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ORIGINAL RESEARCH PAPER

ESG and financial performance in public and private companies: evidence from Brazil

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Abstract

Using detailed, questionnaire-based ESG data embedded in a broader corporate ranking for 156 public and 317 private Brazilian companies from 2017 to 2023, we examine the relationship between ownership structure, financial performance, and ESG performance. Panel regressions and propensity score matching reveal that public companies have lower ESG scores than private companies due to weaker governance. The gap is most pronounced among large companies with low leverage, high liquidity, and low capital intensity. Transitions from public to private ownership are associated with improved ESG scores. Prior profitability is positively linked to ESG scores, particularly in brown industries and among companies with weaker financial constraints, consistent with financial slack theory. Family ownership is positively associated with profitability, especially in private companies. A difference-in-differences design around an ESG disclosure regulation shows that ESG scores of public companies significantly increased after implementation. Our findings highlight the pivotal roles of ownership structure, financial slack, and disclosure mandates in shaping ESG performance in emerging markets, extending ESG analysis to private companies and identifying a family-ownership premium in profitability.

Keywords ESG scores · Corporate ownership · Private companies · Financial performance · Disclosure regulation · Corporate governance

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1 Introduction

Empirical environmental, social, governance (ESG) studies primarily focus on large, publicly traded companies because ratings and disclosures are more readily available for these companies (Drempetic et al. 2020). However, small and medium enterprises (SMEs), which are predominantly privately held and often family-owned, account for more than 95% of registered companies worldwide, over half of employment, and more than one-third of GDP in many emerging markets (Alibhai et al. 2017). Despite their economic importance, the ESG behavior of private companies remains underexplored, partly because disclosure is limited and because these companies are less embedded in the institutional infrastructures that produce and standardize ESG information (Kornberger et al. 2017). Consequently, comparisons between public and private companies may confound differences in actual ESG practices with differences in what can be measured within existing ESG rating systems (Cormier et al. 2005; van Weeren and Bluntz 2025). Since most commercial ESG ratings primarily cover listed companies, direct ownership comparisons within a common measurement framework are rarely possible.

Recent evidence shows that public and private companies differ materially in their emissions (Shive and Forster 2020). Such ownership differences likely depend on institutional and regulatory context, making emerging markets a particularly relevant setting. Brazil provides a compelling case for at least three reasons. First, Brazil is one of the world's largest economies and the largest in Latin America, while also ranking among the top global greenhouse gas emitters (International Monetary Fund 2025; International Energy Agency 2023). As the region's largest GHG emitter, Brazil's corporate sustainability practices have important implications for climate policy, regulation, and financial markets. Second, Brazilian capital markets combine formal regulation for public companies with limited transparency requirements for private companies, enabling clear ownership-based comparisons (La Porta et al. 1999; Leal and Carvalhal-da-Silva 2005). Third, the 2021 introduction of CVM Resolution No. 59 (CVM59), which mandates ESG disclosure for listed companies, creates a rare opportunity to examine how regulation shapes ESG behavior in an emerging market. As a disclosure-focused intervention, CVM59 may influence not only organizational practices but also how ESG information is formalized and reported to external audiences (O'Dwyer et al. 2011; Cooper and Owen 2007).

To address these gaps, we compile a novel dataset of 473 Brazilian companies (317 private and 156 public) from 2017 to 2023. The companies are drawn from Época Negócios 360, a long-running business ranking that surveys large companies operating in Brazil and has become an established evaluative device in the corporate field. Unlike commercial ESG ratings, which largely cover publicly listed companies, this setting enables us to measure ESG performance for both public and private companies within a common evaluative framework.

The dataset is not intended to represent all Brazilian companies but rather captures a economically significant segment of large companies operating in Brazil, including both domestic and multinational companies. Approximately 3500 companies in Brazil report annual sales of BRL 1 billion (about USD 200 million) or more. In our sample, roughly three-quarters exceed this threshold, with average sales of BRL 9.4

billion (about USD 1.9 billion) in 2022. Moreover, eight of the ten largest companies by sales are included in the data. These features indicate that the sample covers a central part of the corporate landscape, where ESG considerations and reputational accountability are particularly salient.

Época Negócios 360 operates alongside other market reference rankings such as Valor 1000. While Valor 1000 primarily evaluates financial performance, Época Negócios 360 combines financial indicators with governance, sustainability, innovation, HR practices, and forward-looking strategy. This broader scope makes the data particularly informative for comparing ESG performance across ownership forms, especially for large private companies for which ESG information is typically unavailable. Rather than functioning as a stand-alone ESG survey, ESG-related questions are embedded in a broader "360-degree" assessment. This setting helps mitigate concerns that participation is driven solely by ESG signaling incentives and allows us to study differences in constructed ESG scores across ownership forms.

Our analysis addresses two connected research questions. First, what determines ESG performance, and in particular how do ownership structure, prior profitability, and disclosure regulation shape it? Second, how does ownership structure, especially family control, relate to financial performance? The first question organizes our analysis of the public–private ESG gap, the role of financial slack, and the effect of the CVM59 disclosure mandate; the second isolates the performance implications of family ownership.

Our methodological approach has four components. First, we construct E, S, and G pillar scores from questionnaire subcomponents aligned with categories used by the London Stock Exchange Group (LSEG), a leading global ESG rating provider, and aggregate them into a composite ESG score. This step translates organizational practices into a comparable evaluative format across companies and time while recognizing that ESG scores are constructed through classification and weighting choices rather than directly observed (Kornberger et al. 2017; van Weeren and Bluntz 2025). Second, we estimate panel regressions of ESG scores on ownership, profitability, and company characteristics, complemented by subsample analyses. To test whether differences between public and private companies persist after accounting for observable characteristics, we additionally apply propensity score matching to improve comparability on observables. Third, we analyze profitability (Operating ROA, hereafter OROA) in relation to ESG scores to assess whether financially stronger companies exhibit higher subsequent ESG scores, consistent with slack-enabled investment in ESG practices. Fourth, we examine the introduction of CVM59 using a difference-in-differences design to evaluate how a disclosure mandate is associated with changes in reported ESG scores.

Our results yield four main findings. First, public companies exhibit significantly lower composite ESG scores, driven primarily by the governance pillar, i.e., disclosure- and accountability-related structures central to how ESG becomes measurable and comparable in practice (Cooper and Owen 2007; O'Dwyer et al. 2011). The gap is most pronounced among large companies with low leverage, high liquidity, and low capital intensity. Propensity score matching confirms that public companies score lower on ESG even after accounting for observable company characteristics. Second, lagged OROA is positively associated with current ESG scores, consistent

with financial slack theory. This relationship is strongest among companies in brown industries with low capital intensity, suggesting that financially constrained, high-impact sectors are particularly responsive to performance-driven ESG investments. Third, CVM59 increased ESG scores of listed companies by 0.05 points relative to private peers (about one-quarter of a standard deviation), with no evidence of diverging trends before 2021. Fourth, among private companies, family ownership is associated with higher financial returns, indicating that concentrated control may support alignment between long-term profitability and stakeholder priorities. Together, these results highlight the role of ownership structure and regulatory enforcement in shaping company-level ESG performance and its financial implications.

These findings yield three contributions. First, we contribute to the sustainable-finance literature by extending ESG analysis beyond listed firms to a large sample of private companies. Calibrating our questionnaire-based scores to an established rating regime (LSEG) enables commensuration across ownership forms, an empirical setting rarely observed in ESG research (Kornberger et al. 2017; van Weeren and Bluntz 2025), and shows that the public–private gap in composite ESG scores concentrates in governance components tied to disclosure and accountability infrastructures (Cooper and Owen 2007). Second, we contribute to the accounting-and-disclosure literature by isolating the effect of the CVM59 disclosure mandate on measured ESG performance, consistent with regulation shaping the organizational work of disclosure (O'Dwyer et al. 2011) and informing the debate over whether such mandates change behavior or merely reporting. Third, we contribute to the corporate-governance and family-firm literature by showing that family ownership is associated with higher profitability, with the premium concentrated in private companies, and that financial capacity more generally predicts subsequent ESG performance, consistent with slack enabling the formalization of ESG practices.

2 Theory, related literature, and hypotheses

The relationship between ESG scores and corporate financial performance (CFP) has been widely studied but remains contested (e.g., Dixon-Fowler et al. 2013; Eccles et al. 2014; Pedersen et al. 2021; Avramov et al. 2022; Pástor et al. 2022; Friede et al. 2015). A recent review highlights that companies' ESG profiles are shaped by market environment, leadership, and ownership characteristics and are closely linked to company risk, performance, and value (Gillan et al. 2021). At the same time, competing hypotheses and conflicting empirical findings remain unresolved. Meta-analyses further show that the ESG–performance relationship varies across industry, region, and whether markets are developed or emerging (e.g., Friede et al. 2015). However, existing studies predominantly examine publicly listed companies in North America and Europe, leaving ownership structure (public versus private) largely unexplored. This gap motivates our analysis of how ownership structure shapes ESG performance in Brazil, a large emerging market.

Ownership structure shapes companies' disclosure obligations, monitoring intensity, and the formalization of governance and reporting practices. These differences are particularly relevant for ESG measurement because ESG scores rely on calcu-

lative devices such as questionnaires, ratings, and rankings that favor codified and auditable practices (Kornberger et al. 2017; van Weeren and Bluntz 2025). As a result, differences in ESG scores may reflect not only underlying sustainability activities but also how ESG-related practices are made visible and comparable across ownership forms (Mittelbach-Hörmanseder et al. 2021).

Ownership influences managerial appointments and strategic investment decisions (Trostel and Nichols 1982; Capron and Shen 2007; Asker et al. 2013; Gilje and Taillard 2016; Hiller and Raffin 2020). In public companies, institutional investors and activist shareholders can shape innovation and competitive strategy (David et al. 2001; Hoskisson et al. 2002; Connelly et al. 2009; Gerum et al. 2018). At the same time, governance of public companies has increasingly shifted toward concentrated institutional ownership and common ownership (Gillan and Starks 2000; Goranova and Ryan 2014; Kahan and Rock 2007; Azar et al. 2018; Backus et al. 2021; Dennis et al. 2022). Meanwhile, the number of publicly listed companies has declined, and companies remain private longer (Kahle and Stulz 2017; Doidge et al. 2017).

2.1 ESG and ownership incentives

From a theoretical perspective, Friedman (1970b) argued that managers should prioritize shareholder profits and avoid unprofitable social activities. However, subsequent work shows that companies may improve social outcomes, such as workplace safety, even without immediate financial gains (e.g., Cohn et al. 2021). One line of theory suggests that public companies may be more prone to short-termism due to diffuse ownership and earnings pressure, which can discourage long-term ESG investments (Hart and Zingales 2017). In contrast, private (and especially family-owned) companies may more easily incorporate non-financial objectives when owners directly value employee, community, or environmental welfare (Hart and Zingales 2017).

Another strand of research emphasizes that private equity owners often pursue strict profit maximization due to tightly aligned incentives and exit valuations (Davis et al. 2014). At the same time, lower disclosure requirements for private companies may reduce pressure to adopt costly ESG initiatives. These arguments yield competing predictions: private companies may either underinvest in ESG due to stronger profit incentives and weaker reporting obligations or invest more in ESG to pursue long-term stakeholder-oriented objectives. Any resulting differences are most likely to appear in governance and disclosure components of ESG scores, where ownership structure directly affects oversight, reporting routines, and accountability mechanisms (Cooper and Owen 2007; O'Dwyer et al. 2011).

2.2 ESG–CFP mechanisms: theory and evidence

The relationship between ESG and financial performance can be explained by several conceptual mechanisms reflecting different causal directions (Preston and O'Bannon 1997; Wirl et al. 2013). Beyond economic performance, financial resources may also influence a company's ability to formalize and report ESG practices in ways recognized by external evaluators (Bebbington and Larrinaga 2014; Gray 2010).

1. **Financial slack hypothesis** (ROA $\overset{+}{\rightarrow}$ ESG). Drawing on the resource-based view and the corporate slack literature (Cyert and March 1963; Bourgeois 1981), the financial slack hypothesis posits that more profitable companies accumulate excess resources that can be allocated beyond core operations. Such slack enables investments in activities with longer payback horizons, including ESG initiatives, without threatening short-term viability.

2. **Managerial opportunism hypothesis** (ROA $\overset{-}{\rightarrow}$ ESG). From an agency theory perspective, managers may adjust ESG activities to serve private interests rather than shareholder value (Jensen and Meckling 1976; Preston and O'Bannon 1997; Posner and Schmidt 1992). When profitability is weak, managers may emphasize ESG engagement or disclosure to divert attention from poor financial results, using sustainability initiatives as impression management (Wartick and Cochran 1985; Patten 1991). Conversely, when financial performance is strong, managers may reduce ESG expenditures to increase short-term profitability and personal compensation.
3. **Trade-off hypothesis** (ESG $\overset{-}{\rightarrow}$ ROA). Early work in the economics of CSR argues that social and environmental initiatives may divert resources from profit-maximizing activities (Friedman 1970a; Vance 1975). ESG investments, such as upgrading production processes, sourcing sustainable inputs, or expanding compliance systems, can impose costs that do not immediately translate into financial returns. As a result, ESG engagement may reduce short-term profitability, particularly when efficiency or reputational gains are uncertain or delayed. This view forms the trade-off hypothesis, which suggests that ESG investments impose opportunity costs and may limit resources available for operational efficiency (McWilliams and Siegel 2001).
4. **Good management hypothesis** (ESG $\overset{+}{\rightarrow}$ ROA). The good management perspective argues that companies attentive to stakeholder demands and social legitimacy develop stronger management practices and long-term competitive advantages (Carroll 1979; Wartick and Cochran 1985). By integrating ESG into corporate strategy, companies can strengthen governance, improve risk management, and build stronger relationships with employees, customers, and regulators, which may enhance customer satisfaction and company value (Luo and Bhattacharya 2006). In this view, ESG performance reflects managerial quality and organizational effectiveness rather than a cost center. Proactive ESG engagement can therefore improve competitiveness and efficiency (Porter and van der Linde 1995).

These mechanisms are not mutually exclusive. In practice, companies may simultaneously exhibit profitability-driven ESG engagement and ESG-related financial outcomes. However, the hypotheses within each causal direction cannot hold at the same time: either (1) financial slack or (2) managerial opportunism may explain the profitability-to-ESG relationship, while either (3) trade-off or (4) good management may explain the ESG-to-profitability relationship. The distinction lies in the temporal dimension: (1) and (2) describe how financial performance precedes ESG engagement, whereas (3) and (4) describe how ESG activities affect subsequent financial

outcomes. Thus, one mechanism from each pair may coexist, but not both within the same pair.

We now turn from these theoretical mechanisms to the evidence bearing on them, beginning with the aggregate ESG–CFP relationship before turning to evidence on each specific mechanism. At the aggregate level, empirical evidence on the ESG–CFP relationship remains mixed, though a meta-analysis reports that most studies find a non-negative association, often positive (Friede et al. 2015). The relationship depends on company resources and contextual factors, which helps explain variation across settings (Surroca et al. 2010; Anwer et al. 2023), and institutional and regional factors further shape it in emerging markets (Duque-Grisales and Aguilera-Caracuel 2021). Companies with strong sustainability practices also tend to outperform over longer horizons (Eccles et al. 2014). The financial impact of ESG differs across the three pillars (Dorfleitner et al. 2018), with governance components more closely tied to disclosure and reporting practices than to operational outcomes (Cooper and Owen 2007).

The evidence bearing on the four specific mechanisms above is itself mixed. Consistent with the financial-slack channel, lagged profitability and cash flow predict subsequent ESG engagement (Waddock and Graves 1997; Seifert et al. 2004), with more recent work showing that companies expecting stronger future performance invest more in CSR and achieve broader ESG diversification (Lys et al. 2015; Bouslah et al. 2023). In line with managerial opportunism, companies sometimes decouple symbolic CSR engagement from substantive practice, a pattern associated with weaker financial performance (Prior et al. 2008; He et al. 2023), though such evidence is limited and context-dependent. Consistent with a trade-off, several studies find that ESG activity is associated with lower returns under certain conditions, an effect moderated by financial slack (Brammer et al. 2006; Makni et al. 2009; Duque-Grisales and Aguilera-Caracuel 2021), whereas the good-management view is supported by studies documenting a positive ESG–performance association, though this link depends on the institutional environment (Orlitzky et al. 2003; Kang et al. 2016; Lins et al. 2017; DasGupta and Roy 2023).

2.3 Empirical evidence of ESG by ownership type

Comparative evidence on ownership differences in ESG remains limited, particularly outside high-income countries. Shive and Forster (2020) show that publicly listed companies in the U.S. often exhibit weaker emissions performance than private companies, partly due to market pressures and disclosure incentives. More broadly, evidence on how ownership identity relates to ESG outcomes is mixed and context-dependent (Bergmann 2024). For example, some studies find that family-owned companies place greater emphasis on stakeholder- or community-oriented CSR activities (Berrone et al. 2010; Campopiano and De Massis 2015; Block and Wagner 2015), while cross-country evidence suggests that founding families and individual blockholders often underperform on ESG unless family members hold top management roles (Villalonga et al. 2025). These mixed findings point to substantial heterogeneity in how ownership structures translate into ESG practices. The issue is further complicated when ESG scores rely on disclosure-based indicators, as differences in report-

ing infrastructures may affect measured ESG performance independent of underlying practices (Gray 2010; van Weeren and Bluntz 2025).

Related research shows that ownership identity matters beyond family ownership. For example, Boubakri et al. (2019) document a nonlinear relationship between residual state ownership and CSR intensity in privatized companies, suggesting that political objectives interact with profit incentives. Experimental evidence also indicates that private capital providers price ESG information: Crifo et al. (2015) find that unfavorable ESG disclosures reduce valuations among private equity professionals. Overall, prior findings provide no uniform prediction for how ownership structure relates to aggregate ESG performance, particularly when ESG measures combine underlying practices with reporting and disclosure components.

These ambiguities are particularly relevant in emerging economies such as Brazil, where family and private ownership dominate and ESG reporting infrastructures have historically been less standardized. Accordingly, whether ownership form systematically translates into higher measured ESG performance across environmental, social, and governance pillars remains an open empirical question in this context.

2.4 ESG and CFP performance in Brazil

Empirical evidence on the ESG–financial performance relationship in Brazil remains limited. Possebon et al. (2024) show that higher ESG scores among companies listed on the B3 stock exchange are associated with lower cost of capital and higher ROA, particularly driven by environmental performance. Related research links ESG practices to governance improvements through better audit quality (Del Giudice and Rigamonti 2020), while other studies indicate that stronger market competition may reduce ESG engagement in Brazil (Martins 2022). Moreover, the OECD reports persistent transparency and governance weaknesses among Brazilian listed companies, including limited board independence, weak ESG-linked incentives, and insufficient stakeholder transparency (OECD 2022). More recent Brazilian evidence remains mixed and depends on the direction of analysis. Leite et al. (2026) reverse the usual specification and ask whether financial performance predicts ESG practices among 240 B3-listed companies between 2018 and 2022, finding no significant effect of ROA or ROE, while size is positively and liquidity negatively associated with ESG scores. Santos et al. (2026), comparing 2546 companies across developed and emerging markets, report a stronger association between ESG scores and performance in emerging markets, including Brazil. Two features of this literature motivate our design: it is confined to listed companies, and it relies on commercial ratings that private companies do not enter.

2.5 Regulatory shocks and ESG disclosure

A growing literature examines the effects of mandatory ESG disclosure regulations. Disclosure mandates can reshape reporting routines and the production of ESG information, influencing both underlying practices and what becomes visible and comparable to external audiences (Caglio et al. 2020; Contrafatto 2014; O'Dwyer et al. 2011; Bischof et al. 2022). Empirical evidence highlights several channels. Some

studies find that disclosure requirements lead to improvements in corporate sustainability practices (Ioannou and Serafeim 2011), while others emphasize gains in transparency and reporting quality with more limited real-economy effects (Christensen et al. 2021; Gerwing et al. 2022). Additional research documents capital-market consequences: Grewal et al. (2019) show heterogeneous stock market reactions to the EU Non-Financial Reporting Directive, and Krueger et al. (2024) find improved liquidity and information environments when disclosure mandates are strongly enforced. Overall, the literature suggests that mandatory disclosure enhances transparency and investor confidence by increasing the informational content and credibility of sustainability reporting (Caglio et al. 2020; Driss et al. 2024). However, its effects on corporate behavior depend on institutional context. To date, no study has used a mandatory disclosure reform in Brazil to estimate its causal effect on company-level ESG performance.

2.6 Hypotheses development

Drawing on these theoretical perspectives and empirical gaps, we formulate four hypotheses on ownership differences in ESG behavior and organizational performance. Ownership structure may influence ESG engagement through competing mechanisms. Public companies face stricter disclosure requirements, financial oversight, and capital market pressures, which may encourage stronger ESG governance and transparency. By contrast, private companies, particularly those with concentrated, long-term ownership, may be better positioned to pursue stakeholder-oriented strategies and invest in ESG without short-term performance pressures (Hart and Zingales 2017; Berrone et al. 2010). Existing evidence remains mixed and largely focuses on developed markets (Duque-Grisales and Aguilera-Caracuel 2021), while the Brazilian context introduces additional institutional and regulatory uncertainties.

H1 *ESG performance differs systematically between public and private companies, with differences expected to be most pronounced in governance-related components linked to disclosure and accountability.*

Second, the relationship between ESG performance and profitability can arise through several competing mechanisms. The financial slack hypothesis suggests that companies with stronger financial performance possess excess resources that can be allocated to ESG initiatives without threatening core operations (Waddock and Graves 1997; Seifert et al. 2004; Lys et al. 2015). In Brazil's emerging market context, characterized by heterogeneous capital access, fragmented ESG regulation, and largely voluntary sustainability practices, profitability may therefore enable ESG engagement. At the same time, the weak disclosure environment prior to CVM59 created scope for managerial opportunism, whereby managers facing performance pressure may emphasize ESG engagement to protect legitimacy (Preston and O'Bannon 1997; Prior et al. 2008; He et al. 2023). By contrast, the trade-off and good management perspectives offer opposing predictions: ESG investments may divert resources from profit-maximizing activities (McWilliams and Siegel 2001; Brammer et al. 2006; Makni et al. 2009), or reflect stronger governance and stakeholder rela-

tions (Porter and van der Linde 1995; Orlitzky et al. 2003; Lins et al. 2017). Because these latter mechanisms require more mature ESG integration and institutionalized accountability, they are likely weaker in our setting. Overall, we expect prior profitability to increase ESG performance by enabling ESG-related investments and their formalization.

H2 *Higher prior profitability is positively associated with stronger ESG performance.*

Third, ownership concentration and family control shape managerial incentives and organizational efficiency. Concentrated family ownership aligns decision rights and residual claims, reducing agency conflicts and strengthening monitoring of managerial actions (Anderson and Reeb 2003; Bertrand and Schoar 2006). These advantages are particularly pronounced in privately held companies, where family owners face fewer disclosure requirements and less short-term capital market pressure. In such settings, families can pursue long-term value strategies emphasizing operational efficiency, conservative investment, and stable stakeholder relationships. When family ownership persists in publicly listed companies, however, these benefits may be weakened by conflicts with minority shareholders and stricter disclosure and regulatory requirements. In emerging markets such as Brazil, where pyramidal ownership structures and control-enhancing mechanisms are common, these tensions can generate entrenchment risks that limit the performance benefits of family control (La Porta et al. 1999; Leal and Carvalhal-da-Silva 2005). Accordingly, profitability advantages associated with family ownership are expected to be strongest in private companies.

H3 *Family ownership is positively associated with profitability, with the effect being stronger in private companies than in publicly listed companies.*

Fourth, ESG disclosure regulations aim to enhance transparency, reduce information asymmetries, and strengthen accountability by requiring companies to report sustainability-related information (Bischof et al. 2022; Gerwing et al. 2022). Such mandates limit selective reporting and increase external scrutiny, which may encourage improvements in both disclosure and underlying ESG practices. Prior research finds that mandatory disclosure regimes can produce diverse effects, including improvements in corporate sustainability practices, transparency, and capital-market outcomes, particularly where prior standards were weak or voluntary (Ioannou and Serafeim 2011; Krueger et al. 2024; Christensen et al. 2021). In Brazil, the introduction of ESG disclosure requirements for publicly listed companies represents a major institutional change likely to amplify differences in measured ESG performance between public and private companies.

H4 *ESG disclosure regulation leads to a significant increase in reported ESG scores.*

The hypotheses map onto the two research questions introduced above. Hypotheses H1, H2, and H4 concern the first question, the determinants of ESG performance, covering ownership differences, the role of prior profitability, and the effect of disclosure regulation. Hypothesis H3 concerns the second question, the ownership-related

determinants of financial performance, and isolates the profitability implications of family ownership.

3 Sample, data, and construction of ESG scores

3.1 Sample and data set

The empirical analysis uses company-level data from the Época Negócios "360 Best Companies" ranking, a long-running business-journal initiative surveying large companies operating in Brazil. The ranking has become an important corporate reference point, with participation increasing from about 200 companies in the early 2010s to more than 400 in recent waves. Results are disseminated through a high-visibility publication and an annual awards event attended by senior executives. This institutional prominence creates reputational stakes around participation and performance, reinforcing the ranking's role as an evaluative infrastructure rather than a purely academic survey.

The ranking targets companies based on revenue thresholds and industry prominence, covering both publicly listed companies on the B3 (formerly Bovespa) Stock Exchange and large privately held companies across multiple industries. The initial contact database comprised about 3000 companies. From this pool, a revenue cutoff of BRL 250 million (approximately USD 45–50 million) was applied to identify economically significant companies.

Data are collected annually through a structured online questionnaire administered by the ranking organization.[1] Participating companies receive formal email invitations followed by at least two reminders to encourage participation and clarify survey items. Between 2017 and 2023, 715 unique companies submitted valid responses, each completing at least three survey modules with a minimum of 70% valid information. This process produced 2582 company-year observations.

The ranking is administered annually: the questionnaire for wave t is collected during year t and refers to fiscal year $t-1$. Accordingly, both the ESG score and the financial variables for a given firm-year refer to fiscal year $t-1$. The lag structure used in the analysis follows directly from this timing.

Annual response rates averaged about 15–16% of contacted companies, raising the possibility of self-selection, while completion rates among respondents exceeded 90% across survey waves and remained stable over time. Although modest, such response rates are common in surveys targeting senior executives and sensitive organizational information, particularly among private companies. Participation is resource-intensive: companies complete up to seven modules covering functions such as finance, governance, HR, and sustainability and report several hundred indicators beyond audited financial data. Participation also entails reputational exposure because results are publicly released and companies may rank poorly within their

[1] We therefore interpret the results as differences in measured ESG performance within this evaluative infrastructure, while emphasizing patterns less consistent with purely symbolic reporting, such as within-company changes over time.

sector, creating a credible downside risk that discourages low-effort or purely symbolic participation.

Importantly, non-response in this setting is unlikely to indicate an absence of ESG activity. Instead, it likely reflects differences in reporting capacity and willingness to undergo external evaluation. The panel structure mitigates this concern: a substantial part of the sample is observed repeatedly, with 85 companies participating in all seven waves and 427 in at least three, so reported figures can be assessed against the same company's earlier submissions rather than resting on a single cross-section. Repeated participation and stable completion rates thus provide a consistent pattern over time, increasing confidence in within-company changes. Although participation is not random, the resulting sample covers a central segment of the population of large firms operating in Brazil: roughly three-quarters of sample firms report annual sales above BRL 1 billion, average sales are BRL 9.4 billion (2022), and eight of the ten largest firms by sales are included. Selection therefore operates within the segment of large, economically significant firms rather than across the full size distribution. Participation also does not determine whether audited financial statements exist, since the audit requirement described below applies by law to companies of this size regardless of listing status.

The financial variables rest on audited financial statements. Under Article 3 of Law 11,638/2007, which amends Laws 6,404/1976 and 6,385/1976, companies that qualify as "sociedades de grande porte" (those with total assets above BRL 240 million or gross annual revenue above BRL 300 million) must prepare their accounts according to the rules applicable to listed corporations and have them audited by an independent auditor registered with the CVM, regardless of their listing status or legal form. Because the ranking applies a revenue cutoff of BRL 250 million and roughly three-quarters of sample companies report annual sales above BRL 1 billion, the requirement binds for virtually all private companies in our sample. Audited statements therefore underlie the financial information for private and public companies alike, distinct from the questionnaire-based ESG information.

Financial and ESG-related information are reported through the questionnaire and subject to several validation mechanisms. First, the questionnaire includes overlapping items across modules (e.g., governance and sustainability), enabling internal consistency checks that penalize inconsistent responses. Second, reported financial figures are compiled and cross-checked against the underlying audited statements by Boavista, a specialized data provider that assembles company accounts for the ranking. This is not a further audit, but reported values are verified for consistency across independent information sources. Third, automated checks compare each company's figures against its own values in preceding years and flag large deviations, verify listing status, and confirm that the corresponding reports are publicly available. Fourth, selected indicators require supporting documentation (e.g., sustainability reports). Finally, companies ranking at the top are fact-checked against public sources such as annual and sustainability reports and undergo editorial review that considers adverse media coverage. In some cases, companies have reportedly been downgraded or excluded following these reviews.

The resulting panel is unbalanced, reflecting variation in participation over time: nearly half of the companies (330) appear only once, while 85 companies provided

complete responses in all seven years.[2] Despite this variation, the sample includes many companies that shape Brazil's economy and operate in ESG-relevant sectors. For example, eight of the ten largest companies by sales participate in the ranking data. The panel covers major industries such as agriculture and food processing, petrochemicals and chemicals, mining and metals, and energy. This diversity places the analysis in sectors where ESG practices are particularly salient and closely scrutinized.

Overall, the dataset captures a broad cross-section of large Brazilian companies across ownership structures, sizes, and industries. It provides a rare opportunity to examine differences in ESG performance and financial outcomes between public and private companies in an emerging-market setting over multiple years.

3.2 Construction of ESG scores

We construct harmonized ESG pillar scores (E, S, and G) and a composite ESG score using company responses to the structured questionnaire. This process translates diverse organizational practices into standardized numerical measures, enabling comparability across companies with different ownership structures, disclosure obligations, and reporting capacities (Kornberger et al. 2017). Responses are coded into ESG variables aligned with the LSEG methodology, such that higher values indicate better performance.[3]

Each ESG pillar consists of several underlying *categories* that group related questionnaire indicators. For example, the environmental pillar includes the categories emissions, innovation, and resource use. Tables 7 and 8 in the appendix report definitions, measurement details, and descriptive statistics for the ESG variables.

To ensure consistency across ESG pillars and comparability with the composite ESG score, we restrict the sample to company-year observations with non-missing values for all three pillar measures. Because the aggregate ESG score is constructed from the environmental, social, and governance pillars, observations with incomplete pillar information cannot be meaningfully compared and would introduce measurement noise. Moreover, partial non-response is unlikely to be random and may reflect differences in reporting scope rather than underlying ESG activity (Gray 2010). We therefore exclude 214 company-year observations with incomplete pillar data.

To construct ESG scores, we use two complementary approaches:

(i) *Equal-weighting approach.* Each category is normalized to the unit interval $[0, 1]$ by year and averaged with equal weights to obtain pillar scores. The three pillars are then equally weighted to construct the composite ESG score. This approach requires no regression and serves as a transparent benchmark.
(ii) *Weight-calibration approach.* For a subsample of 60 publicly listed companies (226 company-year observations) with available LSEG data, we regress LSEG

[2] Participation distribution: 330 (1 year), 163 (2 years), 170 (3 years), 76 (4 years), 58 (5 years), 38 (6 years), and 85 (7 years).

[3] LSEG's methodology can be accessed here (as of October 2024): https://www.lseg.com/content/dam/data-analytics/en_us/documents/methodology/lseg-esg-scores-methodology.pdf

scores (E, S, G, and aggregate ESG) on the corresponding normalized categories. The estimated coefficients capture the relative importance of each category in LSEG's methodology.[4] Following LSEG's benchmarking practice, we include industry fixed effects to capture within-industry variation rather than structural cross-industry differences. The fitted values are then normalized to the unit interval. The general regression specification is as follows.

For observation i, let Score_i denote the observed LSEG (E, S, G, or ESG) benchmark (where available), and let Cat_{ij} denote the j-th normalized category belonging to that pillar. The weight-calibration regression is specified as:

$$\text{Score}_i = \beta_0 + \sum_{j=1}^{J} \beta_j \, \text{Cat}_{ij} + \sum_{k=1}^{K} \gamma_k D_{i,k} + \varepsilon_i, \tag{1}$$

where $D_{i,k}$ are industry dummies. The fitted values are obtained as

$$\widehat{\text{Score}}_i = \hat{\beta}_0 + \sum_{j=1}^{J} \hat{\beta}_j \, \text{Cat}_{ij} + \sum_{k=1}^{K} \hat{\gamma}_k D_{i,k}. \tag{2}$$

All regression-based fitted values are rescaled to the unit interval by year:

$$\text{Score}_i^* = \frac{\widehat{\text{Score}}_i - \min_j \widehat{\text{Score}}_j}{\max_j \widehat{\text{Score}}_j - \min_j \widehat{\text{Score}}_j}, \quad \text{Score}_i^* \in [0,1], \tag{3}$$

with Score_i^* denoting the calibrated and normalized ESG score for observation i.

For each pillar (E, S, and G) and for the composite ESG score, we estimate both approaches and retain the specification with the higher correlation to the LSEG benchmark. The environmental pillar captures how companies manage ecological impacts and environmental innovation. It combines three questionnaire-based categories: *emissions* (climate-related emissions management and decarbonization commitments), *innovation* (environmental investments and cost reductions), and *resource use* (monitoring practices across the supply chain). Under the weight-calibration framework, the normalized environmental score E_i^* achieves a correlation of 0.313 with the LSEG environmental benchmark, exceeding the equal-weighting approach. We therefore adopt the calibrated score as the final environmental measure.

The social pillar captures how companies manage stakeholder relationships and labor practices. It consists of four categories: *community* engagement, *human rights* (proxied by the absence of labor lawsuits), *product responsibility* (share of sustainable products), and *workforce* practices such as training, evaluation systems, and

[4] The calibration reflects how ESG categories are weighted within a dominant market-based evaluative infrastructure and does not imply that these weights represent an objective or universal measure of sustainability.

employee participation. For this pillar, the calibrated score performs poorly relative to the LSEG benchmark (correlation 0.072), whereas the equal-weighted score reaches 0.160. This likely reflects measurement differences: our human rights proxy relies on negative indicators (lawsuits), whereas LSEG emphasizes policies and controversy screening. In addition, product responsibility is measured by a single variable with only 196 non-missing observations, limiting coverage. Consequently, the social score effectively places greater weight on the community and workforce categories, which have broader data availability. We therefore adopt the equal-weighted specification as the final S_i^*.[5]

The governance pillar captures the institutional framework supporting ESG engagement. Because governance indicators are closely linked to disclosure practices, oversight structures, and accountability mechanisms, they are particularly relevant for understanding differences between public and private companies operating under distinct reporting regimes. The pillar aggregates two categories: *CSR strategy* (e.g., reporting standards and stakeholder inclusion) and *management practices* (e.g., compliance systems and board structures). After calibration, the normalized governance score G_i^* achieves a correlation of 0.139 with the LSEG governance benchmark, exceeding the equal-weighting approach. We therefore adopt the calibrated score as the final governance measure.

The composite ESG score is initially constructed as the equally weighted average of the three normalized pillar scores. Calibrating this measure to the LSEG ESG benchmark yields a correlation of 0.693, indicating strong alignment. We therefore adopt the calibrated score as the final composite ESG measure.

As a robustness check, we construct an alternative composite ESG score by aggregating the three equal-weighted pillar scores before calibration. Calibrating and normalizing this measure against the LSEG ESG benchmark yields a correlation of 0.681, only slightly below the calibrated pillar–composite approach. The correlation between this alternative measure and our main calibrated ESG score is 0.778. These close correlations indicate that the results are not sensitive to the calibration order. We therefore retain our preferred specification, which selects pillar scores based on the highest correlation with LSEG and calibrates the composite ESG score accordingly, consistent with the LSEG methodology and its industry benchmarking.

3.3 Data cleaning and matching to company characteristics

We apply several data-cleaning steps to ensure the validity and comparability of the ESG measures. Due to structural differences in business models, financial reporting, and ESG disclosure requirements, we exclude companies from the financial industry, including banks, insurance companies, and other financial service providers (248 observations), as well as nonprofit organizations (152 observations). This approach follows prior ESG literature, as ESG performance of financial institutions is assessed differently, complicating comparisons with non-financial companies (e.g., Scholtens

[5] ESG ratings from different providers often diverge due to differences in indicator selection, weighting, and methodology (Berg et al. 2022).

2009). The exclusion helps ensure that observed ESG differences are not mechanically driven by sector-specific reporting requirements.

Next, we match the ESG scores with company-level variables used in the empirical analysis. Following standard practice in the ESG–CFP literature (e.g., Flammer 2015; Benlemlih and Bitar 2017), we include control variables in four groups: company size and financial structure (log total assets, leverage, liquidity), operational complexity (capital intensity, R&D intensity, foreign sales share), profitability (OROA), and ownership structure (e.g., family ownership, public listing status).[6] This matching step removes 483 additional observations. The final sample consists of 317 private companies (938 company-year observations) and 156 public companies (547 company-year observations). To limit the influence of outliers, all continuous financial variables are winsorized at the 1st and 99th percentiles.

3.4 Empirical strategy: profitability measure and lag structure

We operationalize corporate financial performance through accounting-based measures, using operating return on assets (OROA, operating profit over total assets) as the primary measure. Two considerations motivate this choice. First, our theoretical channel runs through operating performance: the financial-slack and good-management mechanisms both arise from resources generated by a firm's core operations, which OROA captures while remaining unaffected by capital structure and taxation. Second, market-based measures such as Tobin's Q or the cost of capital require observable prices for traded equity, which are unavailable for the private companies that make up the larger part of our sample. Adopting such a measure would confine the analysis to listed firms and eliminate the public–private comparison that is central to this study. We acknowledge that accounting measures are backward-looking; in our design this is intentional, as the determinant models use lagged profitability to capture accumulated slack that is subsequently deployed toward ESG activities, a channel for which forward-looking market expectations would be conceptually inappropriate.

Throughout the analysis, profitability and ESG performance enter the determinant models in lagged form. Lagging the explanatory variable relative to the outcome mitigates simultaneity and reverse causality between profitability and ESG performance, and it reflects the theorized mechanism, under which financial slack accumulates in one period and is deployed toward ESG activities in subsequent periods; a contemporaneous specification would not capture this channel. All lags are gap-respecting: a prior observation is used only when it is temporally adjacent to the current one, so that gaps in a company's panel do not generate spurious matches.

[6] Definitions of all variables used in the empirical analysis are reported in Table 9 in the appendix.

4 Empirical results

4.1 Descriptive statistics

Table 1 reports descriptive statistics for the full sample (Panel A) and by ownership type (Panel B). Panel A summarizes ESG scores, financial variables, and ownership characteristics across 1485 company-year observations, while Panel B compares public and private companies using t-tests for mean differences. Although the average composite ESG score does not differ significantly across ownership types, private companies show lower environmental and social scores but significantly higher governance scores, with governance exhibiting the largest gap (0.14). Environmental and governance scores also display greater variability than social scores. The share of family-owned companies is similar across groups, with private companies slightly more likely to be family-owned. Despite smaller asset bases, private companies report significantly higher OROA (2.72 difference) and are more concentrated in B2B sectors, whereas public companies exhibit higher leverage, liquidity, and R&D intensity.

Figure 1 complements the descriptive statistics by illustrating the evolution of ESG scores for public and private companies over time. The overall ESG score shows a modest improvement for public companies beginning in 2018, while private companies display greater volatility, increasing from 2017 to 2021 before declining between 2022 and 2023. Environmental scores decrease for both ownership types, particularly after 2021, whereas social scores rise throughout the sample period. Governance trends diverge: private companies experience a gradual decline, while public companies show a marked increase, especially since 2020.

4.2 ESG performance across ownership types and financial performance

To examine how ESG performance varies across ownership structures, we estimate OLS regressions of ESG scores on a *public*-company indicator and a set of control variables. These include financial structure (*leverage*, *liquidity*), company *size*, operational complexity (*capital intensity*, *R&D intensity*, *foreign operations*), and year fixed effects to capture temporal heterogeneity. During the sample period, 24 company-year observations reflect companies going public (*go public*) and 12 reflect companies going private (*go private*). Pearson correlations for all variables are reported in Table 10 in the appendix.

The results in Table 2 show that public companies exhibit significantly lower ESG scores than private companies, even after controlling for company characteristics. The *public*-company coefficient is negative and highly significant across Models 1–3, supporting hypothesis H1. Decomposing ESG into its pillars (Models 4–6) reveals that this gap is driven primarily by governance. In Model 6, the coefficient on the *public*-company indicator is −0.23, indicating that public companies score on average 0.23 lower on governance than comparable private companies (23 percentage points on the 0–1 scale). By contrast, environmental and social scores do not differ significantly across ownership types.

Turning to financial performance, Models 1 and 2 include contemporaneous and lagged operating return on assets (*OROA*, operating profit over total assets). In

Table 1 Descriptive statistics for company-level variables and ownership differences

Variable	Obs.	Mean	Std.	Min	Median	Max
Panel A. Descriptive statistics for company-level variables						
ESG score	1485	0.49	0.21	0.00	0.51	1.00
E score	1485	0.63	0.32	0.00	0.60	1.00
S score	1485	0.67	0.18	0.00	0.70	1.00
G score	1485	0.58	0.33	0.00	0.62	1.00
LSEG ESG score	191	0.56	0.20	0.03	0.58	0.89
LSEG E score	191	0.56	0.24	0.00	0.61	0.96
LSEG S score	191	0.59	0.23	0.01	0.61	0.95
LSEG G score	191	0.54	0.22	0.01	0.58	0.96
Public	1485	0.37	0.48	0.00	0.00	1.00
Family	672	0.46	0.50	0.00	0.00	1.00
OROA	1485	9.92	8.78	−10.51	8.39	43.55
Size	1485	8.06	1.62	4.81	7.94	11.80
Leverage	1485	0.29	0.19	0.00	0.28	0.80
Liquidity	1485	0.43	0.49	−1.01	0.41	1.73
Capital intensity	1485	0.03	0.03	0.00	0.02	0.13
B2B	1485	0.51	0.50	0.00	1.00	1.00
R&D operations	1485	0.83	0.38	0.00	1.00	1.00
Foreign operations	1485	0.37	0.48	0.00	0.00	1.00
Go private	1485	0.07	0.08	0.00	0.00	1.00
Go public	1485	0.01	0.12	0.00	0.00	1.00

	Public			Private			
Variable	Obs.	Mean	Std.	Obs.	Mean	Std.	Diff.
Panel B. Descriptive statistics by ownership type							
ESG score	547	0.482	0.186	938	0.509	0.217	0.015
E score	547	0.666	0.310	938	0.602	0.325	−0.065***
S score	547	0.693	0.161	938	0.663	0.184	−0.030***
G score	547	0.496	0.338	938	0.636	0.307	0.139***
Family	262	0.405	0.492	410	0.490	0.501	0.086***
OROA	547	8.206	6.864	938	10.922	9.585	2.716***
Total assets	547	9.160	1.390	938	7.414	1.384	−1.746***
Leverage	547	0.339	0.191	938	0.260	0.182	−0.079***
Liquidity	547	0.491	0.495	938	0.401	0.486	−0.090***
Capital intensity	547	0.031	0.023	938	0.031	0.026	−0.000
B2B	547	0.417	0.493	938	0.560	0.497	0.143***
R&D operations	547	0.887	0.317	938	0.794	0.404	−0.092***
Foreign operations	547	0.375	0.485	938	0.369	0.483	−0.006

Panel A reports summary statistics on company-level variables for the full sample of 1485 company-year observations. Panel B reports descriptive statistics with t-tests across 156 public and 317 private companies. OROA is operating return on assets (operating profit over total assets, in percent). "Diff." is the mean difference between public and private companies. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

both specifications, *OROA* is positively associated with ESG scores, consistent with the financial slack hypothesis that more profitable companies can allocate greater resources to ESG activities (Waddock and Graves 1997; Seifert et al. 2004; Lys et al. 2015). A one percentage point increase in *OROA* corresponds to a 0.24 percentage

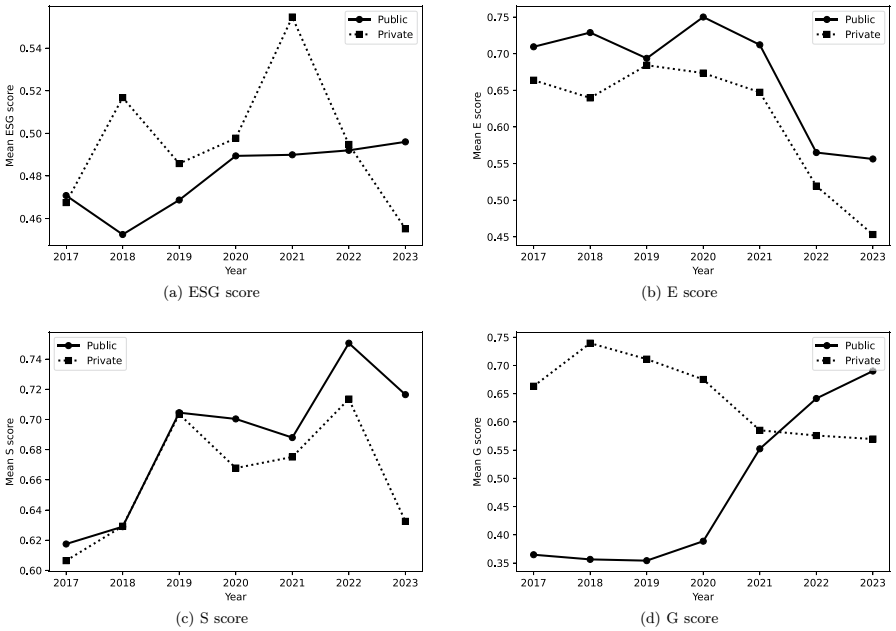


Fig. 1 Evolution of ESG and pillar scores by ownership. Each panel plots year-by-year averages for public companies (solid line) vs. private companies (dashed line)

point increase in the *ESG score*. This relationship does not appear at the pillar level, where coefficients are small and statistically insignificant.

Model 3 examines ownership transitions.[7] Companies transitioning from public to private status (*lagged go private*) experience a statistically significant increase in the *ESG score* of 0.13. This pattern is consistent with the broader finding that private ownership is associated with stronger ESG performance. By contrast, transitions from private to public (*lagged go public*) are not significantly related to ESG.

Company *size* shows a strong positive association with ESG scores, consistent with the size effect documented in prior studies (Dobrick et al. 2023; Drempetic et al. 2020). Companies operating in business-to-business (*B2B*) sectors also tend to score higher on ESG, mainly driven by stronger environmental performance (Model 4). *Capital intensity* is positively related to all three ESG pillars (E, S, and G), although this does not translate into a significant effect on the aggregate ESG score. Finally, *R&D operations* are positively associated with ESG performance both at the aggregate level (Model 1) and across all three pillars.

Overall, the results support hypothesis H1: public–private differences in ESG performance are concentrated in the governance pillar, while environmental and social pillars show no robust conditional differences. For hypothesis H2, we find weak evidence that higher prior profitability is positively associated with ESG scores.

[7] Because the number of observed transitions is small (12 go-private and 24 go-public company-years), these estimates should be interpreted as suggestive rather than causal.

Table 2 Determinants of ESG scores

	ESG			E	S	G
	(1)	(2)	(3)	(4)	(5)	(6)
Ownership variables						
Public	−0.057**	−0.066**		−0.035	−0.014	−0.227***
	(0.023)	(0.028)		(0.029)	(0.014)	(0.027)
Performance variables						
OROA	0.0024**		0.0026*	0.0011	0.0012*	−0.0006
	(0.0010)		(0.0013)	(0.0013)	(0.0007)	(0.0011)
Lagged OROA		0.0027**				
		(0.0011)				
Transition variables						
Lagged go public			0.032			
			(0.055)			
Lagged go private			0.137***			
			(0.028)			
Company controls						
Size	0.030***	0.034***	0.024***	0.056***	0.024***	0.039***
	(0.007)	(0.009)	(0.008)	(0.008)	(0.005)	(0.008)
Leverage	0.049	0.043	0.042	0.047	−0.008	0.095
	(0.050)	(0.055)	(0.057)	(0.067)	(0.034)	(0.062)
Liquidity	−0.017	0.005	−0.010	−0.031	−0.014	−0.008
	(0.020)	(0.023)	(0.024)	(0.023)	(0.012)	(0.023)
Capital intensity	0.369	0.474	0.444	0.710*	0.454**	1.246***
	(0.347)	(0.383)	(0.394)	(0.430)	(0.221)	(0.403)
B2B	0.064***	0.065***	0.060***	0.053**	0.008	−0.018
	(0.019)	(0.021)	(0.022)	(0.024)	(0.014)	(0.022)
R&D operations	0.038*	0.028	0.029	0.086***	0.063***	0.094***
	(0.023)	(0.031)	(0.032)	(0.033)	(0.017)	(0.026)
Foreign operations	−0.012	−0.019	−0.014	0.013	0.033**	0.017
	(0.019)	(0.022)	(0.022)	(0.022)	(0.015)	(0.024)
Constant	0.170***	0.171**	0.181***	0.128*	0.359***	0.214***
	(0.059)	(0.072)	(0.063)	(0.072)	(0.045)	(0.072)
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	1485	985	1038	1485	1485	1485
Adjusted R^2	0.078	0.076	0.053	0.156	0.123	0.103

This table reports regression coefficients where the dependent variable is the ESG score (Models 1–3) or the pillar scores (Models 4–6). OROA is operating return on assets (operating profit over total assets, in percent). Company-level clustered standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

4.3 Heterogeneity in ESG relationships across company characteristics

Table 3 reports OLS regressions of ESG scores on public ownership and *lagged OROA* across ten subsamples defined by size, leverage, liquidity, capital intensity, industry, and year fixed effects. Public ownership is negatively associated with ESG performance in several subsamples. The coefficient is negative and significant among large companies (–0.07), companies with low leverage (–0.11), high liquid-

Table 3 Determinants of ESG scores: Subsample analysis

	Size		Leverage		Liquidity		Capital intensity		Industry	
	Large	Small	High	Low	High	Low	High	Low	Brown	Green
Ownership variables										
Public	−0.067*	−0.073*	−0.035	−0.115***	−0.092***	−0.047	−0.064	−0.085**	−0.079	−0.040
	(0.037)	(0.042)	(0.040)	(0.039)	(0.035)	(0.038)	(0.042)	(0.035)	(0.050)	(0.034)
Performance variables										
Lagged OROA	0.0037**	0.0014	0.0017	0.0027*	0.0016	0.0031**	−0.0014	0.0047***	0.0039**	0.0007
	(0.0017)	(0.0016)	(0.0018)	(0.0015)	(0.0016)	(0.0015)	(0.0017)	(0.0013)	(0.0018)	(0.0015)
Company controls										
Size	0.060***	−0.007	0.018	0.048***	0.036***	0.024**	0.035***	0.025**	0.054***	0.017
	(0.015)	(0.025)	(0.013)	(0.011)	(0.012)	(0.011)	(0.012)	(0.012)	(0.013)	(0.012)
Leverage	−0.040	0.103	0.128	−0.051	0.052	0.017	0.008	0.037	0.028	0.009
	(0.065)	(0.094)	(0.092)	(0.167)	(0.078)	(0.072)	(0.073)	(0.074)	(0.103)	(0.071)
Liquidity	0.016	0.043	−0.019	0.025	0.016	0.024	0.053	−0.022	0.005	0.020
	(0.027)	(0.041)	(0.035)	(0.030)	(0.049)	(0.039)	(0.035)	(0.028)	(0.036)	(0.033)
Capital intensity	1.714***	−0.245	0.344	0.965*	0.741	0.550	0.010	2.918	1.873***	−0.035
	(0.490)	(0.546)	(0.534)	(0.551)	(0.630)	(0.479)	(0.515)	(1.961)	(0.542)	(0.546)
B2B	0.050*	0.071**	0.051*	0.074**	0.089***	0.021	0.009	0.096***	0.011	0.100***
	(0.028)	(0.033)	(0.028)	(0.033)	(0.028)	(0.032)	(0.029)	(0.030)	(0.035)	(0.028)
R&D operations	0.043	0.042	0.080	0.001	0.065	0.018	−0.038	0.083**	0.008	0.043
	(0.040)	(0.044)	(0.051)	(0.037)	(0.045)	(0.036)	(0.039)	(0.041)	(0.042)	(0.046)
Foreign operations	0.004	−0.082**	−0.007	−0.039	−0.039	−0.001	−0.009	−0.049	−0.023	−0.024
	(0.027)	(0.038)	(0.030)	(0.030)	(0.031)	(0.030)	(0.029)	(0.031)	(0.033)	(0.030)
Constant	−0.129	0.391***	0.185*	0.060	0.085	0.214***	0.245***	0.115	−0.039	0.268***
	(0.121)	(0.143)	(0.096)	(0.085)	(0.091)	(0.081)	(0.088)	(0.085)	(0.095)	(0.090)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 3 (continued)

	Size		Leverage		Liquidity		Capital intensity		Industry	
	Large	Small	High	Low	High	Low	High	Low	Brown	Green
N	513	402	482	433	465	450	471	444	366	549
AdjustedR^2	0.198	0.049	0.055	0.103	0.104	0.036	0.040	0.166	0.186	0.060

Each column reports a subsample regression of ESG score on public dummy, lagged OROA, and controls. OROA is operating return on assets (operating profit over total assets, in percent). Splits are defined at median values. "Green" industries comprise agribusiness; food and beverage; wholesale and retail trade; information technology and telecommunications; software and services; professional services; education; healthcare; water and sanitation; pharmaceuticals and cosmetics; hygiene and beauty; electronics; and paper and pulp. "Brown" industries comprise civil construction; infrastructure; construction materials and decoration; mechanical engineering and metallurgy; mining and steelmaking; chemicals and petrochemicals; energy (oil & gas); transportation; textiles, leather and apparel; and vehicles and auto parts. Company-level clustered standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

ity (–0.09), and low capital intensity (–0.08). These results suggest that publicly listed companies score lower on ESG than comparable private companies in specific company environments, particularly among larger companies and those with greater financial flexibility. This pattern is consistent with the view that ESG scores reflect not only underlying practices but also differences in reporting and accountability infrastructures across company types (Kornberger et al. 2017; van Weeren and Bluntz 2025). However, the regressions do not allow direct identification of the underlying mechanisms.

Lagged OROA is positively associated with ESG performance only in specific contexts. Significant effects appear among large companies (0.0037), companies with low leverage (0.0027), low liquidity (0.0030), low capital intensity (0.0046), and those operating in brown industries (0.0038). This pattern supports a conditional financial-slack interpretation, whereby prior profitability is linked to higher ESG scores where internal resources are more easily deployed or environmental externalities are more salient.

Taken together, the subsample analyses show that both ownership status and prior profitability relate to ESG performance in a context-dependent manner. Public listing is associated with lower ESG scores in several subsamples, while profitability translates into higher ESG performance only under specific conditions. These results indicate that neither market discipline nor financial slack alone fully explains cross-company differences in ESG performance.

4.4 Financial performance across ownership structure and ESG performance

Next, we examine how ESG performance and ownership structure relate to companies' financial outcomes. We estimate *OROA* as the dependent variable and include industry and year fixed effects to control for sector-specific and time-varying influences. Table 4 reports the results.

Model 1 includes the *lagged ESG score* as the main explanatory variable, but the coefficient is statistically insignificant. This indicates that past ESG performance does not systematically predict current profitability once company characteristics and fixed effects are controlled for.

Model 2 introduces *family* ownership as a key explanatory variable. The results show that *family*-controlled companies report significantly higher *OROA*, with an estimated effect of 3.65 percentage points. This relationship remains robust and strengthens in Model 3, which includes an interaction between public status and family ownership. The interaction coefficient is negative and significant, indicating that the *OROA* premium for *family* ownership is concentrated in private companies. In other words, *family*-owned public companies do not experience the same financial advantage as their private counterparts. This finding supports hypothesis H3 and is consistent with prior research showing that the performance implications of family control depend on the surrounding ownership and governance environment (Anderson and Reeb 2003; Bertrand and Schoar 2006; La Porta et al. 1999; Bergmann 2024).

Regarding control variables, the results align with expectations. Larger companies report lower *OROA*, while greater *liquidity* is positively associated with profitability. *Leverage* is negatively related to *OROA*. Other characteristics, including *capital*

Table 4 Determinants of financial performance

	(1)	(2)	(3)
ESG variables			
Lagged ESG score	−0.761	−1.440	−1.688
	(2.613)	(2.665)	(2.903)
Ownership variables			
Public		0.099	2.758**
		(1.045)	(1.378)
Family		3.651***	5.709***
		(0.886)	(1.245)
Public × Family			−4.684***
			(1.602)
Company controls			
Size	−1.202***	−1.192***	−1.305***
	(0.294)	(0.385)	(0.414)
Leverage	−4.914**	−6.337***	−6.336**
	(2.227)	(2.446)	(2.595)
Liquidity	3.196***	3.295***	2.837***
	(0.731)	(0.985)	(1.099)
Capital intensity	30.209*	24.553	22.482
	(15.639)	(19.496)	(18.989)
B2B	0.591	0.991	1.102
	(0.763)	(0.887)	(0.927)
R&D operations	0.587	0.987	0.853
	(1.034)	(1.192)	(1.235)
Foreign operations	0.676	0.844	0.596
	(0.756)	(0.776)	(0.806)
Constant	14.825***	13.452***	17.595***
	(2.150)	(2.668)	(3.765)
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
N	1038	544	476
Adjusted R^2	0.237	0.361	0.358

This table reports the results of regression models where the dependent variable is OROA, operating return on assets (operating profit over total assets, in percent). Company-level clustered standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

intensity, *B2B* orientation, *foreign operations*, and *R&D operations*, are not consistently significant across models.

Overall, we find robust evidence that family ownership enhances profitability, particularly in private companies, while ESG performance does not significantly predict *OROA* once detailed controls are included. These results underscore the importance of ownership structure for financial outcomes in the Brazilian context.

4.5 Policy-driven changes in ESG performance over time

In 2021, the Brazilian Securities and Exchange Commission (CVM) issued CVM59, significantly restructuring ESG disclosure requirements for publicly listed companies. The regulation requires listed companies to include detailed ESG information in their annual Reference Form or explain omissions under a "comply or explain" framework. CVM59 aligns Brazil's disclosure practices with international standards such as the Global Reporting Initiative (GRI), the Sustainability Accounting Standards Board (SASB), and the Task Force on Climate-Related Financial Disclosures (TCFD), promoting more standardized and transparent ESG reporting.

We treat the implementation of CVM59 as a regulatory shock to the ESG disclosure environment and examine whether it is associated with changes in ESG scores of listed companies relative to private companies. To estimate this effect, we employ a difference-in-differences (DiD) design using private companies as the control group.

The DiD specification interacts a post-2020 indicator ($Year \geq 2021$) with a dummy for *public* companies and includes controls for company characteristics, as well as year, industry, and company fixed effects. To examine dynamic treatment effects and relax the common-trends assumption, we estimate a dynamic DiD model interacting the *public* indicator with year dummies from 2017 to 2023, using 2020 as the reference year. Standard errors are clustered at the company level to account for serial correlation.

As shown in Table 5, ESG scores of *public* companies increased significantly after the disclosure mandate took effect. In the DiD model (Column 1), the interaction term $Public \times Year \geq 2021$ is positive and significant at the 1% level, with a coefficient of 0.044. This indicates that ESG scores of *public* companies increased by 4.4 percentage points relative to private companies following the implementation of CVM59. The estimates also show that, prior to the reform, *public* companies had lower ESG scores overall (–0.061).

A decomposition of the aggregate ESG score shows that the post-reform increase is driven by the governance component. As reported in Table 11 in the appendix, the DiD coefficient is positive and statistically significant for the G score, while the effects for the E and S scores are small and insignificant. This pattern is consistent with the focus of CVM59 on disclosure practices, reporting standards, and governance arrangements rather than environmental or social operations.

The dynamic DiD model (Column 2) confirms and extends these results. The interaction terms $Public \times Year \geq 2021$, $Public \times Year \geq 2022$, and $Public \times Year \geq 2023$ are positive and significant at the 1% level, with increasing magnitudes of 0.036, 0.047, and 0.061, respectively. By contrast, interaction terms for 2017–2019 are small and statistically insignificant, consistent with approximately parallel pre-trends. Both specifications show strong explanatory power, with adjusted R^2 values of 0.96.

Figure 2 complements these results by illustrating the estimated ESG score differences between public and private companies over time. The figure plots the average predicted *ESG score* differential from an OLS model with public-by-year interactions, full controls, and fixed effects. The vertical axis shows ESG score differences, while the horizontal axis reports years relative to the 2020 baseline (marked by a red

Table 5 ESG disclosure mandate impact on ESG scores of public companies

	DiD	Dynamic DiD
	(1)	(2)
Public × Year ≥ 2021 (DiD term)	0.044***	
	(0.008)	
Public	−0.061***	−0.053***
	(0.015)	(0.013)
Public × Year 2017		−0.008
		(0.012)
Public × Year 2018		−0.011
		(0.011)
Public × Year 2019		−0.014
		(0.010)
Public × Year 2021 (cutoff)		0.036***
		(0.011)
Public × Year 2022		0.047***
		(0.011)
Public × Year 2023		0.061***
		(0.011)
Constant	0.248***	0.248***
	(0.061)	(0.062)
Controls	Yes	Yes
Year	Yes	Yes
Industry	Yes	Yes
Company	Yes	Yes
N	1380	1380
Adjusted R^2	0.955	0.955

This table reports the results of a difference-in-differences (DiD) regression model (Model 1) and a dynamic DiD regression model (Model 2), where the dependent variable is the ESG score. Both models include the same set of company-level control variables as in Table 2. Company fixed effects are absorbed. Year and industry effects are included as indicator variables. In Model 1, the coefficient of Public × Year ≥ 2021 equals the average change in ESG for public companies attributable to CVM59. In Model 2, Year 2020 is the omitted category in all Public × Year interactions. Company-level clustered standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

dashed line). Prior to 2021, the differences are statistically insignificant, with confidence intervals overlapping zero. From 2021 onward, however, a clear upward shift appears, indicating improving ESG scores for public companies relative to private companies. By 2023, the gap becomes significantly positive, suggesting that public companies began outperforming private companies in ESG performance following the regulation.

Taken together, the results support hypothesis H4: the DiD estimates show that CVM59 is associated with a sustained increase in reported ESG scores for listed companies relative to private companies, consistent with changes in disclosure-oriented governance and reporting practices. These findings suggest that mandatory ESG disclosure, particularly under a "comply or explain" framework, can promote meaningful changes in corporate sustainability reporting and strengthen transparency

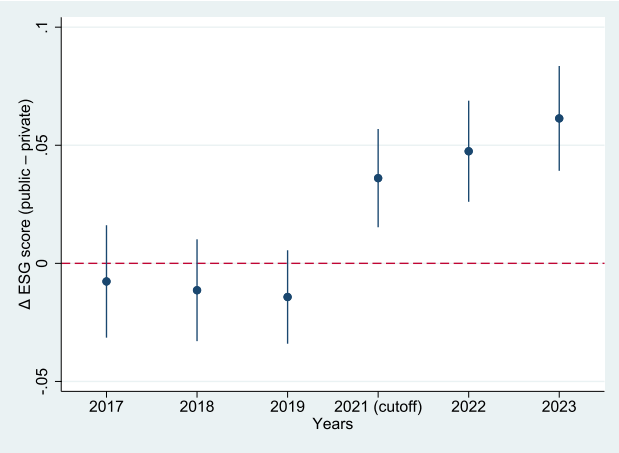


Fig. 2 This illustration plots the average difference in predicted ESG scores between public and private companies in each calendar year from 2017 through 2023. The predictions are generated from an OLS regression that includes a public-by-year interaction term, control variables, and company- and industry-level fixed effects. Standard errors are clustered at the company level. The horizontal axis represents year (with 2020 as base year), and the vertical axis represents the average predicted ESG score with other covariates at their observed values and company fixed effects at 0. The difference between the public and private lines for a given year represents the impact of public ownership on ESG compared to 2020. A dashed red line at zero marks the 2020 baseline. Dots indicate point estimates of Public × Year from the lead-lag specification. Vertical lines show 95% confidence intervals

and accountability, especially in emerging markets where voluntary adoption may be uneven.

4.6 Robustness checks

To assess robustness, we conduct three complementary checks.

(i) Propensity-score matching. To examine whether publicly listed companies exhibit lower ESG performance than comparable private companies, we apply a propensity-score matching (PSM) approach. Industries are first reclassified into GICS industry groups to reduce fragmentation and improve matching quality. We then estimate a logit model predicting public-listing status using company characteristics (*size*, *leverage*, *liquidity*, *capital intensity*, *B2B* orientation, *R&D operations*, and *foreign operations*), as well as year and GICS-industry fixed effects. Using the resulting propensity scores, we perform 1:1 nearest-neighbour matching with replacement and a caliper of 0.05. All 547 treated observations (public companies) find suitable matches among the 938 private-company observations.

Table 6 reports the propensity-score matching results. Post-matching balance diagnostics show a substantial improvement in covariate balance: the standardized mean difference in propensity scores declines from 1.7265 before matching to 0.0001 after matching, and the variance ratio approaches unity. These diagnostics indicate that publicly listed companies are effectively matched with observationally similar private companies based on the included covariates.

Table 6 Propensity score matching results: Impact of public ownership on ESG scores

	Treated	Matched	ATET	Std.	z	$P>\|z\|$	95% CI
ESG score	547	547	–0.0483***	0.0172	−2.81	0.005	–0.0820 to –0.0146
Balance diagnostics Propensity score							
Standardized difference	1.7265	0.0001					
Variance ratio	1.4466	0.9996					
Controls	Yes						
Year	Yes						
Industry	Yes						

The table presents propensity score matching (PSM) estimates of the impact of public ownership on ESG scores. First, we estimate a logit model for the likelihood of being publicly listed, including seven company-level covariates alongside year and 4-digit GICS-industry fixed effects. Predicted propensity scores are then used for 1 : 1 nearest-neighbour matching with replacement (caliper = 0.05), matching all 547 treated (public) companies to 547 of 938 private companies. "Balance diagnostics" report standardized differences and variance ratios of the propensity score, pre- and post-matching. ATET denotes the average treatment effect on the treated (public companies), i.e., the mean difference in ESG scores between matched public and private companies. *** denotes statistical significance at the 1% level

The estimated average treatment effect on the treated (ATET) is –0.0483 ($p = 0.005$), indicating that publicly listed companies exhibit lower ESG scores than matched private companies. This estimate is consistent in sign and magnitude with the baseline fixed-effects regressions. However, the PSM results should not be interpreted as causal: while matching reduces observable differences, unobserved factors, such as organizational culture, disclosure practices, and stakeholder exposure, may still influence listing status and ESG outcomes.

Accordingly, we interpret the PSM results as complementary evidence that the negative association between public ownership and ESG performance is not driven solely by observable company characteristics. Rather than identifying a causal effect of ownership form, the analysis reinforces the robustness of this association across alternative empirical approaches.

(ii) Alternative ESG score construction. As an additional robustness check, we replicate all analyses using an alternative ESG measure constructed by first aggregating the equal-weighted pillar scores and then calibrating the composite score against LSEG benchmarks. The results remain qualitatively unchanged, indicating that our findings are not sensitive to the specific ESG score construction.

(iii) Alternative profitability measures. To ensure that our findings do not depend on a single ratio, we assess robustness to four alternative profitability measures: *OROA*, *ROA* (net income over total assets), *net margin* (net income over revenue), and *EBIT margin* (operating profit over revenue). Table 12 in the appendix replicates Table 2 using return on assets (*ROA*, net income over total assets) in place of *OROA*. The results are virtually unchanged: the negative public-ownership coefficient remains significant across all models, the positive association between contemporaneous profitability and ESG scores is confirmed, and the ownership-transition and pillar-level findings are qualitatively identical. Table 13 in the appendix further replicates the subsample analysis (Table 3) using lagged *net margin* instead of lagged

OROA. The results are mainly robust: the negative public-ownership coefficients are consistent in sign and magnitude, and remain significant in the large-firm, low-leverage, high-liquidity, and low-capital-intensity subsamples. Lagged *net margin* shows a positive and significant association among large firms (0.0019, $p < 0.01$), low-capital-intensity firms (0.0020, $p < 0.01$), and brown-industry firms (0.0027, $p < 0.01$). Results using *EBIT margin*, and the full set of estimates across all four profitability measures, are similarly robust but untabulated. Taken together, these checks confirm that the main findings are not driven by the choice of profitability measure.

5 Concluding remarks and discussion

This study examines the relationship between ESG performance, financial outcomes, and ownership structure in Brazil, an emerging market with evolving regulatory institutions. Using a unique panel of public and private companies from 2017 to 2023, we show how ownership form shapes ESG scores in this context. Consistent with research on evaluative infrastructures, our findings suggest that ESG scores reflect not only underlying practices but also how governance and disclosure arrangements become visible and comparable through specific scoring systems (Gray 2010; Kornberger et al. 2017; van Weeren and Bluntz 2025).

Because evaluative infrastructures operate most strongly where companies are economically visible and subject to public comparison, our evidence primarily applies to large companies participating in a prominent Brazilian market ranking. The dataset does not represent SMEs or the broader population of companies. This boundary condition is substantively meaningful: disclosure routines, reputational exposure, and evaluative scrutiny are strongest in this segment, shaping how ESG becomes measurable across ownership forms.

Against this backdrop, our results clarify how ownership form interacts with governance and disclosure incentives in evaluative settings. First, public–private differences in ESG scores are concentrated in the governance pillar, while environmental and social differences are not robust once company characteristics are controlled for. Publicly listed companies exhibit lower governance scores than comparable private companies. This pattern contrasts with evidence from developed markets, where listing is often associated with stronger ESG disclosure incentives (Gillan et al. 2021; Grewal et al. 2019), and instead aligns with the "amoral drift" perspective of Hart and Zingales (2017). In Brazil's institutional context, short-term market pressures may limit the adoption and formalization of governance and disclosure practices recognized by ESG scoring systems, particularly under the largely voluntary disclosure regime prevailing before CVM59.

Second, profitability is positively associated with ESG performance, but only under conditions of lower financial pressure (e.g., low leverage, low liquidity, or low capital intensity) or in environmentally sensitive industries. This pattern supports financial slack theory (Cyert and March 1963; Bourgeois 1981; Waddock and Graves 1997; Seifert et al. 2004), which predicts that slack resources enable ESG engagement when competing financial demands are limited. From an accounting perspective, profitability may also facilitate the documentation and reporting of ESG

activities in forms recognizable to external evaluators (Bebbington and Larrinaga 2014; Cormier et al. 2005; Gray 2010).

Third, family ownership is positively associated with profitability, particularly in privately held companies. This pattern is consistent with concentrated ownership aligning control and cash-flow rights, thereby reducing agency conflicts and improving operational efficiency (Anderson and Reeb 2003; Bertrand and Schoar 2006). In publicly listed companies, however, the profitability advantage of family control weakens, consistent with entrenchment risks and conflicts with minority shareholders in emerging-market ownership structures (La Porta et al. 1999; Leal and Carvalhalda-Silva 2005).

Fourth, companies transitioning from public to private ownership exhibit a significant increase in ESG scores. Given the small number of observed ownership transitions, this result should be interpreted as suggestive rather than causal. Combined with the cross-sectional findings, the pattern indicates that ownership form itself shapes how governance and reporting practices translate into measured ESG outcomes, consistent with evidence that private companies can develop distinct accountability infrastructures outside mandatory reporting regimes (Dedman et al. 2014).

Finally, the introduction of CVM59 in 2021 is associated with a sustained increase in reported ESG scores among listed companies, consistent with disclosure mandates reshaping governance and reporting routines (Christensen et al. 2021; O'Dwyer et al. 2011; Contrafatto 2014). Decomposing the ESG score shows that this effect is driven by improvements in governance, while environmental and social scores remain largely unchanged. This suggests that mandatory disclosure primarily affects governance and reporting infrastructures rather than underlying environmental or social practices. The results therefore align with international evidence on the effects of ESG disclosure regulation (Ioannou and Serafeim 2011; Christensen et al. 2021; Krueger et al. 2024).

These findings have important implications for investors and regulators. For investors, ownership structure provides a lens for interpreting ESG and financial performance. In emerging markets, private companies, particularly family-owned ones, may achieve stronger sustainability outcomes than public companies. For regulators, the evidence suggests that disclosure mandates can increase reported ESG scores without short-term profitability penalties. This supports extending ESG disclosure requirements to large private companies, while recognizing that whether such score increases reflect substantive behavioral change or reporting effects remains an open question.

The findings also carry practical implications for the large private and family-owned companies in our sample. Because these companies achieve governance and ESG outcomes comparable to, or stronger than, their listed peers without a binding disclosure mandate, they can build credible accountability and reporting practices ahead of regulation, an advantage in accessing sustainability-linked capital and global supply chains that increasingly require ESG information. Brazilian debt markets illustrate this channel: privately held companies have been active issuers of sustainability-linked debentures, and for capital-intensive, expansion-oriented com-

panies even moderate reductions in funding costs translate quickly into investment capacity. Whether this extends to smaller firms with less disclosure capacity and reputational exposure remains an open question for future research.

This is particularly relevant given the evolution of Brazil's sustainability disclosure framework. Under CVM Resolution 193 (2023), listed companies could adopt ISSB-aligned sustainability standards voluntarily from 2024, with mandatory reporting initially scheduled for fiscal years beginning in 2026. In 2026, however, CVM Resolution 244[8] removed this mandatory phase and retained a voluntary, comply-or-explain regime: companies that do not report must disclose and explain that decision. Our sample ends in 2023 and thus lies entirely within the mandatory CVM59 regime, before ISSB-aligned reporting became available even on a voluntary basis, so the 2026 revision does not bear on our estimates. The shift from an anticipated mandate back to voluntary disclosure underscores the open question our findings raise, whether observed increases in ESG scores reflect substantive behavioral change or reporting effects, and makes the governance-and-disclosure channel we document directly relevant to the current policy debate.

Several limitations qualify these findings. First, as noted above, the sample covers large companies participating in a prominent market ranking rather than SMEs or the broader corporate population. Second, the design supports causal interpretation most credibly around the CVM59 disclosure mandate, which provides a plausibly exogenous shock; the remaining associations, between profitability and ESG performance, and between family ownership and profitability, are estimated with lagged explanatory variables to mitigate simultaneity, but the lag structure does not by itself establish causality, and unobserved time-varying factors may contribute to these relationships. The small number of observed ownership transitions likewise renders the public-to-private evidence suggestive rather than causal. Third, our profitability measures are accounting-based; a fully specified cash flow from operations cannot be constructed for this sample, because the data required to compute it are not available, so cash-flow dynamics are captured only indirectly through liquidity controls and margin-based measures. Fourth, ESG performance is measured through a ranking-based scoring system; although the scores are externally validated against the LSEG benchmark, they inevitably reflect the categories and weighting of that evaluative infrastructure. Addressing these limitations, through broader firm coverage, richer cash-flow data, and complementary ESG measures, offers opportunities for future work.

Appendix

See Tables 7, 8, 9, 10, 11, 12 and 13.

[8] CVM Resolution No. 244 of May 29, 2026, amending CVM Resolution No. 193/2023; available at https://conteudo.cvm.gov.br/legislacao/resolucoes/resol244.html (as of July 2026).

Table 7 Definitions and measurements for ESG variables

Pillar	Category	Variable	Measurement
E pillar	Emissions	Emissions and climate factors in investments	D: 1 if the company includes the factors emissions and climate in investments, 0 otherwise
		Carbon neutrality target year	How soon does the company have a public commitment to become carbon neutral? (0: no commitment, 1: > 15 years, 2: 11−15 years, 3: 6−10 years, 3(median): sector is not considered as main CO2 emitter, 4: 0−5 years)
		Carbon absorbation target year	Does the company have a public commitment to absorb more carbon than it emits in how long? (0: no, 1: > 15 years, 2: 11−15 years, 3: 6−10 years, 3(median): sector is not considered as main CO2 emitter, 4: 0−5 years)
		Climate certificates	D: 1 if the company has climate-related certificates, 0 otherwise
	Innovation	Cost reduction through ESG actions	Has the company implemented sustainability and ESG actions that have contributed to a reduction in costs? If so, how much does this reduction represent in relation to net revenue? (0: no actions, 1: < 5%, 2: 5.1% − 10%, 3: 10.1% − 15%, 4: 15.1% − 20%, 5: > 20%)
		ESG investments	The percentage of net revenue invested in sustainability and ESG last year. (0: 0%, 1: 0.01% − 0.5% , 2: 0.51% − 1%, 3: 1.01% − 2%, 4: 2.01% − 3%, 5: 3.01% − 4%, 6: > 4%)
		Green R&D investments	The percentage of the R&D (Research and Development) budget invested in research and development of green technologies. (0: no measurement, 1: <= 20%, 2: 21% − 40%, 3: 41% − 60%, 4: 61% − 80%)
	Resource use	Environmental and social supplier monitoring	D: 1 if the company monitors its suppliers for environmental and social aspects (including labor), 0 otherwise
		Environmental and social supplier programs	D: 1 if the company has programs to develop the social and environmental practices of its suppliers, 0 otherwise
S pillar	Community	Products for low-income communities	D: 1 if the company offers products and services for the benefit of the inclusion of low-income people and disadvantaged communities in the sector in which it operates, 0 otherwise
		Income-generating opportunities for poor communities	D: 1 if the company creates income-generating opportunities for poor communities, 0 otherwise
		Hiring employees from vulnerable groups	D: 1 if the company has targets for hiring employees from the most vulnerable groups in the region where it operates (e.g. illiterate people, people over 60, black people, women, others), 0 otherwise
		Local development strategy	D: 1 if the company follows a local development strategy with shared goals with NGOs, local governments and other companies, 0 otherwise

Table 7 (continued)

Pillar	Category	Variable	Measurement
		Structured dialog processes with stakeholders	D: 1 if the company has structured dialog processes (identification of stakeholders, engagement planning, treatment of stakeholder opinions, others) in its relations with its stakeholders, 0 otherwise
	Human rights	Number of labor lawsuits filed by employees	1 − total number of labor lawsuits filed by employees, regardless of outcome
		Number of labor lawsuits filed by third parties	1 − total number of labor lawsuits filed by third parties, regardless of outcome
	Product responsibility	Percentage of revenue from sustainable products	The percentage of net revenue obtained from new, more sustainable products and services. (0: 0% , 1: < 5%, 2: 10.1% − 15%, 3: 15.1% − 20%, 4: 20.1% − 25%, 5: > 50%)
	Workforce	Frequency of performance appraisal process	The frequency of the companies formal performance appraisal process carried out
		Employee education	Count variable determining how the company encourages continuing education for employees. (Internal training, agreements with schools and universities, online training, corporate university, no offer)
		Identification of employee training needs	Count variable determining how the company identifies training needs. (Strategic planning, evaluation of performance, company performance indicators, request from supervisors and managers, negotiated between employees and supervisors, needs in employee's Individual Development Plans (IDPs), others, no formal evaluation)
Pillar	Category	Variable	Description
		Employee training results	Count variable determining how the evaluation of training results is verified. (Optimization of work process, achievement of strategic planning goals, individual performance indicators, organizational performance indicators, others, no formal evaluation)
		Dealing with learning and retraining needs	Count variable determining how the company deals with the need for continuous learning, retraining and updating on the part of its professionals. (Facilitate access to short courses, facilitate access to post-graduate courses, enrollment in courses to think openly and innovatively, training system/platform or content, partnership with entity that provides training or courses, sending to innovation events in Brazil, sending to innovation events abroad, no actions on trainings)
		Employee dialogue channel	Which open channel for dialogue does the company use the most? (0: none, 1: ombudsman, 2: telephone line, 3: e-mail/mailbox/confidential intranet, 4: confidential intranet/mobile app)
		Deadline for answering questions	How is the deadline set for answering questions registered through the 'open channel'? (0: no answer, 1: answered according to the availability of the team responsible, 2: answered within a pre-established timeframe by the responsible team)

Table 7 (continued)

Pillar	Category	Variable	Description
		Employee satisfaction	How satisfied are most employees with the company? (1: < 60%, 2: 60% − 79.9%, 3: 80% − 89.9%, 4: 90% − 100%)
		Employee health plan	Offering of health plan by the company. (0: no offer, 1: fully paid by employee, 2: mostly paid by employee, 3: paid 50/50 by company and employee, 4: mostly paid by company, 5: fully paid by company)
G pillar	CSR strategy	Performance reporting	Do the performance reports present economic-financial results and results relating to environmental and social responsibility issues? (0: no, 1: partially, 2: yes)
		Public performance reporting	C: Are performance reports containing economic and financial results and results relating to environmental and social responsibility issues made available to the external public? (0: no, 1: partially, 2: yes)
		Sustainability report	Count variable determining the structure of the company's sustainability report. (Performance indicators developed with stakeholder engagement, includes negative results, is independently audited, indicators are presented with their time series, includes results on gender equality targets, GRI standard not adopted, not published)
	Management	Compliance board	D: 1 if governance is existent in the company, 0 otherwise
		Compliance advisory board	D: 1 if the company has an advisory board, 0 otherwise
		Number of women in board	Number of women in board
		Number of different nationalities in board	Number of board members of different nationalities or Brazilians living abroad (people living in other cultures)
		Board age difference	Difference in years between the age of the oldest board member and the youngest board member
		Board evaluation	D: 1 if the company has a formal individual assessment process for the reappointment of board members, 0 otherwise
		CEO performance evaluation	D: 1 if the company's board of directors evaluate the performance of the CEO (even if he/she is the owner or a member of the controlling family, in the case of family businesses), 0 otherwise
		Employees taking part in setting their own targets	Do employees take part in setting their own targets? (0: no, 1: yes, everyone, 2: yes, only strategic, 3: yes, strategic and tactical, 4: yes, tactical and operational)

This table provides definitions and measurements of the variables used to construct the ESG scores. All variables are sourced from survey data. Variable encoding is in parentheses. "D" determines dummy variable

Table 8 Descriptive statistics for ESG variables

Pillar	Category	Variable	Obs.	Mean	Std.	Min	Median	Max
E pillar	Emissions	Emissions and climate factors in investments	1058	0.76	0.43	0.00	1.00	1.00
		Carbon neutrality target year	850	2.89	1.75	0.00	3.00	5.00
		Carbon absorbation target year	845	2.98	1.95	0.00	3.00	5.00
		Climate certificates	1248	0.38	0.49	0.00	0.00	1.00
	Innovation	Cost reduction through ESG actions	473	1.05	0.81	0.00	1.00	5.00
		ESG investments	504	2.55	1.96	0.00	2.00	6.00
		Green R&D investments	527	1.25	1.50	0.00	1.00	5.00
	Resource use	Environmental and social supplier monitoring	2366	0.82	0.38	0.00	1.00	1.00
		Environmental and social supplier programs	2312	0.51	0.50	0.00	1.00	1.00
S pillar	Community	Products for low-income communities	1936	0.65	0.48	0.00	1.00	1.00
		Income-generating opportunities for poor communities	2242	0.77	0.42	0.00	1.00	1.00
		Hiring employees from vulnerable groups	2118	0.54	0.50	0.00	1.00	1.00
		Local development strategy	2267	0.60	0.49	0.00	1.00	1.00
		Structured dialog processes with stakeholders	2314	0.89	0.32	0.00	1.00	1.00
	Human rights	Number of labor lawsuits filed by employees	1516	−256.91	911.41	−14,104	−38.00	0.00
		Number of labor lawsuits filed by third parties	1260	−153.06	443.91	−5,859	−25.00	0.00
	Product responsibility	Percentage of revenue from sustainable products	196	1.83	2.04	0.00	1.00	5.00
	Workforce	Frequency of performance appraisal process	2453	3.11	0.91	1.00	3.00	6.00
		Employee education	2208	2.92	1.01	0.00	3.00	4.00
		Identification of employee training needs	2487	3.22	1.52	0.00	3.00	7.00
		Employee training results	2453	1.87	1.31	0.00	2.00	5.00

Table 8 (continued)

Pillar	Category	Variable	Obs.	Mean	Std.	Min	Median	Max
		Dealing with learning and retraining needs	1516	3.79	2.00	0.00	4.00	7.00
		Employee dialogue channel	1859	2.01	1.19	0.00	2.00	4.00
		Deadline for answering questions	1751	1.86	0.36	0.00	2.00	2.00
		Employee satisfaction	2287	2.57	0.94	1.00	3.00	4.00
		Employee health plan	2043	3.88	0.95	0.00	4.00	5.00
G pillar	CSR strategy	Performance reporting issues	1336	1.48	0.72	0.00	2.00	2.00
		Public performance reporting	469	1.54	0.69	0.00	2.00	2.00
		Sustainability report	1151	2.44	1.90	0.00	3.00	5.00
	Management	Compliance board	557	0.76	0.43	0.00	1.00	1.00
		Compliance advisory board	127	0.48	0.50	0.00	0.00	1.00
		Number of women in board	445	1.74	1.02	1.00	1.00	8.00
		Number of different nationalities in board	115	2.63	1.74	1.00	2.00	7.00
		Board age difference	247	26.91	10.66	1.00	27.00	60.00
		Board evaluation	1451	0.42	0.49	0.00	0.00	1.00
		CEO performance evaluation	899	0.74	0.44	0.00	1.00	1.00
		Employees taking part in setting their own targets	1809	1.86	1.17	0.00	1.00	4.00

This table reports summary statistics on the ESG variables pre standardization and aggregation into ESG pillar scores

Table 9 Definitions of variables

Variable	Measurement	Source
ESG score	Environmental, social, governance (ESG) score	Own calculation / survey
E score	Environmental pillar score	Own calculation / survey
S score	Social pillar score	Own calculation / survey
G score	Governance pillar score	Own calculation / survey
LSEG ESG score	LSEG's environmental, social, governance (ESG) score divided by 100	LSEG
LSEG E score	LSEG's environmental pillar score divided by 100	LSEG
LSEG S score	LSEG's social pillar score divided by 100	LSEG
LSEG G score	LSEG's governance pillar score divided by 100	LSEG
Public	D: 1 if the company is listed on the Brazilian stock exchange B3, 0 otherwise	Survey
Family	D: 1 if the company is family-owned, 0 otherwise	Survey
OROA	Operating return on assets: operating profit divided by total assets, in percent.	Survey
Size	(Logarithm of) total assets	Survey
Leverage	Total short-term loans and financing plus total long-term loans and financing, divided by total assets	Survey
Liquidity	(Logarithm of) liquidity	Survey
Capital intensity	Depreciation divided by total assets	Survey
B2B	D: 1 if the company is primarily engaged in business-to-business activities, 0 otherwise	Survey
R&D operations	D: 1 if the company has Research and Development (R&D) / innovation operations in Brazil, 0 otherwise	Survey
Foreign operations	D: 1 if the company operates abroad, 0 otherwise	Survey
Go private	D: 1 if the company changed its ownership status from public to private, 0 otherwise	Survey
Go public	D: 1 if the company changed its ownership status from private to public, 0 otherwise	Survey

This table provides the definitions of the variables, which are used in econometric analyses. "D" determines dummy variable

Table 10 Correlations

	Variable	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	ESG score	1.00																			
2	E score	0.23	1.00																		
3	S score	0.18	0.31	1.00																	
4	G score	0.24	0.13	0.23	1.00																
5	LSEG ESG score	0.69	0.33	0.22	0.23	1.00															
6	LSEG E score	0.57	0.38	0.26	0.26	0.88	1.00														
7	LSEG S score	0.65	0.31	0.19	0.18	0.92	0.75	1.00													
8	LSEG G score	0.61	0.19	0.11	0.21	0.81	0.56	0.63	1.00												
9	Public	−0.03	0.10	0.08	−0.21	−0.25	−0.21	−0.22	−0.24	1.00											
10	Family	−0.05	−0.05	−0.08	−0.16	−0.39	−0.25	−0.48	−0.21	−0.08	1.00										
11	OROA	0.08	−0.04	0.04	−0.01	−0.01	0.01	0.05	−0.09	−0.15	0.23	1.00									
12	Size	0.13	0.23	0.24	0.07	0.37	0.39	0.34	0.25	0.52	−0.19	−0.19	1.00								
13	Leverage	0.05	0.07	0.04	0.04	0.13	0.22	0.12	0.02	0.20	0.07	−0.16	0.19	1.00							
14	Liquidity	−0.05	−0.09	−0.04	−0.09	−0.21	−0.30	−0.14	−0.08	0.09	0.22	0.18	−0.10	−0.21	1.00						
15	Capital intensity	0.08	0.09	0.08	0.10	0.26	0.21	0.18	0.32	0.01	−0.00	0.01	0.01	0.13	−0.22	1.00					
16	B2B	0.13	0.02	0.01	−0.02	0.08	0.06	0.08	0.09	−0.14	0.13	0.16	−0.22	−0.03	0.15	0.10	1.00				
17	R&D operations	0.10	0.14	0.20	0.12	0.21	0.24	0.20	0.14	0.12	0.01	0.03	0.23	0.01	0.06	−0.00	−0.00	1.00			
18	Foreign operations	0.06	−0.01	0.16	0.05	0.18	0.20	0.11	0.19	0.01	0.04	0.13	0.16	0.01	0.05	0.01	0.21	0.18	1.00		
19	Go private	0.04	0.02	0.04	0.06					−0.06	−0.03	−0.03	0.03	0.07	−0.05	0.03	−0.03	−0.01	−0.03	1.00	
20	Go public	0.03	−0.01	0.03	−0.04	−0.07	−0.11	0.01	−0.14	0.15	0.02	−0.01	0.04	−0.00	−0.04	−0.03	−0.00	0.01	−0.02	−0.01	1.00

This table reports the pairwise Pearson correlation coefficients. OROA is operating return on assets (operating profit over total assets, in percent)

Table 11 ESG disclosure mandate impact on E, S, and G scores of public companies

	E score	S score	G score
	(1)	(2)	(3)
Public × Year ≥ 2021 (DiD term)	0.000	0.006	0.344***
	(0.041)	(0.020)	(0.056)
Public	−0.231***	0.063	−0.315***
	(0.069)	(0.042)	(0.095)
Constant	0.036	0.466***	0.864***
	(0.323)	(0.156)	(0.280)
Controls	Yes	Yes	Yes
Year	Yes	Yes	Yes
Industry	Yes	Yes	Yes
Company	Yes	Yes	Yes
N	1380	1380	1380
Adjusted R^2	0.510	0.538	0.459

This table reports the results of difference-in-differences (DiD) regression models, where the dependent variable is the E score (Model 1), S score (Model 2), and G score (Model 3), respectively. All models include the same set of company-level control variables as in Table 2. Company fixed effects are absorbed. Year and industry effects are included as indicator variables. The coefficient of Public × Year ≥ 2021 equals the average change in the respective ESG pillar score for public companies attributable to CVM59. Company-level clustered standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

Table 12 Determinants of ESG scores using return on assets (ROA)

	ESG			E	S	G
	(1)	(2)	(3)	(4)	(5)	(6)
Ownership variables						
Public	−0.059**	−0.068**		−0.035	−0.015	−0.226***
	(0.024)	(0.028)		(0.029)	(0.014)	(0.027)
Performance variables						
ROA	0.0024**		0.0024	0.0005	0.0010	−0.0002
	(0.0012)		(0.0015)	(0.0014)	(0.0008)	(0.0014)
Lagged ROA		0.002*				
		(0.001)				
Transition variables						
Lagged go public			0.032			
			(0.055)			
Lagged go private			0.131***			
			(0.028)			
Company controls						
Size	0.030***	0.033***	0.023***	0.056***	0.023***	0.039***
	(0.008)	(0.009)	(0.008)	(0.008)	(0.005)	(0.008)
Leverage	0.065	0.055	0.053	0.048	−0.003	0.095
	(0.053)	(0.056)	(0.058)	(0.068)	(0.034)	(0.063)
Liquidity	−0.019	0.006	−0.010	−0.030	−0.013	−0.009
	(0.021)	(0.023)	(0.024)	(0.023)	(0.012)	(0.023)
Capital intensity	0.425	0.508	0.502	0.731*	0.476**	1.236***
	(0.358)	(0.386)	(0.395)	(0.435)	(0.223)	(0.404)
B2B	0.068***	0.067***	0.061***	0.054**	0.009	−0.019
	(0.019)	(0.022)	(0.022)	(0.024)	(0.014)	(0.022)
R&D operations	0.040*	0.029	0.029	0.087***	0.063***	0.094***
	(0.024)	(0.031)	(0.032)	(0.032)	(0.017)	(0.025)
Foreign operations	−0.011	−0.017	−0.013	0.015	0.034**	0.016
	(0.020)	(0.022)	(0.022)	(0.022)	(0.015)	(0.024)
Constant	0.157***	0.186**	0.190***	0.138*	0.366***	0.209***
	(0.061)	(0.072)	(0.062)	(0.073)	(0.045)	(0.072)
Year	Yes	Yes	Yes	Yes	Yes	Yes
N	1485	985	1037	1485	1485	1485
Adjusted R^2	0.075	0.070	0.049	0.155	0.122	0.103

This table replicates Table 2 replacing OROA (operating return on assets: operating profit over total assets, in percent) with return on assets (ROA, net income over total assets) as the profitability measure. The dependent variable is the ESG score (Models 1–3) or the pillar scores (Models 4–6). Company-level clustered standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

Table 13 Determinants of ESG scores: Subsample analysis with lagged net margin

	Size		Leverage		Liquidity		Capital intensity		Industry	
	Large	Small	High	Low	High	Low	High	Low	Brown	Green
Ownership variables										
Public	−0.071**	−0.080*	−0.036	−0.118***	−0.094***	−0.046	−0.061	−0.097***	−0.086*	−0.040
	(0.035)	(0.041)	(0.039)	(0.037)	(0.034)	(0.038)	(0.041)	(0.034)	(0.048)	(0.033)
Performance variables										
Lagged net margin	0.0019***	−0.0022	0.0007	0.0011	0.0003	0.0014	−0.0004	0.0020***	0.0027***	−0.0013
	(0.0006)	(0.0022)	(0.0010)	(0.0009)	(0.0009)	(0.0010)	(0.0009)	(0.0007)	(0.0008)	(0.0011)
Company controls										
Size	0.055***	−0.005	0.016	0.042***	0.033***	0.020*	0.036***	0.019*	0.045***	0.018
	(0.015)	(0.025)	(0.013)	(0.010)	(0.012)	(0.011)	(0.012)	(0.012)	(0.013)	(0.012)
Leverage	−0.019	0.062	0.126	−0.060	0.049	0.021	0.010	0.045	0.056	−0.011
	(0.064)	(0.089)	(0.088)	(0.160)	(0.073)	(0.071)	(0.072)	(0.072)	(0.095)	(0.069)
Liquidity	0.009	0.057	−0.019	0.025	0.023	0.017	0.051	−0.020	−0.004	0.027
	(0.025)	(0.039)	(0.035)	(0.029)	(0.046)	(0.040)	(0.033)	(0.028)	(0.036)	(0.032)
Capital intensity	1.747***	−0.269	0.332	1.056**	0.787	0.556	0.031	3.641*	2.159***	−0.050
	(0.470)	(0.542)	(0.546)	(0.532)	(0.630)	(0.480)	(0.518)	(1.958)	(0.557)	(0.537)
B2B	0.048*	0.067**	0.051*	0.067**	0.086***	0.019	0.010	0.096***	−0.001	0.100***
	(0.028)	(0.031)	(0.027)	(0.033)	(0.028)	(0.031)	(0.027)	(0.030)	(0.034)	(0.028)
R&D operations	0.049	0.042	0.080	0.001	0.064	0.022	−0.036	0.086**	0.011	0.043
	(0.038)	(0.043)	(0.049)	(0.038)	(0.044)	(0.034)	(0.038)	(0.040)	(0.038)	(0.044)
Foreign operations	0.011	−0.078**	−0.005	−0.033	−0.035	0.001	−0.011	−0.042	−0.012	−0.024
	(0.027)	(0.037)	(0.030)	(0.030)	(0.030)	(0.030)	(0.028)	(0.031)	(0.033)	(0.029)
Constant	−0.092	0.499***	0.259**	0.151	0.138	0.330***	0.287***	0.204**	0.039	0.359***
	(0.135)	(0.161)	(0.105)	(0.092)	(0.097)	(0.091)	(0.091)	(0.098)	(0.111)	(0.092)
Year	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Table 13 (continued)

	Size		Leverage		Liquidity		Capital intensity		Industry	
	Large	Small	High	Low	High	Low	High	Low	Brown	Green
N	513	402	481	434	465	450	470	445	366	549
Adjusted R^2	0.199	0.051	0.052	0.095	0.102	0.026	0.039	0.149	0.193	0.063

Each column reports a subsample regression of ESG score on public dummy, lagged net margin, and controls, replicating the structure of Table 3. Net margin is the net liquid margin (net income over revenue), winsorized at the 1% and 99% levels. Splits are defined at median values of the full sample. Industry definitions follow Table 3. Company-level clustered standard errors are reported in parentheses. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively

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Declarations

Conflict of interest The authors have no relevant financial or non-financial interests to disclose.

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