risk (Bolton and Kacperczyk, 2021) and that investors pay attention to climate risk (Krueger et al., 2020);

iii. **Integration channel.** Acquirers may view carbon-intensive assets as requiring costly retrofits and managerial attention, which can delay synergy realization and raise integration risk. Since time-to-synergy is often a key driver of deal value, additional upgrading requirements reduce the net present value of synergies.

Taken together, these channels point to a "brown discount": more carbon-intensive targets should, on average, command lower premiums, all else equal, because they entail higher expected costs and greater uncertainty.

2.3.1 Competing hypotheses: when carbon intensity could increase premiums

It would be way too simplistic to claim the sign must be negative in all settings. Carbon-intensive targets could command higher premiums if bidders expect to create value through rapid efficiency improvements, or if the target owns scarce strategic assets whose cash flows remain valuable even under transition scenarios, or if the acquirers think it has the capacity to start a process to make the target "greener". From a certain point of view, an acquirer may buy a "brown" firm to obtain infrastructure, capabilities, or market access and then convert operations toward greener outcomes. In heavy industries, the scarcity of strategic assets can push premiums upward even when the assets are carbon-intensive.

So, the theory does not mechanically pin down a negative coefficient. The sign depends on whether strategic motives and synergy potential dominate expected compliance (policy compliance, especially in our case), costs, stranded-asset risk, and discount-rate effects. This ambiguity also helps explain why empirical ESG M&A studies can produce mixed results when using broad composite scores rather than direct emissions measures.

2.4 ESG in M&A: Evidence, Heterogeneity, and Measurement Issues

The ESG M&A literature is empirically heterogeneous. Deng, Kang, and Low (2013) provide early evidence that CSR-oriented (Corporate Socially Responsible) acquirers

experience better acquisition outcomes, which they interpret through a stakeholder-value lens. Related work finds that sustainability-related characteristics can correlate with announcement effects and longer-run integration success (Aktas, de Bodt, and Cousin, 2011; Gomes and Marsat, 2018). Yen and André (2019) similarly show that ESG characteristics can matter for M&A outcomes, though results vary across contexts.

Studies focusing on European settings and modern ESG metrics frequently report that effects depend on industry, time period, and whether ESG is measured as a composite score or decomposed into its components (Tampakoudis and Anagnostopoulou, 2020; Tampakoudis et al., 2021; Teti and Spiga, 2023; Zrigui et al., 2024). A central limitation is that composite ESG measures pool together environmental, social, and governance characteristics that can operate through distinct, and possibly opposing, channels. Governance quality is tightly connected to agency costs and investment efficiency (Jensen, 1986). Social performance may influence stakeholder relations and reputational capital. Environmental performance, particularly emissions, maps directly into regulatory exposure and transition risk. Consequently, a study using an emissions intensity proxy tests a more clearly defined valuation mechanism for the Environmental component than a study using a blended ESG index.

Recent contributions across corporate finance and sustainability research further highlight the importance of context and measurement in interpreting ESG outcomes (e.g., Crace and Gehman, 2023; Jost et al., 2022; Li and Haleblian, 2022; Ahmad et al., 2024). This thesis adopts that lesson by focusing on GHG intensity as a targeted proxy for environmental risk exposure rather than an omnibus "responsibility" score.

2.5 Payment Method, Risk Sharing, and Climate Exposure

The method-of-payment literature is particularly relevant when the target's fundamentals are exposed to policy risk. Cash deals concentrate post-merger risk on the acquirer, whereas stock deals share risk with target shareholders (Hubbard and Palia, 1999; Betton et al., 2009). In settings where climate policy can shift abruptly, altering cost structures and required investment, risk sharing becomes economically meaningful.

From this perspective, one may expect that carbon intensity interacts with payment method. If high carbon intensity raises uncertainty about future cash flows,

acquirers may prefer stock to share transition risk. When an acquirer nevertheless uses cash, it may reflect stronger confidence in synergy capture, higher deal competition, or strategic urgency, each of which can increase premiums. Therefore, a positive cash coefficient can coexist with a negative emissions coefficient: payment structure and carbon exposure affect pricing through different channels.

2.6 Cross-Border M&A, Institutional Distance, and Environmental Frictions

Cross-border acquisitions introduce additional frictions beyond domestic deals. The strategy and international business literatures emphasize that institutional differences raise coordination and integration costs (Gatignon and Anderson, 1988; Shimizu et al., 2004). Cross-border deals often involve greater information asymmetry and post-merger integration challenges, which can shape both the premium and eventual performance.

Institutional distance is commonly proxied by cultural measures (Kogut and Singh, 1988) or broader multidimensional indices (Berry, Guillén, and Zhou, 2010). The underlying mechanism is that a greater distance increases transaction costs, adaptation requirements, and uncertainty.

2.6.1 Environmental Institutional Distance and ΔEPI

This thesis extends the institutional distance framework by focusing on environmental institutional distance, proxied by differences in Environmental Performance Index (EPI) scores between the acquirer and target countries. EPI captures cross-country variation in environmental outcomes and, indirectly, differences in policy enforcement and societal environmental standards. While EPI is not a direct measure of climate regulation, it offers a consistent cross-country proxy for environmental institutional quality.

Environmental distance can affect takeover pricing through multiple channels. A first mechanism follows the traditional institutional distance literature. When an acquirer from a high-environmental-performance country acquires a target in a lower-performing environment, post-merger harmonization may require significant operational adjustments, monitoring systems, and compliance investments. Moreover, the combined firm may face reputational spillovers as investors and stakeholders evaluate the acquirer under home-country standards. Under this friction-based

interpretation, greater environmental asymmetry increases integration costs and uncertainty, potentially reducing the bidder's willingness to pay and compressing the bid premium.

However, the environmental dimension also introduces a distinct strategic channel. Differences in environmental institutional quality may create asymmetries in regulatory stringency, enforcement intensity, and cost structures. When bidders originate from relatively stricter environmental regimes and acquire targets in jurisdictions with lower environmental performance, the transaction may provide access to comparatively less stringent regulatory environments or lower compliance costs. In this case, environmental distance does not solely represent an adaptation burden, it may also alter expected operating flexibility and the distribution of post-merger surplus.

Accordingly, while the broader institutional distance literature emphasizes adaptation and uncertainty costs (Shimizu et al., 2004; Berry et al., 2010), the environmental dimension may generate both frictions and strategic opportunities. The net effect of ΔEPI on acquisition premiums is therefore theoretically ambiguous and ultimately an empirical question.

2.7 Why European Acquirers Provide a High-Stringency Setting

The focus on European acquirers is motivated by institutional and regulatory architecture rather than by general impressions. European firms operate under the most developed climate policy instruments globally. The EU Emissions Trading System (EU ETS) introduces explicit carbon pricing for covered sectors. The disclosure regimes have expanded over time through the Non-Financial Reporting Directive (NFRD) and its replacement and strengthening via the Corporate Sustainability Reporting Directive (CSRD). Instead, financial-sector regulation has been implemented through the Sustainable Finance Disclosure Regulation (SFDR), which increases transparency and pressure in capital allocation. Investor-side norms, including the Principles for Responsible Investment (PRI), reinforce integration of environmental risk into financing and governance decisions (PRI, 2017).

This environment plausibly strengthens both the cash-flow and discount-rate channels of carbon exposure. If climate policy is credible and enforcement is meaningful, carbon-intensive assets should carry higher expected compliance costs and higher transition-risk premia. In such a context, European acquirers may incorpo-

rate carbon risk more explicitly into deal valuation and negotiation, increasing the likelihood that emissions intensity and environmental distance are reflected in bid premiums.

2.8 Industry Heterogeneity: Heavy Emitters Vs. Non-Heavy Industries

Climate policy and carbon pricing mechanisms are likely to bind more strongly in emission-intensive industries. In heavy industries, such as energy, materials, and industrials, carbon exposure can map directly into marginal costs, capital expenditure requirements, and asset obsolescence risk. The climate finance literature suggests that the pricing of carbon exposure can be more pronounced in sectors where emissions are economically central (Bolton and Kacperczyk, 2021).

In takeover pricing, this implies stronger emissions–premium relationships in heavy industries. At the same time, strategic motives in heavy industries (e.g., acquiring scarce assets, infrastructure, or market access) can push premiums upward, creating a setting where both "strategic scarcity" and "transition-risk discounting" coexist. This duality motivates interaction-based tests and heterogeneity analyses across sector groups.

2.9 Summary and Research Gap

The takeover premium literature identifies payment structure, competition, and bidder and target characteristics as central pricing determinants (Betton et al., 2009; Harford, 1999). Separately, climate finance and environmental accounting research shows that carbon emissions and environmental performance are value-relevant and priced in capital markets (Matsumura et al., 2014; Clarkson et al., 2015; Bolton and Kacperczyk, 2021; Krueger et al., 2020). Yet direct evidence connecting emissions intensity to bid premiums, particularly through an explicit environmental institutional distance channel and within a high-stringency regulatory environment.

This thesis contributes by:

i. employing GHG intensity as a targeted proxy for environmental risk exposure rather than relying on composite ESG scores or CO_2 intensity;

ii. introducing ΔEPI as an environmental institutional distance measure that captures cross-country environmental frictions or opportunities;

iii. focusing on European acquirers operating under a stringent and evolving regulatory architecture;

2.10 Testable Predictions and Empirical Hypotheses

This section states the hypotheses that are directly testable within the empirical design actually implemented in this thesis.

Because bid premium measurement can combine pre-bid market anticipation (run-up) and may be affected by rumors and information, the same structural mechanism may manifest differently across premium windows. This motivates formulating hypotheses at the level of expected signs and robustness across windows, rather than claiming a single "true" premium construct.

H1. Target carbon intensity and the bid premium (the "brown discount").

Hp: Holding constant target fundamentals and deal characteristics, the bid premium is decreasing in the target's GHG intensity.

Economic rationale: Higher carbon intensity raises expected compliance and adjustment costs (cash-flow channel) and may increase perceived transition risk (discount-rate channel), compressing the bidder's willingness to pay. This is consistent with evidence that emissions are economically penalized in firm valuation and linked to expected future costs and uncertainty.

Empirical implementation: This maps directly into a negative coefficient on Target GHG intensity in the baseline premium regression, with robustness checks using an alternative emissions proxy (e.g., total emissions intensity) and alternative premium windows.

H1a. Window sensitivity

Hp The negative association between target GHG intensity and acquisition premiums should be most precisely estimated in broader premium measures (e.g., 1-month) that embed not too noisy pre-bid anticipation and gradual information diffusion.

Economic rationale: Acquisition premiums are benchmarked to pre-announcement market prices that can be noisy (microstructure effects, transitory volatility, short-lived news) and may embed different degrees of anticipation/leakage. Using a broader reference window (1-month average price) reduces idiosyncratic pricing noise and yields a cleaner proxy for the target's standalone value, improving the signal-to-noise ratio in premium estimates. Short-window (1-week) and "announced" bench-

marks are informative robustness checks but are more sensitive to short-term price fluctuations and timing effects.

Empirical implementation: Short-window and announced premiums are used as robustness checks for sign consistency but may exhibit weaker statistical precision due to higher noise and reduced scope for runup-related adjustment.

H2. Environmental institutional distance (ΔEPI) and the bid premium.

Hp: The Environmental institutional distance, proxied by ΔEPI = EPI(Target country) - EPI(Acquirer country), is associated with the bid premium.

Economic rationale: A larger and positive environmental institutional distance may increase post-merger harmonization and compliance costs, reducing the bidder's willingness to pay. However, when the acquirer originates from a relatively stronger environmental institutional environment (ΔEPI < 0), regulatory asymmetry may also generate strategic flexibility or cost advantages, or it may generate reputational risks in the home country.

Empirical implementation: This maps into an ambiguous coefficient on ΔEPI in the baseline regression and is checked using alternative EPI constructions (e.g., including the target's EPI level separately).

H3. Cash payment, risk concentration, and the bid premium

Hp: Cash deals are associated with higher bid premiums, controlling for target characteristics and environmental variables.

Economic rationale: In cash transactions, the bidder concentrates post-merger risk, while stock offers share valuation uncertainty with target shareholders; cash offers therefore tend to carry stronger "commitment" and are empirically associated with higher premiums.

Empirical implementation: This maps into a positive coefficient on the Cash deal dummy in the baseline and robustness regressions. In a world where climate risk increases cash-flow uncertainty, cash financing can be interpreted as a stronger signal of synergy confidence, so observing a positive cash coefficient alongside a negative emissions or ΔEPI coefficient is not contradictory.

H4. Cross-border status and the bid premium

Hp Cross-border deals exhibit a systematic difference in premiums, but the sign is theoretically ambiguous.

Economic rationale: Institutional-distance arguments predict higher transaction and integration costs that could depress premiums; simultaneously, cross-border acquisitions can reflect strategic asset-seeking, market entry, or competition for scarce

targets, forces that can raise premiums.

Empirical implementation: The cross-border dummy enters the baseline model directly and is preserved across robustness checks.

H5. Heavy-industry focus: environmental variables should be more valuation-relevant where carbon binds

Hp: The association between environmental variables (GHG intensity, ΔEPI) and bid premiums is expected to be stronger in carbon-intensive ("heavy") industries.

Economic rationale: Where emissions are economically central, carbon pricing and compliance constraints are more likely to map into marginal costs and capex needs; in enforced regimes like the EU ETS, valuation implications can vary with institutional features such as allowances and pass-through capacity, features especially important in heavy sectors.

Empirical implementation: This is why the thesis reports the baseline results on the Heavy clean subsample and contrasts them with full-sample variants as robustness.

Table 2.1: Testable hypotheses and key empirical variables (with empirical mapping)

H	**Prediction (testable in this thesis)**	**Key variable(s) / expected sign**	**Empirical mapping**
H1	Targets with higher carbon intensity command lower bid premiums ("brown discount"), controlling for target fundamentals and deal characteristics.	GHGIntensity_T $(-)$	**Table 4.6, Cols (1)-(2)**
H1a	The emissions-premium relation is more stable in premium measures, less sensitive to transitory noise / bid-day volatility; better captures the overall control price, including anticipation. So long windows are better to negotiated outcomes (announcement / short-window) than in short windows that embed leakage/runup.	Premium window: 1m stronger than 1m & announced	**Table 4.6, Cols (1)-(2); Table 4.7, Cols (3)-(6)**
H2	Bid premiums are related to ΔEPI (Target − Acquirer)	ΔEPI (?)	**Table 4.6, Cols (1)-(2); Table 4.7, Cols (3)-(5)-(6)**
H3	Cash-financed deals carry higher premiums, consistent with risk concentration and commitment/signaling.	CashDummy (+)	**Table 4.6, Cols (1)-(2); Table 4.7, Cols(1)-(6)**
H4	Cross-border deals exhibit systematic differences in premiums, but the sign is a priori ambiguous due to competing integration-cost vs strategic/competition forces.	CrossBorderDummy (?)	**Table 4.6, Cols (1)-(2); Table 4.7, Cols(1)-(6)**
H5	Environmental variables are expected to matter more in emission-intensive ("heavy") industries; effects should be stronger in the Heavy subsample than in the full sample.	Heavy vs Full: stronger $\lvert\beta\rvert$ on GHGIntensity_T and ΔEPI	**Table 4.6, Cols (1)-(2)**

Chapter 3

Methodology

3.1 Sample Selection and Definition of Variables

This thesis studies whether a target's environmental risk exposure, proxied by greenhouse-gas (GHG) emissions intensity, is reflected in the acquisition premium paid in M&A deals. While "ESG" is sometimes used as an umbrella label in the M&A debate, the empirical design here focuses on the E-dimension, where the valuation mechanism is most clearly mapped into expected compliance costs and transition risk.

The dataset is built from Bloomberg M&A and includes only completed transactions with EU-headquartered acquirers, a context in which sustainability disclosure and ESG-related constraints are more present in corporate decision-making. Pending and withdrawn deals are excluded because they do not deliver a finalized transaction price. Moreover, minority purchases are removed since the acquisition premium is primarily a control premium, linked to the acquisition of control rights and post-merger integration, and minority stakes typically do not involve a comparable control component.

In the baseline regression and most of the robustness checks, I used the GHG intensity in (tons/million$).For part of the empirical analysis (robustness), a target is classified as "green" when its emissions performance ranks in the top quartile relative to peers in the same industry and year. This peer-based definition allows environmentally related performance to be evaluated within a comparable competitive environment rather than through absolute thresholds that differ across sectors and time, in the case of the dummy green variable.

Time Set

The sample spans from 2010 to 2024. This horizon is meant to capture ESG in Europe as it developed: from a mostly voluntary disclosure practice, sometimes driven by investor requests, to a framework that is increasingly shaped by EU sustainable-finance regulation. There is a huge change in the legal framework in 2018, when the European Commission launched the Action Plan on Financing Sustainable Growth[1], which effectively opened the EU's sustainable-finance agenda[2]

In the 2010–2018 period, ESG reporting and measurement were discretionary, which made ESG signals noisier and less comparable across firms (Berg et al. 2022). In such a setting, ESG should matter for prices mainly when investors choose to price it rather than because firms face a common, binding constraint (Pastor et al. 2021, Pedersen et al. 2021). After 2018, the European approach became more rule-based and homogeneous: sustainability disclosure has been strengthened, and the market was given clearer "infrastructure" for ESG information, including investor-facing disclosure requirements (SFDR)[3] and a formal classification of environmentally sustainable activities (EU Taxonomy)[4], alongside the broader tightening of corporate sustainability reporting obligations (CSRD).[5]

Extending the horizon until 2024 helps to cover not only the policy turn, in which ESG information becomes harder to ignore in financial decision-making, but also the early implementation phase. Overall, the time design treats ESG not as a static phenomenon, but as an evolving institutional feature shaped by European regulatory intervention.

European Acquirers

To maintain the bidder-side institutional environment as similar as feasible, and for the reason I talked about in the previous section, I exclusively include acquirers with their headquarters in the EU. In fact, as mentioned before, Europe has been

[1]European Commission, *Action Plan: Financing Sustainable Growth*, COM(2018) 97 final, 8 March 2018 (EUR-Lex). https://eur-lex.europa.eu/legal-content

[2]European Commission,. *High-Level Expert Group on Sustainable Finance (HLEG), "Financing a Sustainable European Economy: Final Report,"* 31 January 2018. https://finance.ec.europa.eu/system/files/2018-01/180131-sustainable-finance-final-report_en.pdf

[3] *Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector (SFDR)*, OJ L 317, 9.12.2019; applicable from 10 March 2021.https://eur-lex.europa.eu/legal-content

[4] *Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment (EU Taxonomy Regulation)*, OJ L 198, 22.6.2020. https://eur-lex.europa.eu/legal-content

[5]*Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups (NFRD)*, OJ L 330, 15.11.2014, pp. 1–9. https://eur-lex.europa.eu/eli/dir/2014/95/

moving toward a more organized ESG framework.[6]

By keeping the acquirer's regulatory background the same, the analysis can cut down on cross-country institutional noise and see if target sustainability is factored into acquisition premia. In practice, EU bidders work in an environment where sustainability disclosure and related compliance issues are difficult to ignore, making Europe a great place to investigate the relevance of ESG in M&A appraisal.

Completed Deals and minority purchase

The empirical sample is limited to finalized transactions that entail a transfer of control, thereby excluding:

i. announced but uncompleted agreements;

ii. minority stake acquisitions;

iii. deals value < 50\$ million .

A bid premium is clear only when the deal is done and the offer price is paid. When transactions are still pending or failed. This is because investors price the chance and timing of closing. If the bid fails, the target price usually goes back to where it was before the bid. This logic shows why mixing completed and failed deals would add execution risk to the premium, thus bringing noise to the objective of this research (Betton, Eckbo, and Thorburn, 2008).

For the second point, the analysis excludes minority acquisitions as they do not incorporate the same alteration in control rights that characterizes the traditional concept of a takeover premium. In the literature on takeovers, a control bid is defined as a bid for a majority interest acquisition, for example, an offer where the buyer owns a minority stake before and wants to gain control (Betton, Eckbo, and Thorburn, 2008).

The sample also has a deal value of at least \$50 million. This limit is in line with what is usually done in the takeover literature; for example, Hackbarth and Morellec (2008) set a minimum transaction value of \$50 million. The cutoff helps keep control of control purchases from small transactions that are structurally different and harder to compare in terms of price and information content. Moreover, to facilitate the data collection process, all the companies in the sample are public

[6]European Commission, "Action Plan: Financing Sustainable Growth," COM(2018) 97 final, 8 March 2018; Regulation (EU) 2019/2088 on sustainability-related disclosures in the financial services sector (SFDR); Regulation (EU) 2020/852 establishing a framework to facilitate sustainable investment (EU Taxonomy Regulation) (all EUR-Lex).

companies. The analysis reduces measurement noise in the premium and makes it easier to compare transactions by setting a minimum deal size.

Worldwide Targets

The sample, as said before, is limited to only EU acquirers, but I don't limit the targets' locations. They can be based anywhere as long as they are publicly traded.

This approach is mostly about not limiting the study to a small group of agreements. If targets were limited to Europe, the sample would favor domestic or intra-European deals, so reducing the bidder's effective opportunity set and diminishing the cross-border distance that frequently influences valuation. The international business and institutional-distance literatures underscore that cross-border acquisitions incur additional coordination and integration costs, discriminating information asymmetry, and increased uncertainty due to the variability of institutional environments across countries (Gatignon and Anderson, 1988; Shimizu et al., 2004; Berry, Guillén, and Zhou, 2010).

Methodologically, maintaining a consistent institutional framework for the acquirer while permitting variability on the target side enhances identification: the variation in premiums is less likely to be driven by differences in bidders' regulatory environments and more likely to reflect how EU bidders evaluate sustainability factors during negotiations.

In brief, the design is intentional: the thesis looks at the premium as the result of EU acquirers' assessment of target ESG quality and environmental distance, not as a result of combining different bidder institutional regimes.

Industry choice

I didn't limit the sample to a certain industry for either the buyer or the target. The explanation is simple: M&A activity isn't spread out uniformly across sectors. Deals tend to happen in waves and are grouped by industry. An ex-ante industry filter would change the sample in a way that may make "ESG effects" seem like a sector specificity. In the M&A literature, it is increasingly common to preserve cross-industry coverage and cope with differences between sectors by using industry controls and robustness tests, as this research did.

The thesis focuses on environmental pricing, and there is significant justification to anticipate heterogeneity across industries: environmental risk and carbon exposure are more pronounced in sectors where emissions are part of the production

technologies and regulatory constraints are more stringent. In some climate-finance studies, carbon-related pricing and investor reactions exhibit variability across sectors, being more pronounced in high-emission businesses (e.g., Energy, Materials), whereas controlling for industry significantly influences the conclusion.

To ensure that the empirical tests are in line with the idea that environmental factors should matter more when carbon "bites", the analysis adds a sector split into two main groups to the full-sample regressions:

- **More polluting/carbon-intensive ("heavy") industries:** Energy, Industrials, Materials, and Utilities (Bloomberg/GICS sector mapping).
- **Less polluting industries:** all remaining sectors.

Empirically, each baseline specification is estimated (i) on the full sample, and (ii) on the heavy-industry subsample, keeping the same variables and firm controls. This allows the coefficients on the environmental variables to be compared across a setting where environmental exposure is plausibly first-order versus one where it is less central.

EPI

The Environmental Performance Index (EPI) is a country-level indicator used to proxy environmental institutional quality in the empirical analysis. The EPI compares how close countries are to widely accepting environmental policy goals and aggregates multiple indicators into two broad pillars—Environmental Health and Ecosystem Vitality (Papadimitriou, 2020). Because it reflects realized environmental outcomes, the EPI differs from "policy stringency" measures and can be interpreted as capturing the combined effect of policy choices, enforcement, and institutional capacity (Kruse et al., 2022). Details on construction and matching are provided in Section 3.2.3.

3.1.1 Sample Composition

Table 3.1 shows how transactions are spread out between years and sectors.

Table 3.1 depicts how the sample is made up over time. After 2013, the number of transactions went up a lot, with most of them happening between 2014 and 2022. The percentage of heavy-emitting companies changes over time, although it stays economically important throughout the data period, ranging from about 20% to 60%. Cross-border transactions make up a large part of the sample, usually more than 60% in most years. This demonstrates that the empirical situation is mostly

Table 3.1: Sample composition by year (Full sample)

Year	Deals	Heavy share (%)	Cross-border share (%)
2010	15	40.00	66.67
2011	11	54.55	72.73
2012	9	22.22	66.67
2013	10	60.00	70.00
2014	81	40.74	72.84
2015	72	29.17	68.06
2016	69	39.13	68.12
2017	74	37.84	67.57
2018	66	31.82	60.61
2019	71	22.54	63.38
2020	63	22.22	66.67
2021	64	29.69	76.56
2022	57	29.82	47.37
2023	46	23.91	67.39
2024	4	25.00	50.00
Avg	47.5	32.05	66.20

Notes: Heavy share and cross-border share are expressed in percentage terms.

transnational, which is important since the research is mostly about environmental institutional distance.

Table 3.2: Sample composition by industry (Full sample)

Industry	Deals	Heavy share (%)
Communications	54	0.0
Consumer Discretionary	81	0.0
Consumer Staples	36	0.0
Energy	41	100.0
Financials	80	0.0
Health Care	100	0.0
Industrials	125	100.0
Materials	47	100.0
N.A.	1	0.0
Real Estate	61	0.0
Technology	71	0.0
Utilities	15	100.0

Notes: Heavy share is expressed in percentage terms.

Table 3.2 shows how the industry is broken down. Heavy-emitter transactions are mostly in Energy, Industrials, Materials, and Utilities, where the heavy share is 100% by construction. On the other hand, most of the Technology, Health Care, Financials, and Consumer industries are not heavy. The sample is well-balanced between industries that produce a lot of emissions and those that don't, which makes it possible to make meaningful comparisons between sectors.

In general, the distribution shows that the dataset includes a wide range of sectors at a time when cross-border acquisitions were happening all the time. This variety is important for figuring out how environmental exposure and institutional distance affect takeover premiums.

3.2 Variable Definitions

3.2.1 Dependent Variable: Acquisition Premium

The baseline dependent variable is the Premium to 1-Month Avg Px (%), which comes from Bloomberg M&A. It measures the percentage premium offered relative to the target's average market price over the month preceding the announcement. I chose the 1-month timeframe as the major parameter because it is a usual compromise: it is wide enough to smooth out daily noise, yet close to the announcement period, when the takeover price becomes useful (Bennett, 2017; Fich et al., 2024).

It's important to say that the premium can automatically incorporate pre-bid runup (expectation, rumors, and leaks). That is why the thesis does not depend on just one metric; it examines whether the results hold up with several definitions of premium.

The different ways to measure premiums I chose for robustness checks are:

- **Premium to 1-Week Avg Px (%)**: identical construction, but with a shorter time before the announcement;
- **Announced premium (%)**: used as an extra way to check the accuracy.

The 1-month premium uses the target's average price in the month preceding the announcement as the benchmark. It therefore captures the offer price relative to a pre-announcement reference that may already reflect run-up due to anticipation or leakage. I complement this benchmark with a one-week premium and the announced premium to assess whether results are sensitive to the extent of pre-bid runup embedded in the denominator.

In the empirical part, each core regression is estimated utilizing the baseline premium and subsequently replicated with various premium variations, aligning with the notion that the same process may manifest differently based on the extent of "runup" embedded in the premium window.

3.2.2 Main Explanatory Variable: Target's environmental exposure

In theory, one might use an ESG rating, but ESG ratings are frequently not accessible for a significant number of targets, especially in the early years of the sample. The thesis adopts a more precise methodology by utilizing carbon intensity as a proxy for the target's environmental exposure. This metric is directly related to the economics of the firm and aligns more closely with the "cash-flow/transition-cost" framework referenced in the hypotheses.

The primary regressor is Target emissions intensity, quantified as GHG emissions per $ million in sales, sourced from Bloomberg ESG Analytics. Scaling emissions by sales makes it easier to compare companies of different sizes, and it's a common approach to measure how well they use carbon (Bolton & Kacperczyk, 2021; Ilhan, Sautner & Vilkov, 2021). I applied a log transformation because the original distribution was severely skewed.

I get two emissions-based metrics from Bloomberg:

i. **Scope 1+2 intensity (baseline):** emissions that management can control within the company's boundaries and are most directly related to operations and energy consumption;

ii. **Scope 1+2+3 intensity (robustness):** adds Scope 3 value-chain emissions, which are crucial for the economy but typically noisier (and more commonly guessed at than reported).

The baseline concentrates on Scope 1+2 since it shows what an acquirer can manage through operational changes and governance following the acquisition. Scope 3, on the other hand, relies significantly on suppliers, customers, and downstream use, and is less handy for the board.

Most of the time, emissions data is updated once a year. To make the emissions measure fit with the information given around the announcement date, I match each transaction to the most recent emissions observation that would have been available at that time, even when the announcement was made later in the year.

This restriction stops the regressor from looking forward and keeps it based on information from before the deal.

3.2.3 Context Variable: ΔEPI (Yale Environmental Performance Index Distance)

The EPI is produced by the Yale Center for Environmental Law Policy (YCELP) and Columbia University's Center for International Earth Science Information Network (CIESIN) and ranks approximately 180 countries using a standardized set of environmental performance indicators. In this study, the EPI serves as a proxy for country-level environmental institutional quality. Unlike pure regulatory stringency indices, the EPI is outcome-based and thus reflects not only formal policy design but also enforcement capacity, governance effectiveness, and broader institutional capability (Kruse et al., 2022).

The index is released biennially (in even-numbered years). To align country scores with transaction timing and avoid look-ahead bias, each deal is matched to the most recent EPI release available at the time of the transaction (e.g., a 2021 deal is matched to the 2020 EPI release). This approach avoids interpolation and approximates the information set plausibly available to market participants around the deal date.

To measure environmental institutional distance between bidder and target countries, I construct a transaction-level mismatch variable as the difference between the target-country EPI and the acquirer-country EPI:

$$\Delta\text{EPI} = \text{EPI}_{\text{Target's country}} - \text{EPI}_{\text{Acquirer's country}}.$$

With this definition, positive values indicate that the target is headquartered in a country with stronger environmental performance than the acquirer's country, while negative values indicate that the acquirer originates from a relatively stronger environmental institutional environment.

Importantly, this construction captures directional asymmetry rather than absolute distance. It therefore allows the empirical analysis to distinguish between cases in which bidders originate from relatively stronger versus weaker environmental regimes. This distinction is economically meaningful: environmental asymmetry may reflect either potential harmonization costs or strategic differences in regulatory environments. The sign of ΔEPI is thus central to the interpretation of the

estimated coefficient.

If either party is headquartered in a territory not reported separately in the EPI dataset, the observation is mapped to the corresponding sovereign-country score (e.g., Isle of Man to the United Kingdom; Hong Kong to China). This procedure ensures consistent coverage and prevents loss of observations due to reporting boundaries.

3.2.4 Control Variables

To mitigate omitted-variable concerns, the baseline requirements provide a standard array of deal and target controls. I included Target Total Assets (Rossi & Volpin, 2004) to control for target size and Target Return on Assets (Cremers, Nair & John, 2009) to manage for operating performance, a quantitative measure of the firm quality to generate return.

The regressions also include two dummy variables. Cash Payment dummy (Schwert, 1996), which is one when Bloomberg's deal attributes say the payment was cash, and zero otherwise. When the acquirer and target are based in separate countries, the cross-border dummy is equal to one; otherwise, it is equal to zero (Martynova & Renneboog, 2008). These variables assist in explaining why prices are different in a systematic way when payment method and the extra problems and uncertainties that come with foreign transactions are taken into consideration.

Bloomberg provides all of the accounting and transaction-level data. The two dummies are based on Bloomberg's qualitative deal qualities.

A practical constraint in this setting is the limited coverage of firm-level emissions and related accounting variables at the deal date, which implies a parsimonious baseline specification. It avoids mechanically shrinking the sample to a narrow subset of large, highly covered firms and preserves external validity within the observable universe. To mitigate concerns that the coefficients capture generic firm "quality" correlated with environmental exposure, the empirical design relies on economically motivated heterogeneity (emission-intensive industries) and on alternative premium windows and proxies. The consistency of the institutional-distance effect across these complementary tests provides reassurance that the estimates are not driven by an omitted, broad profitability or size factor alone.

3.3 Baseline Model

As already said, this thesis examines whether the premium in M&A deals corresponds to a higher target's quality, and the environmental institutional disparity between the acquiring and target nations has an influence on the premium. The empirical design is simple: takeover premiums are noisy and heavy-tailed even after winsorization, and the emissions coverage that is available limits the number of covariates that can be used without losing a lot of sample size.

The baseline specification is estimated by OLS and takes the form:

$$Premium_i = \alpha + \beta_1 \, GHGIntensity_{T,i}^{(\text{Scope})} + \beta_2 \, \Delta EPI_i + \gamma' X_i + \varepsilon_i,$$

where $Premium_i$ is the winsorized takeover premium measured over the one-month window around the announcement. The main regressor, $GHGIntensity_{T,i}^{(\text{Scope})}$, is the log-transformed target emissions intensity based on Scope 1+2 emissions. The context variable ΔEPI_i captures the institutional distance. The control vector X_i includes standard characteristics: target size (log of total assets), profitability (ROA), a cash-payment indicator, and a cross-border indicator.

The baseline results are shown on the Heavy Clean subsample, which includes deals where the target works in sectors with a lot of emissions. This is because environmental exposure should be most important when carbon "bites" economically and institutionally. To make sure that the baseline inference isn't affected by a small number of important transactions, the Heavy sample is "cleaned" again using a deterministic influence rule based on the baseline model. This means that observations are removed if their Cook's distance is greater than 4/N or if their leverage is greater than 2k/N, where N is the complete-case estimation sample and k is the number of estimated parameters. This method is intentionally mechanical and predetermined, avoiding discretionary outlier trimming and enhancing the stability of coefficient estimates.

Heteroskedasticity-robust standard errors (HC1) are used to estimate all baseline regressions. Unless otherwise indicated, the identical covariate set and inference methodology are maintained across robustness tests to enhance the interpretation of coefficient stability.

Inference is based on heteroskedasticity-robust (HC1) standard errors. A potential concern is cross-sectional dependence arising from country-level components embedded in ΔEPI and from repeated exposure to the same target jurisdictions. In principle, clustering at the target-country (or country-pair) level would address this

dependence; however, given the limited number of clusters in this sample, conventional clustered inference may become unreliable and overly conservative. For this reason, the baseline results rely on HC1 standard errors and are interpreted with emphasis on coefficient stability across alternative specifications (premium windows, emissions proxies, and the emission-intensive subsample), which provides complementary evidence on the robustness of the patterns.

3.4 Robustness Checks

Because it is hard to measure takeover premiums and emissions data and rely completely on those results, robustness is measured in four ways: sample choice, premium window, environmental proxy, and institutional-distance proxy. The goal of all the regressions is not to find significance, but to see if the signs and sizes of the key coefficients stay the same when the empirical design is changed in a way that makes sense from an economic point of view.

The different robustness checks are:

i. **Different sample: Full Clean vs. Heavy Clean.**

   The primary specification is done on a cleaned version of the complete sample, employing the identical criteria and the same control variables. This checks to see if the relationship between emissions and premiums is a general pricing trend or mostly a trait of the industry with high emissions (heavy sample).

ii. **Different premium windows: one-week and announced premium.**

   Because premium measures include different combinations of pre-bid runup, the dependent variable is changed to (a) a one-week premium and (b) the announced premium. If the valuation channel shows negotiations over transition costs and regulatory exposure, the effects should be at least directionally consistent across windows, even if the strength of the statistics changes with noise and anticipation dynamics.

iii. **Another way to measure emissions is total (Scope 1+2+3) intensity.**

   To evaluate sensitivity to emissions boundary selections, the baseline Scope 1+2 intensity is substituted with an alternative total intensity proxy that includes Scope 3. This is a tough test of robustness: Scope 3 is important for the economy, but it is often louder and more dependent on models. The consistency across proxies bolsters the interpretation that the premium pertains to environmental exposure rather than a specific measurement artifact.

iv. **Another institutional variable is the target country's EPI level.**

ΔEPI is the main distance construct, but the analysis also uses the EPI level of the target country instead of ΔEPI. This determines if the results are influenced by "distance" itself or by the environmental conditions of the target country in absolute terms. The two variables encode different mechanisms: distance emphasizes post-merger harmonization frictions, while the level emphasizes operating in a weaker/stronger environmental institutional setting.

v. **Alternative environmental measure (discrete): Green dummy.**

As an additional robustness check, I replace continuous log GHG intensity with a peer-based indicator equal to one if the target belongs to the top quartile of lowest-emission firms within the same industry-year (Bloomberg ESG analytics data). This test verifies that results are not driven by the functional form of the emissions proxy and captures a cleaner-versus-dirtier classification commonly used by practitioners.

vi. **Diagnostics for influence and stability.**

Lastly, the thesis gives diagnostic proof that the cleaning method (Cook's distance and leverage) is correct and sums up the stability of the coefficients across the main and robustness specifications with a compact coefficient plot for the most important variables. These diagnostics are designed to clarify whether the inference is influenced by a limited number of extreme transactions or if the emissions and institutional-distance coefficients indicate a more systematic trend within the data.

Chapter 4

Results

4.1 Descriptive Statistics

Before turning to the regression analysis, it is useful to understand the economic structure of the sample. The data show that takeover prices vary widely, that cross-border acquisitions have significant environmental asymmetries, and that carbon-intensive businesses are more volatile than others.

Table 4.1: Summary statistics

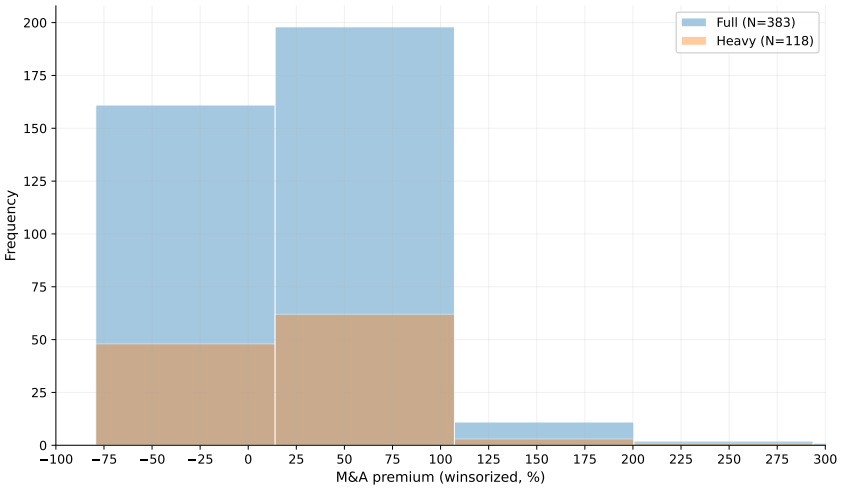
Variable	N	Mean	Std	Min	P25	Median	P75	Max	Skew	Kurt
M&A premium (1 mo.)	383	71.713	331.148	-79.280	0.600	21.010	44.515	2,718.015	7.270	53.726
M&A premium (1 w.)	536	41.705	132.362	-73.022	0.255	19.885	43.315	1,077.633	6.341	44.364
Announced premium	547	32.091	60.399	-100.000	5.645	23.140	43.615	1,050.250	10.088	155.734
Enviromental proxy (scope)	599	3.753	1.404	0.380	3.110	3.640	4.449	7.428	0.190	0.423
Enviromental proxy (total)	534	4.602	1.679	0.891	3.606	4.314	5.393	9.323	0.637	0.431
ΔEPI	712	-4.908	9.018	-51.138	-8.416	-0.704	0.000	20.148	-2.123	5.739
EPI target	712	72.903	10.390	23.400	67.520	74.276	79.890	90.680	-1.266	2.844
Size (log assets)	675	6.340	2.161	-1.014	4.877	6.331	7.718	15.102	0.116	0.295
ROA	693	-4.472	24.945	-194.917	-4.544	1.603	5.688	54.137	-3.440	15.872
Cash dummy	712	0.799	0.401	0.000	1.000	1.000	1.000	1.000	-1.497	0.240
Cross-border dummy	712	0.663	0.473	0.000	0.000	1.000	1.000	1.000	-0.691	-1.527

Notes: This table reports summary statistics for the Full sample. Premium variables are winsorized as described in the Data section.

The premiums in the complete sample are clearly skewed to the right. The average one-month premium is above 70%, whereas the median is close to 21%. The same differences, but with different magnitudes, may be seen in the one-week and announced premiums. This difference between the means and medians shows that a tiny number of transactions are responsible for the higher tail of the distribution. Such heavy-tailed behavior is common in the M&A literature (Andrade, Mitchell, and Stafford, 2001; Betton, Eckbo, and Thorburn, 2009), where big acquisitions

disproportionately impact aggregate averages. Table 4.1 shows that the skewness and kurtosis in our sample are very similar to those in the well-known papers.

Figure 4.1: Distribution of M&A premiums (winsorized) for the full sample and heavy-emitter subsample



Source: Author's calculations based on Bloomberg data, processed in Python.

Figure 4.1 makes the right-tail issue visible: a small number of deals sit far away from the bulk of the distribution, and this motivates the clean-sample diagnostics that follow.

The statistical pattern for environmental characteristics is different. "Environmental (scope)", which is our measure of

$$\log\left(\frac{\text{GHG emissions}_{\text{Scope 1+2}}}{\text{millions \$ in revenues}}\right)$$

exhibits relative symmetry and boundedness. This holds for the Scope 1+2+3 measure too. The mean ΔEPI is negative, which is what I expected. This implies that, on average, acquirers originate from countries with stronger environmental performance than their targets. In other words, a substantial share of transactions in the sample involves bidders headquartered in relatively higher-EPI jurisdictions acquiring firms located in comparatively weaker environmental institutional environments.

This directional asymmetry is economically meaningful. It indicates that environmental institutional distance in the sample is not randomly distributed, but systematically tilted toward transactions in which environmental standards differ across countries. Prior literature shows that cross-border institutional disparities

can influence valuation, integration costs, and post-merger outcomes (Rossi and Volpin, 2004; Bris and Cabolis, 2008; Erel, Liao, and Weisbach, 2012). In the environmental context, such divergence may reflect potential harmonization costs, regulatory asymmetries, or differences in enforcement intensity. The regression analysis that follows examines whether and how this asymmetry is reflected in the pricing of corporate control.

Another important piece of information Table 4.1 gives is that almost the 80% of the deals had been completed using cash. While the 66% of acquisitions concern cross-border companies.

The heavy-industry subsample makes the price differences even bigger. The mean premiums go up a lot, but the medians stay near the full-sample levels. This shows that extreme observations are mostly found in carbon-intensive businesses. Table 4.2 shows that the distributional dispersion gets a lot wider, but the central tendencies stay the same. This pattern makes sense from an economic point of view. Companies that work in industries with a lot of emissions are more likely to experience transition risk and stricter regulations (Bolton and Kacperczyk, 2021; Pankratz, 2021).

Table 4.2: Summary statistics (Heavy sample)

Variable	N	Mean	Std	Min	P25	Median	P75	Max	Skew	Kurt
M&A premium (1 mo.)	118	109.164	465.096	-79.280	0.090	21.520	42.185	2,718.015	5.244	26.483
M&A premium (1 w.)	170	51.264	168.613	-73.022	0.562	21.290	42.255	1,077.633	5.468	30.821
Announced premium	184	26.921	35.067	-100.000	5.120	23.195	40.765	204.310	1.292	7.090
Environmental proxy (scope)	195	4.553	1.602	0.380	3.470	4.541	5.727	7.428	-0.240	-0.377
Environmental proxy (total)	175	5.795	1.844	1.934	4.419	5.733	7.180	9.323	0.121	-0.841
ΔEPI	228	-5.707	10.467	-51.138	-9.334	-0.784	0.000	20.148	-1.833	3.775
EPI target	228	72.448	10.997	33.270	67.290	73.377	80.592	90.680	-1.102	1.607
Size (log assets)	216	6.386	1.987	-1.014	4.995	6.406	7.789	11.439	-0.234	0.395
ROA	224	-1.276	21.914	-194.917	-1.504	2.159	6.017	45.616	-5.117	35.675
Cash dummy	228	0.750	0.434	0.000	0.750	1.000	1.000	1.000	-1.162	-0.655
Cross-border dummy	228	0.684	0.466	0.000	0.000	1.000	1.000	1.000	-0.798	-1.376

Notes: This table reports summary statistics for the Heavy subsample. Premium variables are winsorized as described in the Data section.

Table 4.2 shows that the average one-month premium is over 100%, and the median is still close to 21.5%, which is about the same as the central tendency in the whole sample. It is important to note that the rise in dispersion does not align with significant changes in the major environmental factors. The mean ΔEPI is still negative (-5.7). This indicates that, even in emissions-intensive sectors, acquirers tend to originate from countries with relatively stronger environmental performance than the jurisdictions in which their targets are headquartered.

Thus, the directional environmental asymmetry observed in the full sample persists in heavy industries. The pattern suggests that cross-border transactions in environmentally sensitive sectors are frequently characterized by differences in national environmental institutional quality, reinforcing the relevance of ΔEPI as a transaction-level characteristic in this subsample.

The features of deals are also quite constant. About 75% of the transactions in the heavy subsample are paid for in cash, and about two-thirds are cross-border. This indicates that the primary characteristic of the heavy subsample is not deal structure, but the distributional behavior of premiums.

Table 4.2 shows that carbon-intensive industries have far more volatile negotiated outcomes, but the patterns of institutional distance and transaction structures stay the same. The existence of exceptionally large premium observations in this subsample necessitates a formal influence study to see if a limited number of agreements disproportionately impact future regression estimates.

Table 4.3 highlights several features that are economically informative for the subsequent regression analysis. First, compared to the full sample, the heavy clean subsample exhibits a more compressed distribution of takeover premia, with a mean one-month premium of approximately 22% and a median close to 20%. This reduction reflects the removal of influential outliers but also suggests that pricing dynamics in emission-intensive industries may be more structured and less driven by extreme transactions.

Second, environmental heterogeneity remains substantial. The standard deviation of the Environmental proxy (scope) is 1.601, while the dispersion of environmental institutional distance (ΔEPI) is even larger at 9.710. This indicates that, even within carbon-intensive sectors, firms operate across materially different environmental institutional environments. Such cross-sectional variation is essential for identification: without meaningful dispersion in ΔEPI, it would be difficult to detect whether environmental asymmetry is systematically priced in takeover transactions.

If bidders incorporate expected compliance costs, transition risk, or regulatory asymmetries into valuation, differences in ΔEPI should translate into observable differences in acquisition premiums. The magnitude of the dispersion suggests that the sample contains economically meaningful heterogeneity rather than marginal institutional gaps.

Importantly, the median ΔEPI is close to zero, but the lower tail extends to nearly -47, indicating that a non-negligible fraction of transactions involves sub-

stantial directional environmental asymmetry, with acquirers originating from significantly higher-EPI countries than their targets. These transactions provide a natural setting to test whether environmental institutional distance affects the pricing of corporate control, and through which channel, frictional or strategic, such effects operate.

Taken together, the descriptive evidence suggests that carbon exposure and environmental institutional differences are economically meaningful dimensions of heterogeneity in the heavy clean sample. The regression analysis that follows evaluates whether this heterogeneity is systematically reflected in takeover pricing.

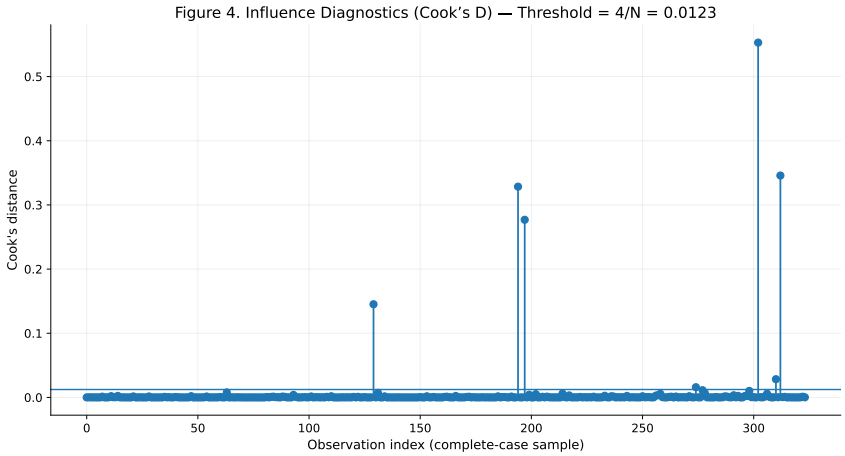
When the extreme outliers are taken out of the heavy-clean sample (see Table 4.3), the average premiums drop substantially and are very near the medians. However, the Environmental proxy levels and ΔEPI are essentially the same. This normalization shows that the extreme results are caused by differences in prices, not by the structure of the environment.

The summary data in Tables 4.1–4.3 show three stylized facts when looked at collectively. First, takeover premiums are quite right-skewed, which is in line with what the literature shows about M&A. Second, environmental institutional distance is consistently seen in cross-border transactions. Third, companies that use a lot of carbon have prices that change more often, but this doesn't change the main environmental features of the sample. These characteristics serve as the empirical foundation for the subsequent multivariate analysis.

The distributional features outlined above indicate that a small number of observations may disproportionately affect the predicted coefficients. Right-skewness is a well-known trait of takeover data, but severe values might make it hard to conclude from small samples. To overcome this issue, I used Cook's Distance to do formal impact diagnostics.

The complete-case sample's Cook's D values are shown in Figure 4. In line with standard practice, I used a threshold of 4/N to find observations that have a big effect. Figure 4 shows that just a few transactions go over this cutoff, and the Cook's D values for these transactions are much higher than those for the rest of the distribution. These observations relate to transactions distinguished by extraordinarily elevated premiums.

Instead of mechanically winsorizing the dependent variable further, I made a heavy-clean subsample by excluding observations that are higher above the Cook's D criterion. This method finds transactions whose leverage on the regression fit is



statistically out of line with the rest of the sample.

Table 4.3: Summary statistics (Heavy clean sample)

Variable	N	Mean	Std	Min	P25	Median	P75	Max	Skew	Kurt
M&A premium (1 mo., wins.)	107	21.690	42.433	-79.280	-0.665	19.940	41.390	214.630	1.250	5.538
M&A premium (1 wk., wins.)	159	25.822	55.130	-73.022	-0.085	20.430	40.645	430.230	3.521	21.463
Announced premium	173	27.121	33.670	-100.000	5.220	23.130	40.730	204.310	1.635	8.129
Enivornmental proxy (scope)	184	4.512	1.601	0.380	3.393	4.484	5.719	7.428	-0.241	-0.358
Environmental proxy (total)	166	5.736	1.841	1.934	4.225	5.613	7.137	9.323	0.146	-0.832
ΔEPI	217	-5.320	9.710	-46.703	-9.004	-0.731	0.000	20.148	-1.684	3.307
EPI target	217	72.730	10.484	34.377	67.520	73.377	80.404	90.680	-0.983	1.442
Size (log assets)	205	6.448	1.957	-1.014	5.032	6.425	7.789	11.439	-0.227	0.513
ROA	213	-0.512	20.635	-194.917	-1.230	2.704	6.016	27.380	-6.231	48.498
Cash dummy	217	0.770	0.422	0.000	1.000	1.000	1.000	1.000	-1.289	-0.341
Cross-border dummy	217	0.687	0.465	0.000	0.000	1.000	1.000	1.000	-0.810	-1.356

Notes: This table reports summary statistics for the Heavy Clean subsample after removing influential observations (Cook's D and leverage rule). Premium variables are winsorized as described in the Data section.

Table 4.3 shows summary data for this heavy-clean sample. Taking out important observations lowers mean premiums a lot and compresses higher-order moments, but it doesn't impact fundamental environmental variables like GHG intensity and ΔEPI too much. This pattern shows that a small number of important deals cause prices to be very different from each other, but the structure of the sample stays the same.

The heavy-clean sample is not meant to change the economic setting; instead, it is meant to provide a standard for robustness. If environmental exposure significantly impacts premiums, such effects should endure even after accounting for notable outliers. Consequently, subsequent regressions are conducted on both the complete and heavy-clean samples to evaluate the stability of the results.

4.2 Correlation Matrix

Before estimating the multivariate specifications, it is beneficial to analyze the unconditional relationships among the principal variables of interest. Tables 4 and 5 show Pearson correlations for the whole dataset and the heavy-clean subsample, respectively.

Table 4.4: Correlation matrix (Full sample)

	Mean	SD	Premium (1M)	Premium (1W)	Announced prem.	Environmental proxy (scope)	Environmental proxy (total)	ΔEPI	EPI target	Size	ROA	Cash	Cross-border
Premium (1M)	74.105	354.576	1.000										
Premium (1W)	44.428	159.742	0.956***	1.000									
Announced prem.	30.470	75.424	0.096	0.271***	1.000								
Enviromental (scope)	3.696	1.395	0.167***	0.150**	0.075	1.000							
Enviromental (total)	4.529	1.608	0.179***	0.163***	0.048	0.702***	1.000						
ΔEPI	-4.035	8.443	0.019	-0.013	-0.107*	-0.155**	-0.193***	1.000					
EPI target	74.781	10.544	-0.012	-0.042	-0.155**	-0.039	-0.148**	0.786***	1.000				
Size	6.263	2.155	-0.168***	-0.193***	-0.193***	-0.206***	-0.091	-0.056	-0.011	1.000			
ROA	-1.719	19.114	-0.095	-0.124**	-0.214***	-0.061	-0.046	0.002	0.029	0.219***	1.000		
Cash	0.800	0.401	-0.219***	-0.142**	0.144**	-0.018	0.081	-0.177***	-0.165***	0.008	-0.001	1.000	
Cross-border	0.593	0.492	-0.023	-0.000	0.040	0.078	0.170***	-0.361***	-0.288***	0.132**	-0.033	0.377***	1.000

Notes: This table reports Pearson correlations. Mean and standard deviation are shown in the first two columns. Correlations are reported in the lower triangle. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Table 4 (full sample) shows a few trends. First, the two premium measurements before the announcement are very similar to each other. The premiums for one month and one week are both positive and correlated with each other at a level above 0.95. This shows that the numerous ways to build premiums closely follow the same price patterns. Instead, the announced premium looks somehow to be different.

Second, environmental factors show a reasonable level of interconnectedness, but not too much. There is a positive correlation (about 0.70) between Environmental proxy (scope) and Environmental proxy (total), which makes sense considering how they were made. However, it is important to note that neither proxy metric shows a strong link with ΔEPI, firm size, or profitability. ΔEPI has a large correlation with the target-country EPI (above 0.75), which is what I expected, but it doesn't have any bad connections with the other firm-level variables. This indicates that environmental institutional distance represents a unique aspect in relation to company characteristics.

Third, premiums are relatively weakly tied to environmental factors when there are no conditions. The correlations between premiums and Environmental indicators are weak, and the correlations between premiums and ΔEPI are almost negligible in the overall sample. This pattern indicates that any correlation between environmental exposure and takeover price is unlikely to be merely mechanical; rather, it may manifest only after accounting for business characteristics and transaction structure within a multivariate context.

Table 4.5: Correlation matrix (Heavy clean sample)

	Mean	SD	Premium (1M)	Premium (1W)	Announced prem.	Environmental proxy (scope)	Environmental proxy (total)	ΔEPI	EPI target	Size	ROA	Cash	Cross-border
Premium (1M)	16.963	38.997	1.000										
Premium (1W)	16.508	40.425	0.987***	1.000									
Announced prem.	24.500	29.465	0.860***	0.872***	1.000								
Enviromental (scope)	4.476	1.645	-0.001	0.008	0.102	1.000							
Enviromental (total)	5.656	1.763	0.088	0.093	0.096	0.623***	1.000						
ΔEPI	-3.777	7.405	-0.399***	-0.395***	-0.387***	-0.248**	-0.183	1.000					
EPI target	75.677	9.352	-0.357***	-0.374***	-0.308***	-0.133	-0.147	0.743***	1.000				
Size	6.485	1.956	-0.192*	-0.189	-0.219*	0.099	0.188	0.091	0.050	1.000			
ROA	2.303	6.618	-0.051	-0.083	-0.139	-0.077	-0.079	-0.068	-0.019	-0.186	1.000		
Cash	0.789	0.410	0.400***	0.368***	0.198*	0.046	0.216*	-0.226**	-0.275**	0.179	-0.088	1.000	
Cross-border	0.618	0.489	0.409***	0.401***	0.290**	0.200*	0.279**	-0.403***	-0.370***	0.182	0.059	0.392***	1.000

Notes: This table reports Pearson correlations. Mean and standard deviation are shown in the first two columns. Correlations are reported in the lower triangle. *, **, and *** denote significance at the 10%, 5%, and 1% levels, respectively.

Giving a look at Table 5 (heavy-clean subsample), the several associations become clearer when influencing data are taken. Specifically, ΔEPI exhibits a statistically significant negative association with the premium measures, particularly after extreme outliers are excluded, which implies that premiums are higher when acquirers originate from relatively stronger environmental institutional environments than their targets (i.e., when ΔEPI is more negative).

In other words, environmental asymmetry appears to be positively valued in transactions where bidders come from higher-EPI countries and acquire firms located in comparatively weaker environmental jurisdictions. This pattern is inconsistent with a pure harmonization-cost interpretation and instead suggests that the directional component of environmental institutional distance may influence the distribution of expected transaction surplus.

No pairwise correlation approaches conventional multicollinearity thresholds (e.g., 0.8), alleviating concerns that the simultaneous inclusion of Environmental measures, ΔEPI, and standard control variables generates unstable coefficient estimates. The negative association, therefore, appears to reflect a distinct pricing effect rather than mechanical collinearity.

In general, the correlation analysis yields two encouraging findings. First, environmental exposure and institutional distance do not exhibit mechanical collinearity with conventional firm controls. Second, basic unconditional correlations don't adequately explain changes in premiums. This shows that the analysis needs a multivariate specification to separate the effects of environmental performance and regulatory distance.

4.3 Baseline results

The dependent variable in Table 6 is the one-month (winsorized) M&A premium, and the findings are for the baseline regression. Column (1) shows estimates for

the whole clean sample, while Column (2) shows estimates for the heavy clean subsample.

Table 4.6 reports our baseline estimates of the relationship between target environmental performance and acquisition premiums. A key choice concerns how the premium is measured. The 1-month premium uses the target's average price in the month preceding the announcement as the benchmark. It therefore captures the offer price relative to a pre-announcement reference that may already reflect a run-up due to anticipation or leakage. I complement this benchmark with a one-week premium and the announced premium to assess whether results are sensitive to the extent of pre-bid runup embedded in the denominator. In practice, if environmental risk is priced by the market and gradually incorporated into expectations as a deal becomes more likely, part of the adjustment can occur before the formal announcement. The one-month window, therefore, provides a natural benchmark to test whether carbon exposure and environmental frictions are reflected in the overall price paid for control.

Table 4.6: Main results: 1-month M&A premium and target GHG intensity (Full vs Heavy).

	(1) Full (Clean)	(2) Heavy (Clean)
Target GHG intensity (Scope)	-5.179	-3.706
	(3.899)	(2.323)
ΔEPI (Target – Acquirer)	-0.987*	-1.056***
	(0.533)	(0.369)
Size (log assets)	-5.153***	-5.229**
	(1.946)	(2.607)
ROA	-1.045**	-1.129**
	(0.435)	(0.470)
Cash deal dummy	43.204***	27.518***
	(8.993)	(8.306)
Cross-border dummy	0.755	25.608***
	(9.656)	(8.080)
Observations	296	89
R^2	0.165	0.384
Adj. R^2	0.148	0.339

Notes: The dependent variable is the 1-month (winsorized) M&A premium. Both columns use the same controls. Robust standard errors (HC1) in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Target GHG intensity

The coefficient on target GHG intensity is negative in both specifications (-5.179 in the full clean sample and -3.706 in the heavy clean subsample), although it is not statistically significant at conventional levels. The sign is economically intuitive: more carbon-intensive targets tend to command lower acquisition premiums. This is consistent with a pricing channel in which bidders internalize expected transition costs-regulatory compliance, future carbon pricing, and potential stranded assets when valuing the target's cash flows and risk profile, in line with evidence that carbon exposure is valuation-relevant in public markets (Bolton and Kacperczyk, 2021; Pankratz, 2021). Importantly, statistical imprecision here should not be read as "no effect." Carbon intensity is notoriously noisy at the firm level, measurement differs across disclosure regimes and industries, and the mapping from emissions to expected costs depends on technology, pass-through, and regulation. With that caveat, the economic magnitude is not trivial. Using the coefficient from Column (1), moving from a relatively low-carbon target to a meaningfully higher-carbon one implies a noticeable discount in the premium paid for control, even if the estimate is not sharp enough to clear strict significance thresholds once firm fundamentals and deal structure are accounted for. In other words, the data point toward a "carbon discount," but the cross-sectional signal in the full sample is estimated with uncertainty.

Distance between Environmental Institutions (ΔEPI)

The coefficient on ΔEPI (Target $-$ Acquirer) is negative and statistically significant in both models. In the full clean sample, the estimate is significant at the 10% level, while in the heavy clean subsample it becomes highly significant at the 1% level.

The negative coefficient implies that acquisition premiums are higher when acquirers originate from relatively stronger environmental institutional environments than their targets (i.e., when ΔEPI is more negative). In other words, the directional component of environmental institutional asymmetry is priced in takeover transactions.

This pattern does not align with a pure harmonization-cost interpretation. If regulatory divergence primarily generated compliance and integration burdens, one would expect lower premiums in transactions characterized by larger asymmetries. Instead, the evidence suggests that environmental asymmetry may influence the distribution of expected surplus in favor of bidders originating from higher-EPI jurisdictions. Such transactions may entail access to comparatively less stringent

regulatory environments or greater operational flexibility, particularly in emissions-intensive industries.

The stronger effect in the heavy subsample is especially informative. In sectors where emissions are central to operations, environmental regulatory differences are likely to be first-order determinants of expected cash flows rather than secondary governance frictions. The heightened statistical significance in this subsample indicates that environmental institutional asymmetry becomes economically salient precisely where environmental costs are material.

Although statistical precision varies across specifications, the economic magnitude is meaningful. In the heavy clean subsample, the standard deviation of ΔEPI is economically substantial, and combining this dispersion with the estimated coefficient implies that moving from the median transaction to one characterized by pronounced negative ΔEPI corresponds to a sizable change in the one-month premium. Relative to a median premium of approximately 20%, this adjustment is economically non-trivial.

Although the estimate is statistically imprecise, its economic magnitude is meaningful. In the heavy clean subsample, the standard deviation of the Environmental proxy (scope), so GHG intensity, is 1.601. Combining this dispersion with the estimated coefficient in Column (2) implies that a one–standard deviation increase in carbon intensity is associated with roughly a 6 percentage point lower one-month premium. Given that the median one-month premium in this subsample is about 20%, the implied discount is economically material.

Controls at the Firm Level

The size of a firm is adversely and strongly linked to the premium in both groups. This conclusion is consistent with previous findings indicating that smaller targets typically attract greater relative premiums (Moeller, Schlingemann, and Stulz, 2004). ROA is also inversely associated with the premium, which means that less profitable companies get greater bids. This might be because they want to restructure or because they have fewer choices outside of the company.

The institutional-distance effect is not only statistically strong but also economically large. The standard deviation of ΔEPI in the heavy clean subsample is 9.710, so the coefficient in Column (2) implies that moving one standard deviation farther in environmental institutional distance corresponds to approximately a 10 percentage point reduction in the premium. Relative to a median premium of roughly 20%, this is a first-order pricing effect.

Features of the Deal

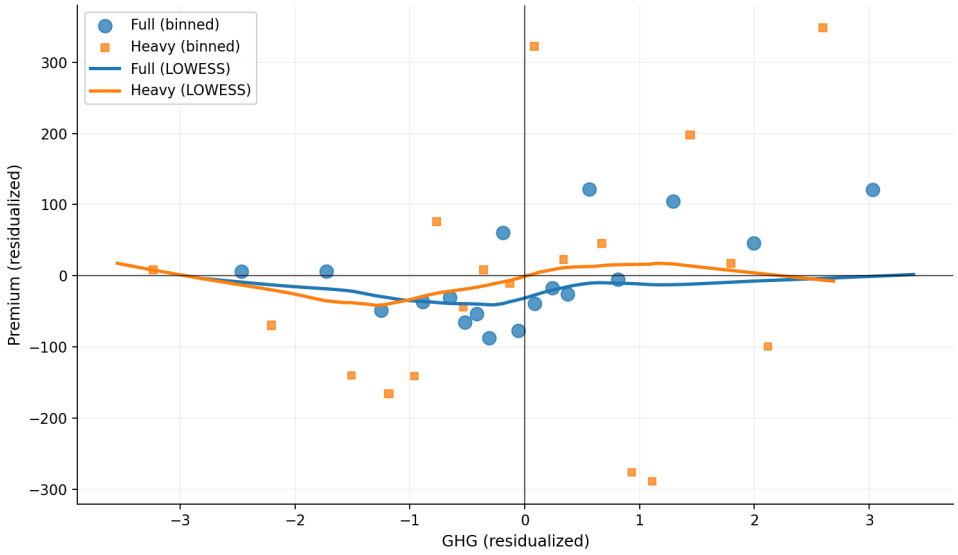
The cash deal dummy is positive and very important in both cases. This finding aligns with existing research indicating that cash offers correlate with elevated premiums, possibly indicative of signaling effects or reduced information asymmetry (Travlos, 1987; Huang and Walkling, 1987).

The cross-border dummy is not important in the entire clean sample, but it is important and positive in the heavy clean subsample. This indicates that foreign transactions in emission-intensive sectors are linked to elevated premiums, contingent upon further regulations.

Fit of the Model

The R^2 goes up from 0.165 in the entire clean sample to 0.384 in the heavy clean subsample. This means that the model accounts for a far bigger portion of the difference in premiums in carbon-intensive industries.

Figure 4.2: Relationship between residualized target emissions and acquisition premiums



Notes: The figure plots binned averages and LOWESS-smoothed relationships between residualized target GHG emissions and residualized acquisition premiums. Residualized values are obtained after controlling for the baseline covariates. Blue circles and line refer to the full sample, while orange squares and line refer to the heavy-emitter subsample.
Source: Author's calculations based on Bloomberg M&A and ESG data, processed in Python.

Figure 4.3 plots the partial relationship between the one-month takeover premium and target carbon intensity (Scope), after residualizing both variables with

respect to the full set of controls included in the baseline regression. The binned scatter points summarize the conditional means, while the LOWESS curves provide a non-parametric smoothing of the relationship for both the full and heavy subsamples.

Several features are worth noting. In the full sample, the smoothed relationship appears relatively flat, with only mild curvature around the center of the distribution. This visual pattern is consistent with the regression evidence, where the coefficient on carbon intensity is negative but statistically imprecise.

A useful way to read the figure is that, in the full sample, the conditional relationship between premiums and carbon exposure is modest relative to the overall dispersion in takeover premia, consistent with a pricing effect that is present but diluted by heterogeneity in business models, disclosure quality, and deal-specific bargaining. Put differently, the "average" takeover may not be the place where carbon exposure dominates pricing, but the pattern becomes clearer precisely where carbon is economically binding.

In contrast, the heavy subsample exhibits a more pronounced downward tendency, particularly in the central range of carbon intensity. While the relationship is not strictly linear, the LOWESS curve suggests that higher carbon exposure is associated with lower residualized premiums in emission-intensive industries. The dispersion of the binned observations also appears greater in the heavy sample, reflecting the higher volatility documented in the descriptive statistics.

It is worth noting that Figure 2 isolates the firm-level carbon exposure channel and abstracts from cross-country environmental asymmetry captured by ΔEPI. The graphical relationship, therefore, reflects pricing adjustments conditional on institutional distance and other deal characteristics. The fact that the pattern strengthens in emission-intensive industries reinforces the interpretation that environmental considerations are economically relevant precisely where they materially affect operating cash flows.

Importantly, the figure does not indicate strong nonlinearities or threshold effects. Rather, it suggests a gradual adjustment in pricing as carbon exposure increases. The graphical evidence, therefore, complements the regression results: the carbon coefficient is modest in the full sample but becomes economically more relevant within carbon-intensive sectors.

4.4 Robustness

Table 4.7 shows a number of extra parameters that were used to see if the baseline results are affected by other modeling options. The objective is clear: to evaluate whether the adverse correlation between environmental institutional distance and takeover premiums persists after justifiable modifications in sample design, variable formulation, and result assessment.

Table 4.7: Robustness tests

	(1) Heavy (Clean, 1w)	(2) Heavy (Clean, Total)	(3) Heavy (Clean, EPI tgt)	(4) Heavy (Clean, Ann.)
Target GHG intensity (Scope)	-0.836		-3.010	-0.520
	(2.301)		(2.308)	(1.653)
Target GHG intensity (Total)		-2.058		
		(2.193)		
ΔEPI (Target – Acquirer)	-0.567	-1.021**		-0.136
	(0.420)	(0.431)		(0.285)
EPI target			-0.567	
			(0.375)	
Size (log assets)	-1.602	-5.670*	-5.492**	-1.989
	(2.914)	(2.911)	(2.597)	(1.821)
ROA	-1.281*	-1.021*	-1.097**	-1.103***
	(0.743)	(0.548)	(0.497)	(0.326)
Cash deal dummy	0.647	29.380***	27.213***	9.847
	(22.224)	(8.138)	(8.746)	(8.111)
Cross-border dummy	26.148**	25.793***	27.894***	11.044
	(11.781)	(8.535)	(8.667)	(6.830)
Observations	134	82	89	134
R^2	0.096	0.385	0.367	0.130
Adj. R^2	0.053	0.336	0.321	0.089

Notes: This table reports robustness checks using alternative premium windows, alternative GHG proxy, alternative EPI measure, and announced premium. Robust standard errors (HC1) are reported in parentheses. *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Recall the main specification for the heavy clean subsample to be a reference point. The coefficient on ΔEPI is negative and very significant.

The model is re-estimated on the whole clean sample, as shown in the baseline results. The coefficient on ΔEPI is still negative and statistically significant, but it is not as strong as it was in the heavy subsample. This pattern gives us useful information. It indicates that environmental regulatory asymmetry is not just characteristic of emission-intensive enterprises; rather, its economic significance is amplified in contexts with substantial carbon exposure.

Column (1) replaces the one-month premium with the one-week premium. As expected, estimates become less precise, and the ΔEPI coefficient weakens. This pattern is economically sensible: shorter windows are closer to capturing the announcement markup component and are less likely to incorporate price adjustments that occur through gradual anticipation and runups. If environmental institutional asymmetry is gradually incorporated into pricing as the deal becomes anticipated (rather than only at the moment the first terms are announced), a one-week window mechanically reduces the scope for detecting that effect. Importantly, however, the sign of ΔEPI remains negative, indicating that the direction of the institutional-distance channel does not hinge on the chosen horizon.

In Column (2), total emissions take the place of Scope 1+2 GHG intensity. The carbon coefficient is still negative, and the ΔEPI effect is still in effect. This is a good thing since the way emissions are assessed can change the outcomes of climate-related studies. The institutional-distance effect's durability across several carbon proxies bolsters confidence in the fundamental mechanism.

Column (3) replaces ΔEPI with the target country's absolute environmental performance (EPI objective). The coefficient is negative, but it doesn't mean anything statistically. This difference is essential. It indicates that pricing is influenced not by environmental quality itself, but by the regulation disparity between acquirer and target nations. So, it seems that what matters is asymmetry, not levels.

Lastly, Column (4) uses the announced premium. In this specification, ΔEPI loses statistical significance. This is not surprising and is informative rather than problematic. Announced premiums reflect the initial terms of the first bid, which may be set before the full set of regulatory and integration considerations are incorporated into the bargaining process. By contrast, the one-month premium is better suited to capture pricing adjustments that unfold as information is processed and deal terms evolve. Taken together, the comparison across outcome measures suggests that environmental frictions are more likely to be reflected in the overall control price than in the very first quoted markup.

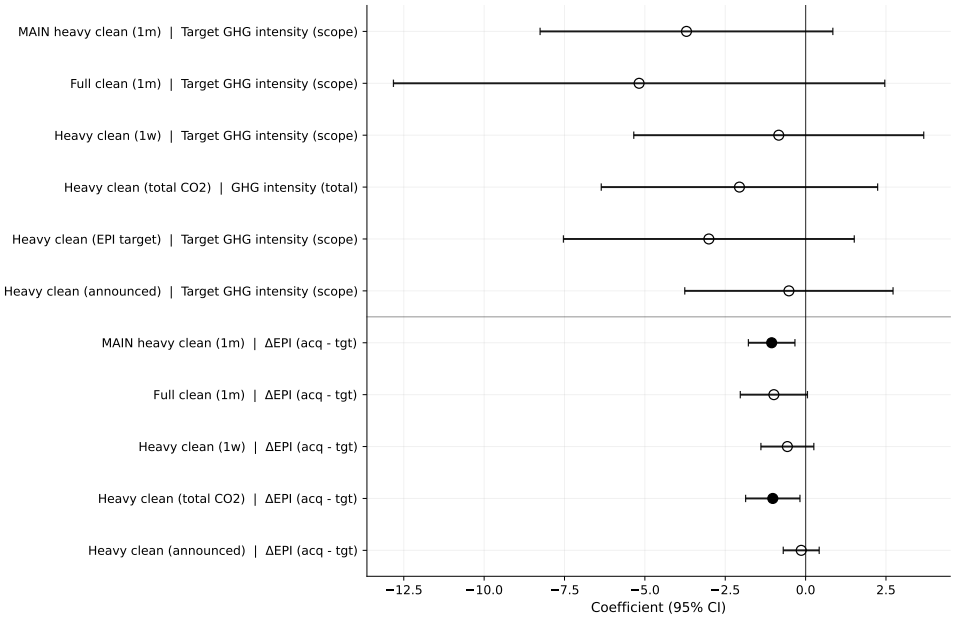
The control variables act the same way in all specifications. Firm size still hurts premiums, ROA usually comes in with a negative sign, and cash dealings are linked to higher premiums. These patterns are similar to the baseline data, which means that the environmental coefficients do not take into account changes that would normally be linked to typical takeover factors.

The robustness experiments demonstrate that the negative association between ΔEPI and acquisition premiums remains stable across specifications. The effect's

direction stays the same, but the size and statistical strength change from sample to sample and outcome measure to outcome measure.

More robustly, environmental institutional distance (ΔEPI) exhibits a stable and statistically significant negative relationship with premiums, particularly in emission-intensive industries. Given the definition $\Delta\text{EPI} = \text{EPI(Target)} - \text{EPI(Acquirer)}$, this implies that premiums are higher when acquirers originate from relatively stronger environmental institutional environments than their targets. The evidence therefore points to the pricing relevance of directional environmental asymmetry rather than to a simple penalty for regulatory divergence.

Figure 4.3: Coefficient stability across alternative premium definitions and emissions measures



Notes: The figure reports coefficient estimates and 95% confidence intervals across alternative specifications.
Source: Author's calculations based on Bloomberg data, processed in Python.

Figure 4.4 provides a visual summary of the key coefficients across the robustness specifications reported in Table 4.7. Each point represents an estimated coefficient, while the horizontal bars indicate 95% confidence intervals. Filled markers denote statistical significance at conventional levels, whereas open markers correspond to estimates that are not statistically significant.

First, the estimates for ΔEPI are consistently negative across specifications. In the main heavy-clean model, the coefficient is clearly below zero and statistically significant. The alternative premium window and the alternative carbon definition

slightly reduce precision, but the sign remains stable. Even in specifications where statistical significance weakens, the point estimates do not reverse direction. This visual consistency reinforces the idea that the environmental institutional distance effect is not driven by a particular modeling choice.

Second, the coefficients on target GHG intensity are also generally negative, but exhibit wider confidence intervals. In most specifications, the intervals overlap zero, indicating statistical imprecision. The dispersion of these intervals highlights that the carbon-intensity effect is economically suggestive but less precisely estimated compared to ΔEPI. Importantly, however, none of the specifications produce a strongly positive estimate.

Another feature worth noting is the absence of large swings in magnitude across models. The clustering of estimates within a relatively narrow range suggests that the results are not highly sensitive to changes in sample definition or variable construction. In other words, the overall direction of the effects is stable even when statistical strength varies.

Overall, the figure complements the regression tables by offering a compact visualization of coefficient stability. Rather than relying solely on individual p-values, it allows the reader to assess the consistency of sign and magnitude across alternative specifications.

The results presented in this chapter provide consistent evidence that environmental factors are economically relevant in takeover pricing, although their statistical precision varies across specifications and samples. In the heavy clean subsample, both the dispersion of environmental performance and the magnitude of institutional environmental distance are substantial. The regression analysis shows that this heterogeneity is not neutral to transaction pricing.

While target carbon intensity alone is estimated with limited precision, its coefficient remains negative across models, suggesting that higher carbon exposure is associated with lower acquisition premia. More robustly, environmental institutional distance (ΔEPI) exhibits a stable and statistically significant negative relationship with premiums, particularly in emission-intensive industries. The economic magnitude of this effect is meaningful relative to the median premium observed in the sample.

The comparison across alternative premium windows further indicates that environmental considerations appear more clearly in broader pricing measures that capture the overall control premium rather than only the initial announced terms.

Taken together, the evidence suggests that environmental exposure and regulatory asymmetry are incorporated, at least partially, into the valuation process underlying corporate acquisitions.

Although the results should be interpreted with caution, given the sample size and measurement limitations, they are consistent with the view that environmental risk is not external to the market for corporate control, but rather enters the pricing of transactions in economically relevant ways.

Taken together, the evidence suggests that environmental exposure and cross-country regulatory asymmetry are incorporated into the valuation process underlying corporate acquisitions. The results are more consistent with a strategic-asymmetry channel than with a pure harmonization-cost interpretation.

Chapter 5

Conclusions

5.1 Environmental Risk as a Determinant of Takeover Valuation

This thesis examined whether environmental exposure and regulatory asymmetries are reflected in acquisition premiums in mergers and acquisitions. The central question was deliberately narrow: do target greenhouse gas emissions and environmental institutional distance affect the price paid for corporate control?

However, the underlying economic issue is broader. The past decade has produced substantial evidence that climate-related risk influences firm valuation in public markets. Studies such as Bolton and Kacperczyk (2021) document that firms with higher carbon emissions earn higher expected returns, suggesting that investors demand compensation for carbon exposure. Pankratz (2021) shows that transition risk affects stock performance. Other work links climate exposure to the cost of capital and downside risk.

These findings imply that carbon exposure has economic content. Yet public market pricing is diffuse, continuous, and diversified. A takeover transaction is different. It is discrete, negotiated, and concentrated. When one firm acquires another, it internalizes the target's risks rather than diversifying them away. If climate exposure is economically meaningful, it should become visible in this setting.

The market for corporate control, therefore, provides a demanding test of whether environmental risk is priced. In this market, valuation is explicit. Bidders construct cash flow projections, assess regulatory exposure, and evaluate integration costs. Premiums reflect not only current performance but expectations about the regulatory and economic environment in which the combined entity will operate.

The empirical analysis conducted in this thesis addresses this test directly.

5.2 Main Findings

The results deliver a coherent set of patterns across the baseline specifications, subsamples, and robustness checks.

The first finding concerns target carbon intensity. In both the full and heavy clean samples, the coefficient on Scope emissions is negative, indicating that more carbon-intensive targets tend to command lower acquisition premiums. While statistical precision is weaker in the full sample, the sign remains stable across alternative specifications, suggesting that the relationship is not driven by a particular modelling choice.

The economic magnitude becomes clearer in the emission-intensive setting. In the heavy clean subsample, a one–standard deviation increase in carbon intensity is associated with roughly a six percentage point reduction in the one-month premium. Given that the median premium in this subsample is close to twenty percent, the implied adjustment is sizeable. Even when conventional significance thresholds are not met, the point estimates imply an economically meaningful discount rather than a negligible effect.

The second and more robust finding concerns environmental institutional asymmetry. Differences in environmental performance between the target's country and the acquirer's, measured by ΔEPI, exhibit a stable negative association with acquisition premiums. This implies premiums to be higher when acquirers originate from relatively stronger environmental institutional environments than their targets (when ΔEPI is more negative). In the heavy clean sample, a one–standard deviation increase in ΔEPI corresponds to an approximate ten percentage point reduction in the premium. Relative to the distribution of observed premiums, this effect is large and, unlike carbon intensity, it is also estimated with higher statistical precision.

Third, the premium window matters for how clearly these effects appear. The one-month premium, which captures the pre-announcement runup yields sharper evidence than the announced premium. This pattern is consistent with the view that environmental institutional asymmetry may be incorporated gradually as deal expectations form and information diffuses, rather than being fully reflected in the initial terms of the first bid.

Taken together, the evidence suggests that environmental exposure and directional regulatory asymmetry are not neutral to takeover pricing. Instead, they

appear to enter valuation decisions in the market for corporate control, particularly in contexts where carbon exposure is economically salient. The results are more consistent with a strategic asymmetry channel than with a pure harmonization-cost interpretation, as premiums are higher when bidders originate from relatively stronger environmental regimes.

5.2.1 Carbon effect

The negative association between carbon intensity and acquisition premiums is consistent with a "carbon discount" interpretation. In emission-intensive industries, higher emissions plausibly proxy for a bundle of expected costs and risks, including future compliance expenditures, exposure to carbon pricing regimes, the possibility of stranded assets, and broader regulatory uncertainty. These channels are economically intuitive and align with the broader climate-finance literature that documents valuation relevance of carbon exposure in public markets (e.g., Bolton and Kacperczyk, 2021; Pankratz, 2021).

A useful way to interpret this result is to recognize the difference between portfolio pricing and control pricing. Diversified investors can hold carbon-exposed firms as long as they are compensated through expected returns. Strategic acquirers, instead, internalize the target's operational and regulatory exposure in a concentrated way. They cannot diversify away transition risk inside a single acquisition. This creates a direct incentive to reflect expected environmental costs in the offer price, especially when those costs are likely to materialize through capital expenditures, process upgrades, reporting requirements, or regulatory constraints.

At the same time, the statistical imprecision of the carbon coefficient deserves attention. Emissions measures are prone to reporting heterogeneity and measurement error, and the economic mapping from emissions to expected costs varies across industries and jurisdictions, depending on abatement technology, cost pass-through, and enforcement intensity. These sources of noise naturally attenuate estimated coefficients and make the relationship harder to pin down precisely in a cross-sectional setting. The persistence of a negative sign across models, however, indicates that the evidence is better described as economically suggestive but imprecisely estimated, rather than unstable or contradictory.

5.2.2 Directional Environmental Institutional Asymmetry

The most precisely estimated and economically robust finding concerns environmental institutional asymmetry. The cross-border M&A literature has long emphasized

that institutional differences shape transaction pricing and post-merger outcomes. Rossi and Volpin (2004) highlight the role of legal origin in international activity; Bris and Cabolis (2008) study governance and valuation channels; and Erel, Liao, and Weisbach (2012) document determinants of cross-border mergers. This thesis extends that framework by focusing specifically on the environmental dimension of institutional differences.

The empirical results indicate that ΔEPI—defined as the difference between the target country's EPI and the acquirer country's EPI enters directionally takeover pricing. The negative coefficient implies that premiums are higher when acquirers originate from relatively stronger environmental institutional environments than their targets. This pattern suggests that what matters is not environmental quality per se, but the asymmetry between the two jurisdictions.

The robustness exercises further clarify the mechanism. When ΔEPI is replaced by the target country's absolute environmental performance (EPI level), the effect weakens materially and loses statistical precision. This contrast is informative. It indicates that valuation is not driven simply by operating in a "better" or "worse" environmental regime, but by the relative institutional position of bidder and target.

One possible interpretation is that environmental asymmetry alters the distribution of expected post-merger surplus. When bidders originate from stricter environmental regimes and acquire targets in comparatively weaker jurisdictions, the transaction may involve differences in regulatory stringency, compliance intensity, and cost structures that are economically relevant for expected cash flows. Particularly in emission-intensive industries, such differences may represent first-order determinants of value rather than marginal governance frictions.

The economic magnitude of the ΔEPI effect is large relative to typical takeover premiums. Especially in heavy industries, the estimated impact corresponds to a substantial fraction of the observed premium distribution. This reinforces the conclusion that environmental institutional asymmetry is not peripheral to corporate control transactions, but meaningfully enters the valuation process.

5.2.3 Environmental Risk, Valuation, and the Logic of Control

The empirical results suggest that environmental variables affect takeover premiums through two distinct but related channels: firm-level operational exposure and cross-country institutional asymmetry. Understanding how these channels interact is essential for interpreting what it means for environmental risk to be "priced" in

the market for corporate control.

Carbon intensity operates at the firm level. It proxies for operational exposure to transition risk, regulatory tightening, and potential capital expenditures required to comply with evolving environmental standards. Higher emissions signal a greater likelihood of future adjustment costs. In valuation terms, this may reduce expected free cash flows or increase the perceived risk associated with them, thereby compressing the premium bidders are willing to offer.

Environmental institutional distance, by contrast, operates at the interface between firms and their jurisdictions. ΔEPI captures directional asymmetry in environmental regulatory environments. Unlike carbon intensity, which reflects gradual exposure to long-term transition dynamics, ΔEPI reflects cross-border differences in institutional positioning at the time of the transaction.

This suggests that what is being priced is not environmental quality in isolation, nor institutional distance per se, but the relative positioning of bidder and target across regulatory regimes. In this sense, environmental asymmetry appears to influence the distribution of expected post-merger surplus.

The relative strength and precision of the ΔEPI coefficient compared to the carbon coefficient are informative. Carbon intensity captures forward-looking transition exposure that is inherently uncertain and difficult to quantify. Institutional asymmetry, by contrast, reflects observable cross-country differences in regulatory context. In a negotiated transaction, bidders may be better able to assess and incorporate such jurisdictional asymmetries than to model long-run climate transition scenarios. This difference in measurability may help explain why institutional asymmetry appears more precisely priced than raw emission levels.

To say that environmental exposure is "priced" in takeover premiums does not imply the existence of a separate carbon factor analogous to those in asset pricing models. Rather, it implies that environmental considerations enter the bidder's valuation framework through adjustments to expected cash flows, regulatory positioning, and perceived risk. The pricing effect manifests as lower premiums for more carbon-intensive targets and as systematic variation in premiums depending on the directional environmental asymmetry between acquirer and target.

Importantly, the observed pricing is conditional and context-dependent. The environmental effect strengthens in emission-intensive industries, where carbon exposure materially affects operating performance. It weakens when narrower premium windows are used, suggesting that environmental considerations are incorporated

gradually as information is processed and expectations adjust. This pattern is consistent with economically grounded valuation behavior rather than purely symbolic ESG signaling.

Taken together, the evidence suggests that environmental exposure and cross-country regulatory asymmetry are economically relevant in the market for corporate control. Carbon intensity reflects firm-level vulnerability to evolving environmental constraints. Institutional asymmetry reflects relative regulatory positioning across jurisdictions. Both channels shape the negotiated price of control, particularly where environmental considerations are central to operating cash flows.

This interpretation remains measured. It does not imply that environmental factors dominate acquisition pricing. It does suggest, however, that they are sufficiently material to influence transaction outcomes in economically meaningful ways.

5.3 Implications

The evidence in this thesis suggests that environmental exposure is not merely a background characteristic of firms involved in M&A transactions. Rather, it appears to enter takeover pricing through identifiable valuation channels. The key distinction is not whether Environmental measures "matter" in the abstract, but how and through which mechanisms environmental variables influence the negotiated price of control. The results do not imply that environmental factors dominate transaction pricing. They do indicate that, in contexts where emissions and regulatory alignment are economically relevant, environmental considerations become part of the economic logic underlying acquisition premiums.

5.3.1 Implications for valuation and deal-making

From a corporate finance perspective, the findings support the view that environmental risk is incorporated into control transactions through expected compliance costs and cross-country regulatory asymmetries that affect the distribution of post-merger surplus.This has concrete implications for valuation practice.

In emission-intensive industries, carbon exposure is unlikely to be a purely reputational issue. Even when statistical precision is limited, the economic magnitude of the carbon coefficient suggests that bidders may apply meaningful adjustments to the premium they are willing to offer. In practical terms, this implies that emissions exposure should be integrated into valuation models in the same way as other risk drivers. Scenario analysis, regulatory stress testing, and explicit budgeting for

environmental capital expenditures become part of disciplined due diligence rather than peripheral considerations.

The more robust effect of environmental institutional distance highlights an additional layer of complexity in cross-border transactions. The more robust effect of environmental institutional distance highlights an additional layer of complexity in cross-border transactions. Because ΔEPI is directional, the results indicate that premiums are higher when acquirers originate from relatively stronger environmental regimes than their targets. This suggests that what is being priced is not regulatory divergence per se, but relative institutional positioning. In practice, bidders may incorporate expected differences in regulatory stringency, compliance intensity, and operating flexibility when evaluating cross-border targets. These may include upgrading reporting systems, adapting production processes, or aligning corporate policies with stricter institutional benchmarks. The fact that distance matters more than absolute environmental performance suggests that bidders are pricing the cost of reconciling regulatory environments rather than rewarding or penalizing environmental quality per se. In this sense, environmental asymmetry functions as a measurable transaction friction.

The evidence regarding premium windows also has practical implications. The fact that environmental effects are clearer in the one-month premium than in the announced premium suggests that pricing adjustments may unfold gradually, through negotiation and market anticipation. Environmental considerations may therefore influence the broader bargaining process rather than being fully embedded in the first bid. For practitioners, this implies that environmental risk may shape both the structure and the evolution of negotiations.

5.3.2 Implications for targets and strategic positioning

For target firms, the results suggest that environmental exposure can affect bargaining power. In emission-intensive sectors, weaker environmental performance may not only increase operating risk but may also translate into lower acquisition premiums. This does not imply that environmentally strong firms automatically receive higher offers. Rather, the evidence is more consistent with a discount mechanism: high carbon exposure is associated with lower premiums. By contrast, the institutional-distance results suggest that relative regulatory positioning, rather than misalignment alone, shapes bargaining power in cross-border deals.

This distinction matters. It suggests that environmental improvements may enhance strategic positioning not by generating a distinct "green premium," but

by reducing valuation frictions linked to expected compliance costs and uncertainty. Transparency and credible disclosure may also play a role, since measurement noise and uncertainty about environmental exposure can increase perceived risk during due diligence.

5.3.3 Implications for cross-border M&A and institutions

The negative relationship between ΔEPI and acquisition premiums indicates that cross-country environmental asymmetry is systematically reflected in transaction pricing. Because ΔEPI is directional, the evidence does not imply that regulatory heterogeneity universally depresses valuation. Rather, it suggests that relative institutional positioning between bidder and target influences the negotiated control price. This finding nuances the broader institutional-distance literature by highlighting that the direction of asymmetry matters.

The result that distance matters more than levels is particularly informative. It indicates that regulatory fragmentation creates pricing frictions independent of absolute environmental performance. Convergence or harmonization of environmental standards may therefore reduce uncertainty and integration costs in international transactions. In this sense, environmental policy design may indirectly affect capital flows and ownership structures through its impact on transaction-level valuation.

5.3.4 Implications for the broader "pricing" debate in climate finance

Finally, the results speak to the broader question of whether environmental exposure represents priced risk or non-financial preference. In public markets, carbon exposure may manifest through expected-return differentials or discount-rate adjustments. In takeover markets, the mechanism is different. The bidder is pricing an integrated operating asset, not a marginal traded claim.

The evidence presented here is most consistent with an interpretation in which environmental exposure enters pricing through expected cash flow adjustments, compliance costs, and integration frictions. This is a narrower claim than asserting the existence of a distinct ESG factor, but it is economically meaningful. It suggests that environmental risk influences not only portfolio allocation decisions but also strategic corporate transactions and the transfer of control.

5.4 Limitations

Any empirical analysis that seeks to identify pricing effects in complex corporate transactions must confront several conceptual and methodological limitations. While the results presented in this thesis are consistent with the interpretation that environmental exposure and institutional asymmetry influence takeover pricing, several constraints qualify the strength and generalizability of the conclusions. These limitations do not invalidate the findings, but they shape the scope within which they should be interpreted.

5.4.1 Measurement of Carbon Exposure

Target carbon intensity, proxied through Scope emissions scaled appropriately, is an imperfect indicator of transition risk. Emissions data suffer from several well-known issues. Reporting standards vary across jurisdictions and across time. Disclosure quality differs between firms, particularly between those subject to mandatory non-financial reporting and those operating under more voluntary regimes. Measurement methodologies for Scope emissions are not perfectly harmonized, and verification standards vary.

Moreover, carbon intensity captures only one dimension of climate-related exposure. Transition risk may depend not only on current emissions but also on abatement capacity, technological flexibility, capital vintage, contractual structures, and regulatory expectations. Two firms with similar emission intensity may face very different future cost trajectories depending on industry structure and regulatory enforcement.

Measurement error in the independent variable generally biases estimated coefficients toward zero. In this context, attenuation bias may partly explain the statistical imprecision of the carbon coefficient. If emissions data are noisy proxies for expected transition costs, the true underlying relationship between carbon exposure and acquisition premiums may be stronger than estimated.

At the same time, carbon intensity may correlate with other firm characteristics, such as capital intensity, asset tangibility, or industry concentration. Although the regressions include standard controls, residual confounding cannot be fully ruled out.

5.4.2 Environmental Institutional Distance as a Proxy

The Environmental Performance Index is a composite indicator capturing multiple dimensions of environmental policy and outcomes at the country level. While it provides a broad measure of environmental regulatory quality and enforcement, it does not directly measure the specific regulatory costs faced by individual firms.

ΔEPI therefore proxies for regulatory asymmetry rather than directly measuring expected compliance expenditures or enforcement intensity. Differences in EPI scores may reflect structural characteristics unrelated to takeover integration costs. Additionally, EPI captures contemporaneous environmental performance, whereas takeover pricing may incorporate expectations about future regulatory tightening.

Another conceptual limitation is that ΔEPI measures distance at the country level, while firms within the same jurisdiction may face heterogeneous enforcement intensity depending on industry, region, or political exposure. The use of country-level indices inevitably abstracts from this within-country heterogeneity.

Despite these caveats, ΔEPI remains a useful and theoretically motivated proxy for regulatory asymmetry. However, the interpretation of its coefficient must remain cautious: it reflects institutional distance broadly construed, not a direct measure of firm-specific environmental compliance cost.

In addition, because ΔEPI is directional rather than absolute, the estimated coefficient reflects relative institutional positioning rather than regulatory divergence in magnitude. Future research could examine absolute distance measures to disentangle these effects.

5.4.3 Cross-Sectional Design and Causality

The empirical design of this thesis is cross-sectional. The analysis identifies associations between environmental variables and acquisition premiums, controlling for observable firm and deal characteristics. However, it does not establish causal identification in a strict econometric sense.

Unobserved variables may influence both environmental exposure and takeover pricing. For example, firms with high carbon intensity may systematically differ in governance quality, capital structure, or strategic positioning. While controls mitigate this concern, omitted variable bias cannot be fully excluded.

Furthermore, reverse causality is unlikely in this setting, as emissions precede takeover pricing. However, selection effects may operate. Certain types of firms may

be more likely to become acquisition targets precisely because of their environmental characteristics, thereby shaping the observed premium distribution.

Causal identification would require exogenous variation in environmental regulation or emissions intensity, such as regulatory shocks, carbon pricing introductions, or enforcement changes. While such designs are beyond the scope of this thesis, they represent a promising avenue for future research

5.4.4 Sample Size and Statistical Power

A key limitation of the empirical design concerns sample selection induced by data availability. Firm-level emissions measures (and, more generally, granular sustainability variables) are not uniformly covered across targets, particularly among smaller firms and in jurisdictions with weaker disclosure infrastructures. As a consequence, the estimation sample may over-represent larger and more transparent targets and may under-represent transactions in which environmental exposure is economically relevant but poorly observed.

This non-random coverage can affect external validity and, potentially, the correlation between environmental variables and unobserved firm characteristics (e.g., reporting sophistication, governance, or investor base). Accordingly, the analysis is best interpreted as evidence on takeover pricing within the observable universe of disclosed emissions rather than as a population-wide estimate. Reassuringly, the main patterns are stronger where theory predicts salience, namely in emission-intensive industries and in broader premium windows that better approximate the negotiated price of control, which mitigates the concern that results are solely an artefact of disclosure selection.

A related trade-off arises from robustness-oriented refinements. The emission-intensive subsample increases economic focus by concentrating on sectors where carbon exposure is most likely to be valuation-relevant, while influence diagnostics reduce the risk that a small number of extreme observations drive the estimates. However, these refinements necessarily reduce sample size and statistical power.

Limited power may contribute to the imprecision of the carbon-intensity coefficient: in smaller samples, even economically meaningful effects may fail to achieve conventional significance thresholds, particularly when the explanatory variable exhibits moderate cross-sectional dispersion. Overall, the analysis therefore emphasizes coefficient signs, economic magnitudes, and stability across specifications, while interpreting statistical significance with appropriate caution.

5.4.5 Premium Measurement and Event Windows

Another limitation concerns the measurement of acquisition premiums. While the one-month premiumr window allows detection of gradual pricing adjustments, it may also incorporate unrelated market movements or information leakage not directly tied to environmental considerations.

Conversely, narrower windows, such as the one-week or announced premium, may isolate negotiation effects but fail to capture anticipatory pricing.

No premium measure perfectly isolates the environmental component of takeover pricing. The comparison across windows partially addresses this issue, but residual ambiguity remains.

5.4.6 External Validity

The sample is constrained by data availability on emissions and environmental performance. This may limit generalizability to jurisdictions with reliable disclosure regimes. Firms in countries with weaker reporting standards may be underrepresented.

Additionally, the period under study coincides with increasing awareness of climate risk. The pricing of environmental exposure may differ in earlier or later periods depending on regulatory expectations and investor attention.

5.4.7 Conceptual Boundaries

This thesis documents associations consistent with environmental exposure influencing acquisition premiums. It does not demonstrate that carbon exposure commands a distinct risk premium in the asset pricing sense. Nor does it imply that environmental considerations dominate valuation decisions.

Rather, the results suggest that environmental risk enters the valuation process as one component among many. Its magnitude varies across industries and institutional contexts.

5.4.8 Synthesis of Limitations

Taken together, these limitations imply that the findings should be interpreted as economically suggestive rather than causally definitive.

Measurement noise likely attenuates carbon coefficients. Institutional distance

proxies for regulatory asymmetry imperfectly. Cross-sectional analysis limits causal inference. Sample size constrains precision.

Yet the consistency of the negative signs, the robustness of EPI, and the economic magnitude of the estimated effects provide converging evidence that environmental exposure is not irrelevant to takeover pricing.

Recognizing these limitations strengthens, rather than weakens, the credibility of the analysis. A measured interpretation acknowledges uncertainty while highlighting economically meaningful patterns.

5.5 Future research

The results presented in this thesis open several avenues for further investigation. While the evidence is consistent with environmental exposure and regulatory asymmetry influencing takeover pricing, the mechanisms through which this occurs deserve deeper exploration.

5.5.1 Exploiting Regulatory Shocks

A natural extension would be to introduce exogenous variation in environmental regulation. Regulatory shocks, such as the Paris Agreement, the introduction of carbon pricing mechanisms, or sudden enforcement changes at the national level, provide quasi-experimental settings to identify causal effects.

For instance, one could examine whether the sensitivity of acquisition premiums to carbon intensity increases following the introduction of stricter climate policies. If pricing effects strengthen after regulatory tightening, this would provide stronger causal evidence that bidders internalize transition risk.

Similarly, staggered implementation of non-financial reporting directives across jurisdictions could provide variation in disclosure intensity. Research by Fiechter, Hitz, and Lehmann (2022) shows that CSR reporting mandates can generate real effects. A comparable design could test whether enhanced environmental transparency increases the pricing sensitivity of acquisition premiums.

Such approaches would allow the identification of causal channels beyond cross-sectional association.

5.5.2 Dynamic Pricing and Time Variation

Another promising direction concerns time variation in pricing effects. Climate risk perception has evolved significantly over the past two decades. Investor attention to environmental risk, regulatory activism, and public discourse have all intensified. It is therefore plausible that the pricing of environmental exposure in takeover transactions is not constant over time.

Future research could interact carbon intensity and EPI with time indicators, testing whether environmental pricing strengthens in later periods. A structural break analysis could assess whether specific events, such as major climate summits or regulatory reforms, alter takeover pricing dynamics.

Such analysis would contribute to understanding whether environmental risk pricing is structural or contingent on the regulatory environment.

5.5.3 Interaction with Deal Characteristics

The current analysis focuses on baseline pricing relationships. However, environmental exposure may interact with transaction structure.

Payment method provides one potential channel. In cash deals, acquirers internalize the target's risk fully. In stock deals, risk is partially shared with target shareholders. If environmental risk is significant, its pricing effect may differ by payment method.

Similarly, bidder competition and auction dynamics may moderate environmental discounts. In competitive auctions, strategic considerations may override environmental concerns, reducing the observable impact on premiums.

Incorporating such interaction effects would deepen the understanding of how environmental risk enters negotiation processes.

5.5.4 Beyond Emissions: Broader Measures of Transition Risk

Carbon intensity captures a narrow dimension of climate exposure. Transition risk encompasses regulatory change, technological disruption, litigation risk, and reputational pressure.

Future research could incorporate forward-looking measures, such as exposure to carbon pricing regimes, firm-level climate targets, green capital expenditure intensity, or scenario-based climate risk assessments. The growing availability of climate-

related financial disclosures may enable richer measurement of environmental exposure.

5.5.5 Post-Acquisition Outcomes

If bidders discount high-emission targets at acquisition, does this discount accurately reflect future costs? Do acquisitions involving large environmental institutional distance experience lower post-merger performance?

Examining operating performance, impairment charges, or post-deal returns could shed light on whether environmental discounts are efficient or overestimated.

5.5.6 International Capital Allocation and Policy Implications

At a broader level, future research could explore whether environmental regulatory asymmetry affects the direction of cross-border capital flows.

If environmental distance reduces premiums, does it also reduce deal frequency? Do firms prefer targets in environmentally similar jurisdictions? Such analysis would connect corporate finance with international political economy and environmental policy design.

5.6 End of The Beginning

This thesis began with a narrow empirical question: whether environmental exposure and regulatory asymmetry are reflected in acquisition premiums. It concludes with an answer that is neither revolutionary nor trivial. Environmental variables do not overturn the logic of takeover pricing, nor do they appear as dominant drivers of valuation. Yet they are not irrelevant. Within the boundaries imposed by measurement, sample size, and identification, the evidence suggests that environmental exposure, particularly in the form of institutional distance, enters the arithmetic of corporate control in economically meaningful ways.

This result may appear modest. In reality, it is precisely what one should expect from a market that is neither blind to risk nor driven by ideology. The market for corporate control is a place where expectations about future cash flows, regulatory burdens, and integration frictions are translated into a negotiated price. If regulatory asymmetry alters expected costs, operating flexibility, or the distribution of post-merger surplus, then valuation should reflect it. The findings of this thesis are consistent with that logic.

At the same time, the analysis does not claim more than it can sustain. Measurement noise clouds the carbon proxy. Institutional indices approximate rather than perfectly capture regulatory exposure. Cross-sectional associations do not constitute definitive causal proof. These constraints define the limits of what can be inferred. But within those limits, the patterns are coherent. They suggest that environmental considerations are not an external overlay on financial markets, but part of the evolving structure within which corporate decisions are made.

If there is a broader lesson, it is that climate-related risk is gradually becoming embedded in ordinary economic mechanisms. Not through dramatic repricing events alone, but through incremental adjustments in how firms evaluate acquisitions, negotiate terms, and allocate capital. The transition is not marked by sudden breaks, but by the quiet incorporation of new constraints into established valuation frameworks.

In that sense, this thesis is appropriately titled The end of the beginning. It does not claim to settle the debate on how environmental risk reshapes corporate finance. Rather, it documents one setting in which that reshaping appears to be taking place. The empirical evidence offered here is a starting point, not a conclusion.

As with many questions at the intersection of regulation, markets, and long-term risk, progress will be cumulative. Better data, sharper identification strategies, and richer institutional variation will refine the picture. For now, the findings suggest that environmental exposure is not external to the market for corporate control. It is gradually internalized, priced, and negotiated.

And perhaps that is the appropriate place to pause. The analysis has shown that environmental risk leaves measurable traces in takeover pricing, particularly where institutional distance is large and carbon exposure is economically salient. Whether this mechanism strengthens, weakens, or transforms as regulation evolves remains an open question.

Bibliography

[1] Aktas, N., E. De Bodt, and J.-G. Cousin. 2011. Do Financial Markets Care About SRI? Evidence from Mergers and Acquisitions. *Journal of Banking & Finance* 35(7): 1753–1761.

[2] Andrade, G., M. Mitchell, and E. Stafford. 2001. New Evidence and Perspectives on Mergers. *Journal of Economic Perspectives* 15(2): 103–120.

[3] Berg, F., J. F. Kölbel, and R. Rigobon. 2022. Aggregate Confusion: The Divergence of ESG Ratings. *Review of Finance* 26(6): 1315–1344.

[4] Bennett, B., and R. A. Dam. 2017. Merger Activity, Stock Prices, and Measuring Gains from M&A. *Working Paper, Ohio State University (Fisher College of Business) and University of Colorado (Leeds School of Business)*

[5] Berry, H., M. F. Guillén, and N. Zhou. 2010. An Institutional Approach to Cross-National Distance. *Journal of International Business Studies* 41(9): 1460–1480.

[6] Betton, S., B. E. Eckbo, and K. S. Thorburn. 2008. Corporate Takeovers. *In Handbook of Corporate Finance: Empirical Corporate Finance*, Vol. 2, ed. B. E. Eckbo. Elsevier/North-Holland.

[7] Betton, S., B. E. Eckbo, and K. S. Thorburn. 2009. Takeover Premiums and Shareholder Gains in Mergers. *The Review of Financial Studies* 22(10): 3891–3938.

[8] Bolton, P., and M. Kacperczyk. 2021. Do Investors Care about Carbon Risk? *Journal of Financial Economics* 142(2): 517–549.

[9] Bris, A., and C. Cabolis. 2008. The Value of Investor Protection: Firm Evidence from Cross-Border Mergers. *The Review of Financial Studie* 21(2): 605–648.

[10] Clarkson, P. M., Y. Li, G. D. Richardson, and F. P. Vasvari. 2015. The Valuation Relevance of Greenhouse Gas Emissions: Evidence from the European Union Emissions Trading Scheme. *European Accounting Review* 24(3): 551–580.

[11] Cremers, K. J. M., V. B. Nair, and K. John. 2009. Takeovers and the Cross-Section of Returns. *The Review of Financial Studies* 22(4): 1409–1445.

[12] Deng, X., J.-K. Kang, and B. S. Low. 2013. Corporate Social Responsibility and Stakeholder Value Maximization: Evidence from Mergers. *Journal of Financial Economics* 110(1): 87–109.

[13] Erel, I., R. C. Liao, and M. S. Weisbach. 2012. Determinants of Cross-Border Mergers and Acquisitions. *The Journal of Finance* 67(3): 1045–1082.

[14] European Commission. 2018. Action Plan: Financing Sustainable Growth. COM(2018) 97 final.

[15] European Union. 2014. Directive 2014/95/EU of the European Parliament and of the Council of 22 October 2014 amending Directive 2013/34/EU as regards disclosure of non-financial and diversity information by certain large undertakings and groups. *Official Journal of the European Union.*

[16] European Union. 2019. Regulation (EU) 2019/2088 of the European Parliament and of the Council of 27 November 2019 on sustainability-related disclosures in the financial services sector (SFDR). *Official Journal of the European Union.*

[17] European Union. 2020. Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 on the establishment of a framework to facilitate sustainable investment (Taxonomy Regulation). *Official Journal of the European Union.*

[18] European Union. 2022. Directive (EU) 2022/2464 of the European Parliament and of the Council of 14 December 2022 as regards corporate sustainability reporting (CSRD). *Official Journal of the European Union.*

[19] Fich, E. M., V. Lantushenko, and C. Sialm. 2024. Institutional Trading around M&A Announcements. *Financial Management* 53(4): 643–680. DOI: 10.1111/fima.12469

[20] Gatignon, H., and E. Anderson. 1988. The Multinational Corporation's Degree of Control over Foreign Subsidiaries: An Empirical Test of a Transaction Cost Explanation. *The Journal of Law, Economics, and Organization* 4(2): 305–336.

[21] Gomes, M., and S. Marsat. 2018. Does CSR Impact Premiums in M&A Transactions? *Finance Research Letters* 26: 71–80.

[22] Griffin, P. A., D. H. Lont, and E. Y. Sun. 2017. The Relevance to Investors of Greenhouse Gas Emission Disclosures. *Contemporary Accounting Research* 34(2): 1265–1297.

[23] Hackbarth, D., and E. Morellec. 2008. Stock Returns in Mergers and Acquisitions. *The Journal of Finance* 63(3): 1213–1252.

[24] Harford, J. 1999. Corporate Cash Reserves and Acquisitions. *The Journal of Finance* 54(6): 1969–1997.

[25] Huang, Y.-S., and R. A. Walkling. 1987. Target Abnormal Returns Associated with Acquisition Announcements: Payment, Acquisition Form, and Managerial Resistance. *Journal of Financial Economics* 19(2): 329–349.

[26] Hubbard, R. G., and D. Palia. 1999. A Reexamination of the Conglomerate Merger Wave in the 1960s: An Internal Capital Markets View. *The Journal of Finance* 54(3): 1131–1152.

[27] Ilhan, E., Z. Sautner, and G. Vilkov. 2021. Carbon Tail Risk. *The Review of Financial Studies* 34(3): 1540–1571.

[28] Jensen, M. C. 1986. Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers. *American Economic Review* 76(2): 323–329.

[29] Jensen, M. C., and W. H. Meckling. 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3(4): 305–360.

[30] Jensen, M. C., and R. S. Ruback. 1983. The Market for Corporate Control: The Scientific Evidence. *Journal of Financial Economics* 11(1–4): 5–50.

[31] Jost, S., Sautner, Z., & coauthors (2022). Does corporate social responsibility impact mergers & acquisitions premia? Finance Research Letters, 46, 102353.

[32] Kogut, B., and H. Singh. 1988. The Effect of National Culture on the Choice of Entry Mode. *Journal of International Business Studies* 19(3): 411–432.

[33] Krueger, P., Z. Sautner, and L. T. Starks. 2020. The Importance of Climate Risks for Institutional Investors. *The Review of Financial Studies* 33(3): 1067–1111.

[34] Li, C., and J. Haleblian. 2022. The Influence of Nation-Level Institutions on Acquisition Premiums: A Cross-Country Comparative Study. *Journal of Management* 48(4): 878–904.

[35] Martynova, M., and L. Renneboog. 2008. A Century of Corporate Takeovers: What Have We Learned and Where Do We Stand? *Journal of Banking & Finance* 32(10): 2148–2177.

[36] Matsumura, E. M., R. Prakash, and S. Vera-Muñoz. 2014. Firm-Value Effects of Carbon Emissions and Carbon Disclosures. *The Accounting Review* 89(2): 695–724.

[37] Moeller, S. B., F. P. Schlingemann, and R. M. Stulz. 2004. Firm Size and the Gains from Acquisitions. *Journal of Financial Economics* 73(2): 201–228.

[38] Moeller, S. B., and F. P. Schlingemann. 2005. Global Diversification and Bidder Gains: A Comparison between Cross-Border and Domestic Acquisitions. *Journal of Banking & Finance* 29(3): 533–564.

[39] Mulherin, J. H., and S. A. Simsir. 2015. Measuring Deal Premiums in Takeovers. *Financial Management* 44(1): 1–14.

[40] Papadimitriou, E., A. R. Neves, and M. Saisana. 2020. JRC Statistical Audit of the 2020 Environmental Performance Index. EUR 30234 EN. *Publications Office of the European Union.*

[41] Pástor, Ľ., R. F. Stambaugh, and L. A. Taylor. 2021. Sustainable Investing in Equilibrium. *Journal of Financial Economics* 142(2): 550–571.

[42] Pedersen, L. H., S. Fitzgibbons, and L. Pomorski. 2021. Responsible Investing: The ESG-Efficient Frontier. *Journal of Financial Economics* 142(2): 572–597.

[43] Principles for Responsible Investment (PRI). 2017. How ESG Investing Affects Financial Performance. *PRI* (web publication, 11 January 2017).

[44] Rossi, S., and P. F. Volpin. 2004. Cross-Country Determinants of Mergers and Acquisitions. *Journal of Financial Economics* 74(2): 277–304.

[45] Schwert, G. W. 1996. Markup Pricing in Mergers and Acquisitions. *Journal of Financial Economics* 41(2): 153–192.

[46] Seltzer, L. H., L. T. Starks, and Q. Zhu. 2022. Climate Regulatory Risk and Corporate Bonds. *NBER Working Paper No. 29994.*

[47] Shimizu, K., M. A. Hitt, D. Vaidyanath, and V. Pisano. 2004. Theoretical Foundations of Cross-Border Mergers and Acquisitions: A Review of Current Research and Recommendations for the Future. *Journal of International Management* 10(3): 307–353.

[48] Tampakoudis, I., and E. Anagnostopoulou. 2020. The Effect of Mergers and Acquisitions on Environmental, Social and Governance Performance and Market Value: Evidence from EU Acquirers. Business Strategy and the Environment 29(5): 1865–1875.

[49] Tampakoudis, I., A. Noulas, N. Kiosses,and G. Drogalas. 2021. The Effect of ESG on Value Creation from Mergers and Acquisitions: What Changed During the COVID-19 Pandemic? Corporate Governance: *The International Journal of Business in Society* 21(6): 1117–1141.

[50] Tang, N., & coauthors (2024). The impact of ESG distance on mergers and acquisitions. *Journal of Corporate Finance*, 86, 102609

[51] Teti, E., and L. Spiga. 2023. The Effect of Environmental, Social and Governance Score on Operating Performance after Mergers and Acquisitions. Business Strategy and the Environment 32(6): 3165–3177.

[52] Travlos, N. G. 1987. Corporate Takeover Bids, Methods of Payment, and Bidding Firms' Stock Returns. *The Journal of Finance* 42(4): 943–963.

[53] Yen, T.-Y., & André, P. (2019). Market reaction to the effect of corporate social responsibility on mergers and acquisitions: Evidence on emerging markets. *The Quarterly Review of Economics and Finance*, 71, 114–131

[54] Wendling, Z. A., J. W. Emerson, D. C. Esty, et al. 2020. 2020 Environmental Performance Index. *Yale Center for Environmental Law & Policy, Yale University; Center for International Earth Science Information Network, Columbia University.*

[55] Zrigui, M., I. Khanchel, and N. Lassoued. 2024. Does Environmental, Social and Governance (ESG) Performance Affect Acquisition Premium? Review of International Business and Strategy 34(4): 469–494.