Do ESG Activities Help Firms in Times of Financial Difficulty?

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Abstract: Do ESG Activities Help Firms in Times of Financial Difficulty?

This research examines how firms' engagement in ESG practices influences their stability and attractiveness to investors. Using the frameworks of social and historical aspiration, and legitimization pressure, statistical analysis over 20 years for over 500 firms was conducted. Firstly, it was shown that firms who face financial and aspirational challenges invest more in ESG compared to those who do not. We also found that ESG activities are not suitable for mitigating a decrease in relative market value for all companies. Investors tended to value the response to a downturn more than the price depreciation itself. Looking into firms that experience above-average shortfalls, the results change suggesting that ESG is useful for mitigating decreases in firm legitimacy.

Key words:

- ESG performance
- Legitimization theory
- Aspiration
- Financial shortfall

Resumo: As Actividades ESG Ajudam as Empresas em Tempos de Dificuldades Financeiras?

Esta investigação examina a forma como o envolvimento das empresas em práticas ESG influencia a sua estabilidade e atratividade para os investidores. Utilizando os quadros de aspiração social e histórica e de pressão de legitimação, foi efectuada uma análise estatística ao longo de 20 anos para mais de 500 empresas. Em primeiro lugar, foi demonstrado que as empresas que enfrentam desafios financeiros e de aspiração investem mais em ESG do que aquelas que não o fazem. Concluímos também que as actividades ESG não são adequadas para atenuar uma diminuição do valor de mercado relativo para todas as empresas. Os investidores tendem a valorizar mais a reação a uma recessão do que a própria depreciação dos preços. Se analisarmos as empresas que registam quebras acima da média, os resultados mudam, sugerindo que as actividades ESG são úteis para atenuar a diminuição da legitimidade da empresa.

Palavras chave:

- Desempenho ESG
- Teoria da legitimação
- Aspiração
- Défice financeiro

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1 Introduction

Firms around the world seem to increasingly align their strategies with the Stakeholder framework, acting to advance stakeholder interests (Olsen, 2016). Research suggests that acting with environmental, social, and governance (ESG) integrity may be a winning strategy as it aligns firm strategy with stakeholder concerns (Freeman, 1999). This alignment essentially gives rise to ESG obligations, positioning these considerations as central to modern business strategies (Belyaeva et al., 2020). At first glance, it is surprising that firms are rediscovering altruism in times of interest rate challenges, the Covid-19 pandemic, supply chain bottlenecks, and a shortage of skilled workers. Many firms have suffered, affecting both business success and the willingness of equity investors to invest.

Prospect theory and its extensions (Chari et al., 2018; Kahneman & Tversky, 1979) suggest a negative correlation between a firm's economic resources and ESG concerns. This implies that when firms experience performance downturns, the tendency increases for riskier actions, such as cutting corners on product safety, reducing investment in employee welfare, or diminishing community contributions.

Conversely, Cornell and Damodaran (2020) contend that the natural inclination of firms, particularly in economically challenging times, is to bolster growth, improve margins, and enhance investment efficiency, thus serving shareholder value. Nevertheless, there is growing interest in ESG activities, purportedly linked to positive financial outcomes (Fu & Li, 2023). Accordingly, this phenomenon requires further investigation (Horváthová, 2010).

Building on research by DasGupta, (2022), which suggests that ESG activities are beneficial during downturns, this study investigates the efficacy of corporate ESG actions as a management tool, effective in the short term, and also as a potentially cost-efficient strategy.

This study proposes an explanation based on Meyer and Rowan, (1977a), who argue that firms are increasingly concerned with maintaining their legitimacy in the eyes of stakeholders, often at the cost of their primary goal of profitability.

The remainder of the study is structured as follows. First, we examine the current literature on Environmental, Social, and Governance (ESG) research. This section aimed to generate hypotheses and furnish readers with the necessary knowledge to follow the subsequent sections. The research findings indicated a mixed relationship between profitability, firm value and, ESG activity. Therefore, the second step involved further theoretical investigations of the value drivers and value determents for firms.

In the third step, firm-specific data spanning over 20 years was analyzed to gain insights. Subsequently, the findings are presented and discussed, aiming to answer the previously developed hypothesis.

The paper ends with a discussion and synthesis of the insights gained, acknowledges limitations, and suggests avenues for future investigation.

1.1 Terminology and definitions

Aspiration: In a dynamic business landscape, firms must balance risk and reward. The concept of 'aspiration levels' offers a lens through which organizations can gauge success and strategize future moves. Pioneered by Cyert and March, (1963), this construct has influenced organizational behavior and decision-making. Aspiration levels provide a line between demarcating triumph and disappointment, a yardstick against which companies measure accomplishments. Consider the case of SpaceX, which has set an unprecedented aspiration level to revolutionize space travel. This guides the firm's risk-taking, leading to groundbreaking achievements. Aspiration levels contour into how firms set, adjust, and pursue goals, shaping strategic choices and risk-taking propensities.

Aspiration levels are central to understanding organizational decision-making, risk-taking behaviors, and how firms evaluate performance (Cyert & March, 1963; Kahneman & Tversky, 1979; March & Simon, 1958). An aspiration level is neither arbitrary nor solely ambitious; it is a psychologically neutral benchmark that acts as the smallest satisfactory outcome for decision-makers, akin to a reservation price that sets a minimal threshold in bargaining (Fiegenbaum et al., 1996; Kameda & Davis, 1990; Schneider, 1992).

Functioning under bounded rationality, organizations simplify complex performance evaluations by categorizing outcomes as either successes or failures, using the aspiration level as the line of demarcation for risk-taking (March & Simon, 1958; March, 1988). When performance falls short of the aspiration level, firms are more inclined to engage in riskier ventures (Bromiley & Harris, 2014; Greve, 1998, 2003; Lant et al., 1992; March & Shapira, 1992).

Social and historical influences are inputs that help establish aspiration levels. Social aspiration levels are rooted in social comparison theory, whereby firms benchmark themselves against peers (Cyert & March, 1963; Festinger, 1954). This serves for self-assessment or self-enhancement and heavily depends on the characteristics deemed relevant by the firm, such as size, industry, and prior performance (Davis & Greve, 1997; Haveman, 1993; Wood, 1989).

Historical aspiration levels, conversely, are informed by the firm's own performance history. They represent an internal standard that reflects the organization's past achievements and failures (Cyert & March, 1963; Levinthal & March, 1981). This allows firms to tailor their aspirations to their unique experiences, ensuring that benchmarks are realistic and attainable given specific firm contexts and capabilities.

Firm decision makers behave as intuitive scientists, constructing expectations of future performance based on available data and simple processing rules (Meyer & Gellatly, 1988; Nisbett & Ross, 1980). The expectation formed from the performance of referent organizations or the firm's own history then becomes the aspiration level, guiding future organizational strategies and risk behaviors (Lant et al., 1992).

ESG: Various terms have been used to describe corporate engagement with environmental and social challenges. These include corporate citizenship, corporate responsibility (CR), corporate social responsibility (CSR), business ethics, environment social and governance (ESG), sustainability, and philanthropy. These terms are often used interchangeably. The commonality is that they deal with corporate social responsibility with a particular focus on environmental and social issues (Ditlev-Simonsen, 2022)**.**

Regarding evolving understandings of ESG, Veith et al. (2021) cite the UNECD Conference in Rio, the Kyoto Protocol, the UN Sustainable Development Goals (SDG´s), the Paris Climate Agreement 2016, the Principles of Responsible Investment, the European Green Deal and most recently the EU taxonomy as milestones (Veith et al., 2021, [authors translation]). The EU taxonomy, introduced on January 1, 2022, attempts to define criteria for environmental, social and, corporate governance. According to the EU taxonomy, economic activities that significantly contribute to at least one of the EU's climate and environmental goals[1] are classified as 'green' or ESG-compliant.

The EU regulation further introduces mandatory disclosure obligations for companies and investors, requiring them to disclose taxonomy-compliant activities. This is intended to help guide investment decisions. Companies demonstrating a high level of positive environmental performance are considered more investable.

[1] The EU's six climate and environment goals are climate change mitigation, adaptation to climate change, sustainable use and protection of water and marine resources, transition to a circular economy, pollution prevention and control, and protection and restoration of biodiversity and ecosystems (European Commission, 2021).

However, the EU taxonomy is not a mandatory guideline, nor does it contain binding requirements for companies or financial products. It is described as a working document that may be updated over time (European Commission, 2021a). Because ESG terminology is evolving, keywords such as ESG criteria, ESG compliant, sustainability, green, good, and environmental awareness are used interchangeably in this study. However, particular nuances of sustainability, i.e., environmental, social, and governance, should always be considered when using these terms.

Legitimization: Given the global sustainability movement and the wide range of social activism it has spawned, companies from various industries have come under the increased scrutiny of observers and non-governmental organizations (NGOs) who highlight "the negative contribution of companies to global environmental destruction" (Curbach, [authors translation] (2008). Corporate misconduct is morally sanctioned in the public domain through protests, calls for boycotts, and media-staged events. A prominent example was the conflict between Greenpeace and Royal Dutch Shell plc. in the mid-1990s over the planned sinking of the decommissioned Brent Spar oil platform (Holzer, 2007). For weeks, the oil company was subjected to public censure and a boycott of its own petrol stations by sections of the public.

Companies facing disapproval and criticism from NGOs and the public can incur significant economic damage. For example, Elon Musk consumed marijuana while recording a video podcast in 2018 (Bloomberg LP, 2018). The 'pot-smoking CEO' was watched by millions of viewers, and Tesla's share price dropped by 9.2% (LaFevre, 2021). Even though Tesla recovered, the immediate public reaction was striking. This illustrates how activities considered socially unacceptable, for social or legal reasons (governance) to actions that harm the environment (environmental), can have rapid consequences.

In the contemporary business landscape, companies have evolved new organizational patterns and approaches to legitimacy. By embracing sustainability certifications, engaging in corporate social responsibility (CSR) reporting, and innovating eco-friendly technologies, firms aim to secure public approval of their business practices as noted by Curbach (2008, [author's translation]).

The concept of organizational legitimacy was linked to sociological neo-institutionalism[2] by John W. Meyer and Brian Rowan in "Institutionalized Organizations: Formal Structure as Myth and Ceremony" (1977). The authors propose that organizations conform to societal 'myths' to maintain legitimacy and function. Legitimacy arises from collective perceptions within a social framework, validated as actions deemed desirable or proper (Suchman, 1995).

While firms theoretically possess the autonomy to adopt or dismiss societal norms, Meyer and Rowan (1977) contend that the process of institutionalization cements these norms as essential for legitimacy. The authors elaborate that the origins of legitimacy are diverse, ranging from public opinion to legal enforcement. They also observed that institutional rules can emerge rapidly in response to societal demands, as exemplified by the swift reactions of laws, unions, and public opinion to safety and environmental concerns (Meyer and Rowan, 1977).

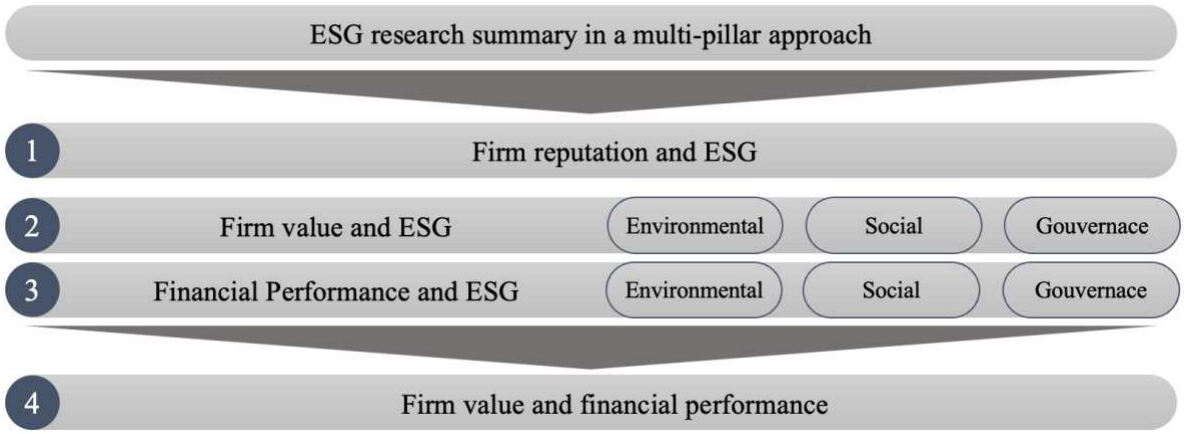
Meyer and Rowan (1977) further discuss how companies inherently pursue legitimacy and stability, recognizing these as foundational to long-term prosperity and continuity. They suggest that the imperative of legitimacy can occasionally eclipse the primary business objective of profit maximization, leading to 'ceremonial' compliance with societal pressures that might not align with the efficiency or profit motives highlighted by economic theorists like Milton Friedman, (1970) and Lazonick & O'Sullivan, (2000).

2 Literature review

This study is associated with two well-examined fields. The literature review will discuss the existing literature on ESG (2.1), address financial performance and firm value (2.2), periods of financial challenges (2.3) and gaps in the literature review (2.4).

[2] It is important to note that Meyer and Rowan's views remain predicated on the assumptions that the primary function of a company is to generate profits (Friedman, 1970) and maximise shareholder value (Lazonick & O'Sullivan, 2000).

Figure 1: Literature review



2.1 ESG

As shown in figure 1, ESG-related research is complex. Consequently, the discussion is organized into four sections. Firstly, the relationship between ESG and firm reputation will be discussed. Secondly, research on ESG and firm value will be examined. Finally, ESG and its impact on financial performance are investigated, following Zhou et al., (2022).

2.1.1 Firm reputation, stakeholder theory, and ESG performance

Meyer and Rowan (1977) propose that institutional rules function as "myths which organizations incorporate to gain legitimacy, resources, stability, and enhance survival prospects" (Meyer & Rowan, 1977). This view continues to be cited in discussions of ESG activities (Bitektine & Haack, 2015; Tost, 2011). In addition, stakeholder theory posits that satisfying the interests of different constituencies with whom the company is associated through various networks (stakeholders) ultimately determines the success of products and services (Freeman, 1984).

Contrary to the traditional principal-agent view (Jensen & Meckling, 1976), a firm may be characterized as a segment of society. This implies that some aspect of value creation pertains to how well it meets societal expectations. Thus, management must effectively balance various competing interests. This means prioritizing diverse and sometimes conflicting demands of different stakeholders in relation to corporate objectives (Freeman, 1984).

Sustainability activities are recognized as a critical stakeholder management tool. Roberts (1992) found that there was a positive relationship between stakeholder influence, sustainable achievements, and the rigors of sustainability reporting. This is further echoed by Clarkson et al. (2008), who asserted that the growing stakeholder interest in sustainable corporate strategies

underscores the importance of robust ESG reporting. They contend that this, in turn, positively correlates with key CSR performance metrics, including CSR ratings and reputational facets.

Overall, empirical studies on ESG activities found a positive relationship between firm reputation and ESG activity (Huang, 2021; Suchman, 1995). Minor and Morgan, (2011) even go as far as to say that ESG can act as reputation insurance, which they confirmed after sampling panel data over 10 years from the S&P500. Hypothesis 1 therefore is:

H_1: ESG activities are a positively associated signaling tool.

2.1.2 Firm market value and ESG performance

Most research on ESG has been narrowly focused on singular aspects such as environmental efforts, social responsibility, or corporate governance (Zhou et al., 2022). This study delves into the individual components of ESG and their collective impact on firm value and financial performance.

Environmental: Initial research, focusing on traditional cost perspectives, suggested that environmental efforts negatively impact firm value (Zhou et al., 2022). Al-Tuwaijri et al. (2004) identified a link between environmental performance and firm valuation but found no correlation with profitability indicators. Subsequent studies extending the analysis to long-term effects, using Tobin's Q, a valuation ratio of market capitalization to book value, revealed that enhanced environmental performance could drive profitability by reducing costs (Earnhart & Lizal, 2007). Nakamura (2011) further showed that long-term investments in environmental initiatives significantly boost firm value. Supporting this, Martin and Moser (2016) found that disclosures of such investments lead to positive investor responses. However, recent studies by Pekovic and Vogt (2021) observed an inverted U-shaped relationship between environmental performance and market value, indicating diminishing returns beyond a certain level of performance. Cojoianu et al. (2021) noted that ESG engagement, particularly regarding environmental issues, helps companies mitigate risks during crises. Gerged et al. (2021), using a 55-item environmental disclosure index, confirmed a positive association between environmental disclosures and firm value across the Gulf Cooperation Council.

Social: The link between corporate social responsibility (CSR) and firm value, grounded in stakeholder theory, remains ambiguous despite extensive empirical research since Moskowitz's (1972) initial study (Zhou et al., 2022). While Cochran & Wood (1984) observed a positive correlation between social activity and firm value, Chen et al. (2001) suggested that CSR performance could dampen stock price volatility. However, the relationship between CSR and

risk reduction is complex, with Mishra and Modi (2013) noting that high financial leverage may negate CSR benefits. Fatemi et al. (2018) found that ESG boosts firm valuation, yet excessive disclosures paradoxically could lower it, especially for firms with existing strong ESG records. Albuquerque et al. (2019) modeled CSR as an investment, showing how it can decrease systematic risk and enhance firm value, particularly in businesses with distinct product differentiation. Moreover, practices like gender-diverse boards are positively related to firm value, as identified by Qureshi et al. (2020).

Governance: Governance research examines how organizational structure, ownership, board design, and executive compensation impact firm valuations. While many studies focus on equity and board structure, other aspects of governance are also important. Larcker et al. (2022) proposed that governance should not be lumped together in the ESG framework. The argument posits that the 'G' in ESG encompasses aspects such as board quality, fair compensation, ownership accountability, and ethical practices, which are crucial not only for ESG-focused companies but also for those with minimal ESG emphasis. This underscores the significance of governance quality in all organizations, not only for socially conscious companies but also for those attempting to reduce their environmental impact. The authors argue that a governance system and measuring the quality of governance are largely independent of a firm's ESG agenda (Larcker et al., 2022).

Cornell and Damodaran (2020) also challenge the inclusion of governance in ESG ratings, contending that traditional governance focuses on managerial accountability to shareholders, not stakeholders. This contrasts with the stakeholder-centric approach prevalent in ESG frameworks. Bebchuk and Tallarita (2020) argue that prioritizing stakeholders over shareholders does not inherently enhance firm accountability. Similarly, Kyle & Vila (1991) observed that conflating the roles of the board chairman and management can lead to decisions harmful to a firm's value.

The literature suggests diverse impacts of ownership structures on valuation. Karamanou and Vafeas (2005), and Petersen (2009) note that concentrated ownership can disadvantage minority shareholders, particularly in Chinese public firms. In contrast, Drakos and Bwkiris (2010) report that management ownership is positively correlated with firm value in Greece. While ESG performance tends to generate positive investor sentiment, Nekhili et al. (2019) found that employee board membership can be viewed unfavorably. Ionescu et al. (2019) demonstrated that governance aspects of ESG contribute positively to firm market value globally. However, Nekhili et al. (2021) indicated that labor representatives on boards might

excessively focus on social issues, potentially neglecting environmental and governance factors.

$H_{2a:}$ ESG activities have a positive impact on firm value.

2.1.3 Financial performance and ESG performance

Here, we discuss ESG and financial performance. Again, few research papers have a comprehensive approach that covers both financial performance and ESG. They typically adopt one of three distinct approaches:

Environmental: A positive correlation between environmental initiatives and financial success is well documented. Such measures bolster public image and industry respect, translating into tangible business advantages. Telle (2006) found mixed outcomes but noted environmental sustainability's positive financial impact in sectors like pulp and paper. Sharfman and Fernando (2008) observed that reducing environmental risks could lower financing costs and enhance profitability. Iwata and Okada (2011) analyzed data from Japanese manufacturers, revealing varied financial effects. Reductions in greenhouse gas emissions generally improved finances, while waste reduction did not yield the same benefits, particularly in pollution-intensive industries. Lahouel et al. (2020) identified a nuanced relationship between environmental and financial performance among French firms, with both inverted-U and inverted-V relationships when assessing Tobin's Q and ROA, respectively.

Conversely, some studies indicated a negative correlation, suggesting that environmental efforts may increase costs and dampen financial performance. Stanwick and Stanwick (1998) posited that higher pollution levels correlated with increased profits, highlighting the role of company size, financial performance, and environmental actions in determining corporate social performance. Horváthová (2010) pointed out that the perceived relationship varied according to research methodology, with simpler analyses more likely to show negative correlations and a positive association more common in common law countries. The findings underscore the significance of longitudinal data in establishing a positive environmental-financial link.

In essence, while most studies support a positive relationship between environmental initiatives and financial performance, there is considerable variance in the findings.

Social: Research on CSR's influence on financial performance predominantly finds a beneficial link, although some studies identify neutral or negative relationships. Inoue and Lee (2011)

assessed various CSR aspects, concluding that while all positively affected profitability, the impact varied across CSR dimensions and over time.

Mallin et al. (2014) explored CSR within 90 banks across 13 Islamic countries, revealing a positive CSR-performance correlation in non-Western settings. Similarly, Maqbool and Zameer (2018) observed a favorable impact of CSR on the financial performance of Indian banks.

Lin et al. (2019), however, noted that while financially successful firms are more likely to engage in CSR, this does not necessarily lead to superior financial performance, aligning with the trade-off hypothesis[3]. They found that CSR could negatively affect metrics such as return on equity and assets.

Pekovic and Vogt (2021) suggested the 'fit' between CSR and corporate governance plays a crucial role, with factors like board composition and ownership concentration moderating CSR's financial impact. Supporting a cautious approach, McWilliams and Siegel (2000) argued that CSR could impede free market dynamics and divert resources from vital investments, such as R&D, impairing financial outcomes.

Governance: Governance has been critiqued as not belonging to the sustainability bucket, as mentioned above. However, it has also been widely researched with consistent positive correlations between sound corporate governance and financial performance. Corporate governance encompasses elements such as organizational layout, ownership design, board management, and executive pay.

Holderness et al. (1999) highlighted the significant influence of a company's ownership structure on financial performance, particularly noting the effects of ownership concentration. Lefort & Urzúa (2008) found that boards with a higher ratio of external directors can positively impact firm valuation and financial outcomes.

Xi et al. (2019) explored the relationship between corporate efficiency, sustainability, and profitability. They found that moderate levels of ESG disclosure correlated positively with corporate efficiency, with governance disclosures showing the strongest positive impact, followed by social and environmental disclosures. Most ESG activities were positively related to corporate financial performance, including return on assets and market value.

[3] This hypothesis posits that when firms are ‘‘being socially responsible’’, they will tend to experience minimized shareholder wealth and lower profits, which restricts socially responsible investments.

Velte (2017) found ESG practices to positively influence Return on Assets (ROA), although no significant effect on Tobin's Q was observed. Specifically, governance components of ESG appeared to have the most substantial impact on financial performance (FINP[4]), surpassing environmental and social factors. Tampakoudis and Anagnostopoulou (2020) examined ESG dynamics in mergers and acquisitions, discovering that acquiring companies experienced an increase in ESG performance and, consequently, market value when they merge with targets with superior ESG ratings.

Overall, a positive correlation between financial performance and ESG appears. Theoretical frameworks employed by researchers include sustainable development theory[5], the resource-based view[6] , and the information asymmetry theory[7].

H_{2b}: ESG activities have a positive impact on financial performance.

2.2 Financial performance and company market value

The link between financial performance and the market value of publicly listed companies has been researched for many years. Four indicators have been typically used: profitability, operating capacity, solvency, and development capacity (Zhou et al., 2022). Concerning company value, some papers use stock price or market cap, whilst others deploy Tobin's Q to measure market value (Wernerfelt & Montgomery, 1988).

Since financial profitability is the goal for any venture, extensive research has been conducted on profitability and firm value. Studies rely on the Fama-French framework, which introduces

[4] FINP can be classified as "financial visibility, or the extent to which a company achieves its economic goals". (Price and Mueller, 1986, quoted by Orlitzky et al., 2003)).

[5] Sustainable development theory posits that businesses focusing on green management and ESG considerations can achieve sustainable growth, leading to improved financial performance. This can manifest in actions like investing in pollution control technology and adopting environmental strategies, which can boost market share by improving production efficiency and reducing pollutants.

[6] The resource-based view indicates that enterprises have various distinctive forms of resources and capabilities. These are considered to be the source of a firm's competitive advantages (Barney, 1991; Wernerfelt, 1984). In this context, investing in environmental management and innovative green technologies becomes is an asset for businesses, enhancing financial outcomes (Russo & Fouts, 1997).

[7] Information asymmetry theory emphasizes that ESG performance can alleviate informational gaps, positively influencing financial results. Porter and Vanderlinde (1995) argued that exemplary environmental performance is a unique and valued asset, aligning with societal expectations, drives business profits, and fosters a harmonious balance between environmental conservation and enterprise competitiveness.

factors beyond the Capital Asset Pricing Model (CAPM) to explain stock returns, including corporate profitability (Fama and French, 1992; 2015).

Earlier, Ball and Brown (1968) demonstrated how accounting income numbers correlated with stock price movements and how income announcements caused changes in stock returns. Similarly, Barth et al. (2001) found that book value and net income influence a firm's market value.

All the papers referenced contribute to the understanding of asset pricing. Specifically, two primary views determine the present value (PV) of an asset: (1) the absolute valuation theory associated with the discounted cash flow model (DCF) and (2) the relative valuation theory. To grasp the impact of ESG on valuation, both are discussed below.

(1) **Absolute valuation theory** holds that the value of an asset is the present value of expected future cash flows (Damodaran, 2012). The present value of an asset is based on discounting future cash flows by a risk-adjusted discount rate. However, determining the right discount rate is challenging and leads to undervaluing or overvaluing assets.

Figure 2: Absolute valuation theory

Expected cash flow (CF) in time periods (n)

$$Value = \frac{E(CF_1)}{(1+r)^1} + \frac{E(CF_2)}{(1+r)^2} + \cdots + \frac{E(CF_n)}{(1+r)^n}$$

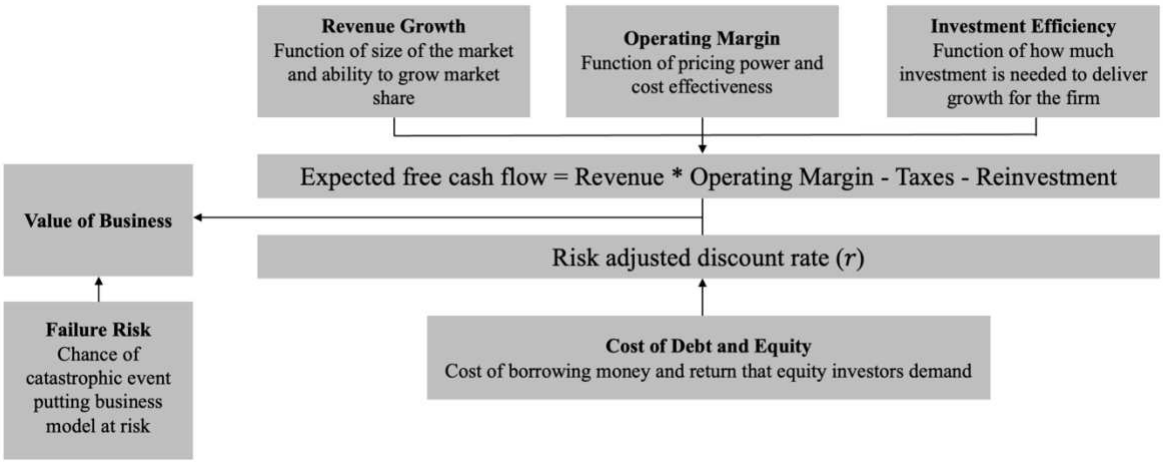
Risk adjusted discount rate (r)

(2) **Relative valuation theory** determines an asset's value by comparing it to similarly priced assets, using a standard measure such as earnings, cash flows, book value, or revenues (Damodaran, 2012). A practical example of this method is valuing a company using the industry's average price-earnings (P/E) ratio. The premise is that other companies in the industry are similar to the one being evaluated, and the market generally prices these entities accurately (Damodaran, 2012).

This concept strongly aligns with Fama's (1970) efficient market hypothesis (EMH), where capital markets are treated as efficient based on their incorporation of all relevant information into asset prices. Therefore, it is impossible to consistently achieve higher-than-average market returns (termed alpha) by analyzing historical returns or through publicly available information

because prices instantly reflect and adjust to new information. The EMH has three forms: weak, semi-strong, and strong, depending on the level of information reflected in stock prices. Essentially, valuation metrics assigned by investors, whether using absolute or relative valuation methods, will not reveal mispricing that can be exploited for outsized returns. Hence, in both established and emerging markets, a company's market value is strongly positively associated with its financial performance, as reflected by a firm's profitability (Damodaran, 2012; Fama, 1970; Zhou et al., 2022).

Figure 3: Relative valuation theory



Notes: Based on Cornell and Damodaran (2020)

To increase any firm's value, Damodaran (2012) and McKinsey & Company et al., (2015) point to four possible levers. Incorporating ESG into at least one or more of these critical drivers of value is imperative if it is to causally enhance a firm's value proposition.

1. **Growth**: Most companies and investors view growth favorably since it allows companies to scale up and increase their market share. This is reflected in sales growth.
2. **Profitability**: Ultimately, there is no benefit to scaling up a business if it fails to generate profit. This is measured by the operating profit margin.
3. **Investment efficiency**: Growing revenues requires investment. Investment efficiency describes how effectively a firm allocates and uses its resources, particularly financial resources, to generate returns and create value based on return on capital. More capital-efficient companies deliver greater added *revenue for every dollar invested*. Efficiency is measured through the capital expenditure to sales ratio and return on assets.
4. **Risk**: Rather than becoming mired in debates about risk and return models in finance and the difficulties of measuring risk, risk primarily can be taken to appear in two places. The

operating risk of a business is a going concern, which involves uncertainties regarding revenues and future operating income. This is captured in *the cost of capital*; higher costs of capital for any given set of expected cash flows will lead to lower valuations (Cornell & Damodaran, 2020)[8].

Based on the above, research has yielded many substantial findings on ESG, financial performance, and value. Hypothesis three is:

H_3: Financial performance is a lever for firm value.

2.3 Periods of financial challenge

Management seeks to improve a firm's longevity and reach targeted performance goals. When firms fail to achieve objectives, managers actively search for strategies to steer the businesses back on the desired course. Several behavioral undertakings and patterns have been observed.

Management may pursue a 'problematic search' (Cyert & March, 1963) to alleviate performance shortcomings. This may emphasize activities such as immediate refinements to existing technology, greater firm efficiency, changes to present firm behavior, or other new actions that reduce or eliminate the discrepancies between targets and performance (Levinthal & March, 1981). This has led many firms to a strategic reorientation (Barker & Duhaime, 1997; Sudarsanam & Lai, 2002), such as divestments from unprofitable businesses (Meschi & Métais, 2015), adjustments to accounting measures (Healy & Palepu, 2001), or replacement of key positions based on age and experience (Desai, 2008). This implies being more open in the selection of business partners (Baum et al., 2005) or risky organizational changes (Greve, 1998).

A widely researched and employed strategy is to increase investments in research and development (R&D) (Bowen et al., 2010; Chen & Miller, 2007; Lucas et al., 2018). However, R&D expenditure can be associated with high opportunity costs, especially for larger firms or those with long development cycles (Dalziel et al., 2011). This often stresses operations and accounting performance indicators[9], leading to further negative effects (Gavetti et al., 2012).

[8] The weighted average cost of capital could be insightful, however the university's DataStream subscription does not provide the corresponding variable.

[9] Such as return on assets, for example.

Therefore, for firms experiencing a deficit in financial performance, investing in R&D may not be a wise strategic move in the short term (DasGupta, 2022).

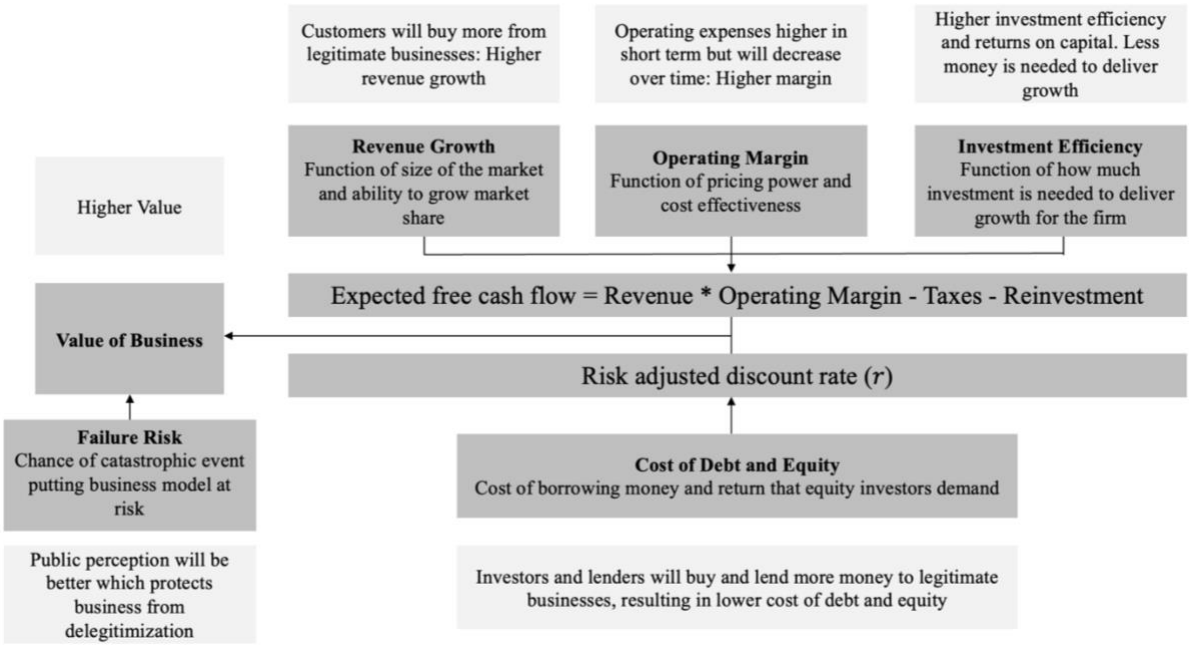
This poses the question of what other possible levers underperforming companies can employ. Recent research has shown that ESG actions have the potential to improve company valuations relatively inexpensively and rapidly. Therefore, hypothesis four is:

H_4: ESG activities are a useful tool to promote firm competence and legitimacy.

2.4 Gaps in literature and relevance of the present study

Most studies have investigated only one aspect of ESG, even though the concept encompasses all three components. ESG activities and their outcomes are often not seen as an instrument that can be used but rather as an ongoing process to be installed. Most studies exploring the outcomes of ESG activities do not propose them as a lever for strategic change. This paper posits ESG as a management tool that can be strategically employed to mitigate challenging periods for firms. This contrasts with many ESG advocates who consider what Cornell and Damodaran (2020) describe as a "virtuous cycle" or simply the payoff of being good.

Figure 4: The virtuous cycle



Notes: Based on Cornell and Damodaran (2020)

As shown in figure 4, being good can benefit a company across every dimension. Customers prefer to buy products and services from social enterprises, thereby allowing the company to gain market share. Even if ESG conformity creates higher operating expenses, cost structures

should adjust, and margins should remain unchanged or even grow. Thus, the payoff of being good might arise from lower employee turnover and hiring costs, better relationships with suppliers who deliver better products and who are more loyal and less likely to switch to unethical competitors. Governmental and general support of the firm might also be higher, coupled with a lower probability of catastrophic scandals that put the business at risk. Furthermore, the cost of capital might be lower for ESG-conforming firms, as debt and equity investors are less concerned about the longevity and risk of the business.

The subsequent numerical analysis tries to evaluate the empirical validity of the "virtuous cycle" for companies, particularly those recovering from financial downturns, to determine how and if theoretical advantages of ESG manifest in practice and could be considered a strategic tool.

3 Materials and methods

Part two of this study is structured as follows. We use existing ESG data following financial downturns. However, instead of a single fixed effects estimator (DasGupta, 2022), we argue that the dependent variable, ESG, is time-dependent, and a dynamic model is more appropriate.

Next, slightly changing the research objective, we investigated comparable models to determine if firms really benefit from higher ESG activities after financial declines. The analysis, now including Tobin's Q as a dependent variable, allowed for further interpretation of the implications of ESG activities and their effect on long-term business outcomes, with emphasis on financial aspiration shortfall.

3.1 Methodology and variables

The main dependent variable for the first analysis is ESG performance, which was taken from DataStream and encompasses all relevant environmental, social, and governmental performance of each firm[10]. Datapoints with missing ESG data were treated with forward and

[10] Refinitiv captures and calculates over 630 company-level ESG measures, of which a subset of 186 of the most comparable and material per industry, power the overall company assessment and scoring process. These are grouped into 10 categories that reformulate the three pillar scores and the final ESG score, which is a reflection of the company's ESG performance, commitment and effectiveness based on publicly-reported information. The category scores are rolled into three pillar scores – environmental, social and corporate governance. The ESG pillar score is a relative sum of the category weights, which vary per industry for the environmental and social categories. For governance, the weights remain the same across all industries. The pillar weights are normalized to percentages ranging between 0 and 100 (Thompson Reuters, 2022)

backward propagation adjustments, implying an unchanged ESG score in the preceding or following year for empty data points (Naumov, 2017).

Building on the approach used by DasGupta in 2022, we factor in ESG-related disputes (ESGCON) as a mediating variable. This involves a binary indicator that assigns a '1' to companies with high ESG-related disputes and a '0' to all others. The scoring for ESG disputes is derived from 23 specific ESG-related issues. If a company is embroiled in a scandal that year, it is penalized, negatively affecting its ESGC score and overall rating. Ongoing media coverage as the dispute unfolds is also considered in the scoring. ESG disputes cover a range of issues: environmental (like ecological damage, chemical spills, and pollution), social (such as workplace health and safety, and lack of diversity), and governance (including unfair executive remuneration, insider trading) (Dorfleitner et al., 2020).

This study used firm aspiration levels in both social and historical contexts. The social aspiration level was calculated as the mean ROA from the preceding year within an industry[11], disregarding the focal firm's performance. The historical aspiration level is a mixture of past-period historical aspiration level and the previous performance of the focal firm (Greve, 2003; Shinkle, 2012), also calculated using ROA.

Financial performance shortfall is determined by comparing both measures with the actual performance in the observation year for each individual firm (DasGupta, 2022; Greve, 2003). With this methodology and computation, the study ends up with two relevant variables: historical aspiration shortfall (HASF) and social aspiration shortfall (SASF).

$$Historic\ Aspiration\ Shortfall_{it} = ROA_{it} - ROA_{i,t-1}$$

ROA_{it} = return on assets for firm i in time period t

$ROA_{i,t-1}$ = return on assets for firm i in previous time period $t-1$

$$Social\ Aspiration\ Shortfall_{it} = ROA_{it} - Mean\ ROA_{jt}$$

ROA_{it} = return on assets for firm i in time period t

Mean ROA_{jt} = mean return on assets for firms in the industry j (excluding firm i) in time t

The underlying hypothesis that only growth, margin, and investment efficiency influence business value (Cornell & Damodaran, 2020) leads to further mediating variables.

[11] Based on the ICB classification.

Following Shi and Veenstra (2021) and Damodaran (2012), firm performance is measured using return on assets (ROA[12]). Revenue growth (REVG%) captures the increase in net sales or revenue, and operating margin (OM%) captures the operating flexibility and the price-setting power of a firm (Kanagaretnam et al., 2015).

Because return on investment is difficult to capture with equity data at the firm level, this study uses CAPEX intensity and R&D intensity as indicators of investment efficiency. The underlying hypothesis is that a low intensity rate is positive because less investment is needed to deliver sales.

Furthermore, firm size and firm age are used as control variables, in line with the relevant literature (DasGupta, 2022; Deb et al., 2019; Duque & Caracuel, 2021; Greve, 2003; Shi & Veenstra, 2021).

Slack is included as a variable to understand a firm's resource management, strategic flexibility, and most importantly, financial health. Absorbed slack, calculated as the ratio of selling, general, and administrative expenses to sales, indicates how much of a company's overhead is used in generating sales. Potential slack, shown by the ratio of long-term debt to total assets as per Deb et al. (2019) and Greve (2003), indicates a firm's ability to leverage additional resources for future opportunities or investments. Including slack measures helps assess a firm's operational efficiency, ability to adapt, and investment in strategic initiatives.

All firm-level variables were winterized at the 1% and 99% percentiles, by fiscal year, to mitigate skew from outliers.

For the second part of the analysis, the dependent variables were changed to capture stakeholder perceptions of firm value.

Firm value and change in firm value were measured using Tobin's Q[13] (TBQ), following numerous prominent finance, business, and economic papers (Lang et al., 2004; Lewellen & Badrinath, 1997).

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[12] Because ROE is affected by a firm's mix of equity and debt, it is a difficult metric to compare across firms. Thus, ROA is preferable.

[13] Tobin's Q, also called the q statistic of a firm, is calculated as the ratio of the market value of outstanding financial claims on the firm relative to the current replacement cost of the firm's assets. The notion is that replacement cost is a logical measure of the alternative-use value of the assets. Hence, unless assets are used by a firm to create at least as much market value as the cost of reproducing them, assets would be better employed

Tobin's Q has also been used as an indicator of intangible value (Lindenberg and Ross 1981) and encompasses investors' perceptions of future performance expectations and should reflect the expected value added from investments irrespective of the number of years needed for payoffs (Deb et al., 2019). The TBQ may be affected by market enthusiasm and speculation or by investor pessimism and biases. If investors views of a company are shaped by cultural and legitimizing factors and the company's contributions to ESG initiatives, this affects market value, thus reflecting firm legitimacy.

$$TBQ = \frac{Equity\ Market\ Value}{Equity\ Book\ Value}$$

Table 1: Variables and description

	Variable name	Symbol	Definition
Dependent Variable	ESG score	*ESG*	= ESG score
	Toobin's Q	*TBQ*	= (Market equity value / Book value of total assets) *100
Mediating variable	ESG controversies	*ESGCON*	= ESG controversies score;1 for firms with high controversies (below 75) and 0 for firms with low controversies (above 75)
Independent variable	Social aspiration shortfall	*SASF*	= Social aspiration performance shortfall indicator
	Historical aspiration shortfall	*HASF*	= Historical aspiration performance shortfall indicator
Control Variable	Lagged ESG score	*ESGLAGG*	= ESG score t-1
	Firm size	*Size*	= Log(Net Revenue)
	Firm age	*Age*	= Log(current year – year of incorporation)
	Return on assets	*ROA%*	= (Net Income – Bottom Line + ((Interest Expense on Debt-Interest Capitalized) * (1-Tax Rate))) / Average of Last Year's and Current Year's Total Assets * 100
	Revenue growth	*REVG%*	= (Current Year's Net Revenue / Last Year's Total Net Revenue - 1) * 100
	Net operating margin	*OM%*	= (Operating Income / Net Revenue) * 100
	CAPEX intensity	*CAPEXINT%*	= (Capital Expenditure / Net Revenue) * 100
	R&D intensity	*R&DINT%*	= (Research and Development Expense / Net Revenue) * 100
	Absorbed slack	*ABSlack*	= SG&A / Sales
	Potential slack	*PSlack*	= Long term debt / Total assets

elsewhere. Firms displaying q's greater than unity are judged as using scarce resources effectively, and those with q's less than unity are judged as deploying resources poorly in investors' minds (Lewellen & Badrinath, 1997).

3.2 Models and data set

We used two types of datasets and six different regression models, specifically built and optimized to deliver insights. First, the structure of the models is discussed.

All models are based on the fixed effects estimator, as Hausman specification tests that compare fixed and random effects models, indicated their appropriateness. The preference for fixed effects models is consistent with the research aim to examine effects across firms while controlling for unobserved heterogeneity that is constant over time, especially longer periods. Moreover, the dataset experiences attrition, which undermines the appropriateness of employing a fixed effects model (Wooldridge, 2010), as fixed effects accommodate attrition by allowing it to be correlated with the unobserved firm-specific effect, represented by a_i.

To address potential first order autocorrelation in the panel dataset, the lagged dependent variable is included as a control variable in all models, turning the model into a "dynamic fixed effects model" (Deb et al., 2019). The models also showed no prior indication of multicollinearity, as the test for variance inflation factors showed values below 2, apart from one variable showing VIF of 4, which was not a concern for the validity of the model (Wooldridge, 2010).

Potential endogeneity concerns caused by omitted variables that influence both the dependent and independent variables were addressed by controlling for firm fixed effects, year fixed effects, and the lagged dependent variable[14].

Firm fixed effects can control for time-invariant omitted variables, but they cannot control for variables that vary across time and across entities. In line with other research (DasGupta, 2022; Deb et al., 2019; Greve, 2003), we employed instrumental variables in a two-stage least square estimator model (2SLS), which is suitable for panel data analysis. The choice of instrumental variables for the 2SLS model was predicated on the likelihood that the main independent variables (HASF and SASF) were endogenous. Firm-specific omitted factors, such as historical financial and strategic decisions, could strongly correlate with current or future shortfalls, influencing both the dependent and independent variables, and leading to biased estimations. To correct for potential endogeneity, the 2SLS estimator used ESG intensity, defined as the

[14] Industry fixed effects are excluded in the fixed effects model due to their time-invariant nature, which, after differencing, results in zero variation and therefore cannot be estimated.

mean ESG intensity of all firms in the industry, excluding the focal firm, as the first instrument. This industry benchmark accounted for the broader trends in ESG practices, providing a relevant predictor for a firm's ESG initiatives while remaining exogenous to individual firm's errors. The second instrument, average industry firm growth, was calculated similarly as the mean growth of all firms in the industry, again excluding the focal firm. This average indicates the industry's overall expansion trajectory, which impacts a firm's growth but is not directly influenced by its specific characteristics or performance. The third instrument used, average TBQ, followed a similar theoretical approach, aimed at predicting aspiration shortfall by projecting the overall quarterly TBQ for firms in an industry, without being affected by the firm's individual characteristics.

These instruments were expected to be correlated with the endogenous variables HASF and SASF but not with the error terms in the regression, thus fulfilling the requirements of valid instruments. Sargan tests validated the exogeneity of all instruments at a 10% significance level, confirming their suitability and joint significance for use in the 2SLS estimation process[15]. By using these instruments, this study aimed to generate more consistent and unbiased estimates of the effect of ESG activity and TBQ on HASF and SASF, contributing to the robustness of findings and challenging other models.

The dataset was comprised of quarterly firm-level panel, encompassing data from 504 firms over 20 years. Despite not being a balanced panel - attributable to changes in reporting formats among some firms - the extensive time frame and the substantial number of observations indicate the reliability of the fixed effects model employed.

The first stage of the empirical analysis used the full dataset for models 1 through 3, ensuring comprehensive inclusion of the data spectrum. Stage two introduced a refined approach, where models 4, 5, and 6 were introduced with distinctly modified datasets.

This modification segregated firms into two categories based on their mean shortfall across the entire dataset period. Firms that exhibited shortfalls exceeding the mean were allocated to a 'High Shortfall' dataset, while those with shortfalls below the mean threshold were assigned to a 'Low Shortfall' dataset. This bifurcation was meticulously conducted for the two shortfall metrics, HASF and SASF, yielding stratified data pools. This methodology was not only

[15] Whilst more instrumental variables could be used for estimation, the addition of too many variables would eventually lead to infinite sample bias and would weaken the F statistic significantly.

statistically sound but also aligned with the goal of discerning patterns that were potentially unique to each subgroup's financial trajectory (Yusriza et al., 2022).

Equations 1 to 3 were used in the first stage, with ESG as a dependent variable. The research objective here was to determine how firm financial characteristics influenced ESG scores and to determine if shortfall firms invested more into ESG activities.

Equation 1: ***FE ESG***

$$ESG_{it} = \alpha + \beta_1 TBQ_{it} + \beta_2 HASF/SASF_{it} + \beta_3 ESG_{it-4} + \beta_{4-12} CONTROL + \gamma_t + \alpha_i + \varepsilon_{it}$$

$CONTROL$[16]:

$$R\&DINT\%_{it} + CAPEXINT\%_{it} + REVG\%_{it} + OM\%_{it} + ROA\%_{it} + Age_{it} + Size_{it} + ABSlack_{it} + PSlack_{it}$$

Model one is the base fixed-effects model with β_1 capturing the relationship between ESG and Toobin's Q, β_2 captures the shortfall dummy, historical or social. The lagged ESG score is captured in β_3. Control variables are consistent across all models and capture R&D intensity, CAPEX intensity, revenue growth, operating margin, return on assets, age, size, and both slack variables. Due to the nature of fixed effects, the error term is decomposed into year fixed effects, firm fixed effects, and the unobserved error term captured by γ_t, α_i and ε_{it} respectively.

Equation 2: ***FE ESG + Interaction***

$$ESG_{it} = \alpha + \beta_1 TBQ_{it} + \beta_2 HASF/SASF_{it} + \beta_3 ESG_{it-4} + \beta_4 HASF/SASF_{it}: ESGCON_{it} + CONTROL + \gamma_t + \alpha_i + \varepsilon_{it}$$

Model two adds the interaction term between high ESG controversies and the shortfall indicator. With this addition to the initial model, further insight into how firms behave under pressure and specifically on prospect theory implications is gained. The control variables and error terms remain unchanged.

Equation 3: ***FE ESG + Interaction 2SLS***

$$\widehat{HASF/SASF_i} = \pi_0 + \pi_1 AverageESG_{jt} + \pi_2 AverageREVG\%_{jt} + \pi_3 AverageTBQ_{jt} + \pi_{4-12} CONTROL + v_{it}$$

$$ESG_{it} = \alpha + \beta_1 TBQ_{it} + \beta_2 \widehat{HASF/SASF_{it}} + \beta_3 ESG_{it-4} + \beta_4 \widehat{HASF/SASF_{it}}: ESGCON_{it} + \beta_{5-12} CONTROL + \gamma_t + \alpha_i + \varepsilon_{it}$$

As mentioned, a 2SLS estimator will be employed to address potential endogeneity concerns within the shortfall indicator. This method requires two models, of which only the latter will be used in the analysis. In the first model, a linear function is applied to regress and predict the shortfall indicators HASF and SASF, denoted with a head, using average ESG intensity,

[16] Holds true for all models.

average revenue growth, and average TBQ among industries as independent instrument variables and all control variables at firm level. The fitted shortfall indicators will then be used as the independent variable in model three. This approach serves as a robust check to the prior models, because if endogeneity issues were present, the residual error term ν_{it} may correlate with the error term ε_{it} or the dependent variables changing the initial findings.

Equations 4 to 6 were used in the second stage, with TBQ as a dependent variable. The main research objective was to determine how firms influence their TBQ and to determine if shortfall firms were viewed differently by the market and how ESG activities might moderate this effect.

Equation 4: *FE TBQ*

$$TBQ_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 HASF/SASF_{it} + \beta_3 TBQ_{it-1} + \beta_{4-12} CONTROL + \gamma_t + \alpha_i + \varepsilon_{it}$$

In the restructured Model 4, the analytical emphasis was shifted to the determinants of TBQ, with a particular interest in discerning the influence of control variables that were previously employed in Models 1 to 3. This model repositioned TBQ as the dependent variable to explore its responsiveness to the explanatory variables. To allow for comparison and maintain the structure used in the previous models and to control for the linear regression assumptions, a lagged dependent variable of TBQ[17] was again included. The application of a fixed effects model, alongside a panel data framework, again controlled for unobservable heterogeneity across firms and time periods, isolating firm and year fixed effects, ensuring result robustness.

Equation 5: *FE TBQ + Interaction*

$$TBQ_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 HASF/SASF_{it} + \beta_3 TBQ_{it-1} + \beta_{4-12} CONTROL + \beta_{13-21} INTERACTION + \gamma_t + \alpha_i + \varepsilon_{it}$$

Interaction:

$HASF/SASF_{it}: ESG_{it} +$
$HASF/SASF_{it}: R\&DINT\%_{it} +$
$HASF/SASF_{it}: CAPEXINT\%_{it} +$
$HASF/SASF_{it}: REVG\%_{it} +$
$HASF/SASF_{it}: OM\%_{it} +$
$HASF/SASF_{it}: ROA\%_{it} +$
$HASF/SASF_{it}: ABSlack_{it} +$
$HASF/SASF_{it}: PSlack_{it}$

[17] As Tobin's Q is a continuous variable that possesses quarterly characteristics, the lag accounts for one period and not four, as it is the case for ESG scores, that are constant over quarters.

Equation 5 retained the core attributes of equation 4 but introduced interaction terms between the shortfall indicator and the above mediators. The model now captures the possible change in effect for all mediators when a firm either experiences HASF / SASF or does not. It allowed for an analysis of how the market values firms by looking at metrics that are considered significant from the perspective of traditional market valuation theories, such as those proposed by Fama and French or Cornell and Damodaran (2020), and introduces ESG alongside them.

Equation 6: *FE TBQ + Interaction 2SLS*

$$\widehat{HASF/SASF}_i = \pi_0 + \pi_1 AverageESG_{jt} + \pi_2 AverageREVG\%_{jt} + \pi_3 AverageTBQ_{jt} + \pi_{4-12} CONTROL + v_{it}$$

$$TBQ_{it} = \alpha + \beta_1 ESG_{it} + \beta_2 \widehat{HASF/SASF}_{it} + \beta_3 TBQ_{it-1} + \beta_{4-12} CONTROL + \beta_{13-21} INTERACTION + \gamma_t + \alpha_i + \varepsilon_{it}$$

Interaction head:

$\widehat{HASF/SASF}_{it}: ESG_{it} +$
$\widehat{HASF/SASF}_{it}: R\&DINT\%_{it} +$
$\widehat{HASF/SASF}_{it}: CAPEXINT\%_{it} +$
$\widehat{HASF/SASF}_{it}: REVG\%_{it} +$
$\widehat{HASF/SASF}_{it}: OM\%_{it} +$
$\widehat{HASF/SASF}_{it}: ROA\%_{it} +$
$\widehat{HASF/SASF}_{it}: ABSlack_{it} +$
$\widehat{HASF/SASF}_{it}: PSlack_{it}$

The final model for TBQ as a dependent variable was based on the same methodical view as model 3 to address potential endogeneity concerns among the shortfall indicators by employing a 2SLS estimator through a two-step process. Again, if endogeneity issues are present, the residual error term v_{it} may correlate with the error term ε_{it} or the dependent variables changing the initial findings.

The first model in the 2SLS process regressed and predicted the shortfall indicators, HASF and SASF, by using industry average ESG intensity, average industry revenue growth, and average TBQ among the control variables at the firm level. The fitted shortfall indicators were then used as independent variables in the second model, which had the same structure as model 5.

3.3 Data analysis and results

Descriptive statistics, shown in table 2, indicated an average ESG level of 52 and proved that ESG does not uniformly translate to enhanced market valuation. ESG scores negatively correlated with Tobin's Q (TBQ), hinting at a potential disconnect between the market's valuation and the long-term benefits of ESG practices.

Table 2: Descriptive statistics and correlation matrix

Variables	*Mean*	*SD*	*ESG*	*ESGCON*	*TBQ*	*HASF*	*SASF*	*ESGLAGG*	*ROA%*	*CAPEXINT%*	*R&DINT%*	*REVG%*	*OM%*	*Age*	*Size*	*PSlack*	*ABSlack*
ESG	52,81	20,16	1.00														
ESGCON	80,24	31,24	-0.28***	1.00													
TBQ	1,83	1,66	-0.04***	0.08***	1.00												
HASF	0,47	0,50	0.04***	-0.01	-0.05***	1.00											
SASF	0,55	0,50	0.04***	-0.08***	-0.37***	0.17***	1.00										
ESGLAGG	52,19	20,19	0.93***	-0.27***	-0.05***	0.03***	0.03***	1.00									
ROA%	7,67	6,37	-0.01	0.05***	0.53***	-0.23***	-0.66***	-0.02**	1.00								
CAPEXINT%	9,65	15,26	-0.04***	0.08***	-0.11***	0.03***	0.04***	-0.04***	-0.19***	1.00							
R&DINT%	6,54	7,72	0.03***	-0.03***	0.32***	0.02*	-0.00	0.02*	0.02**	-0.04***	1.00						
REVG%	10,20	16,24	-0.17***	0.02***	0.24***	-0.18***	-0.06***	-0.16***	0.14***	0.02***	0.14***	1.00					
OM%	16,95	10,60	0.03***	0.02***	0.18***	-0.09***	-0.30***	0.03***	0.37***	0.14***	0.17***	0.05***	1.00				
Age	3,95	0,86	0.26***	-0.09***	-0.19***	0.01	0.05***	0.26***	-0.04***	-0.10***	-0.38***	-0.26***	-0.03**	1.00			
Size	15,86	1,41	0.46***	-0.49***	-0.25***	0.01*	0.10***	0.45***	-0.03***	-0.20***	-0.18***	-0.16***	-0.09***	0.26***	1.00		
PSlack	0,23	0,17	0.10***	0.05***	-0.04***	0.03***	0.03***	0.10***	-0.10***	0.27***	-0.22***	-0.07***	-0.02***	0.03**	-0.02***	1.00	
ABSlack	21,29	13,56	-0.06***	-0.04***	0.17***	-0.00	-0.01	-0.06***	-0.02***	-0.19***	0.27***	0.02***	0.09***	-0.01	-0.20***	-0.22***	1.00

Notes: Table reports mean, standard deviation and persons two tailed correlation results. * implies significance of 10%, ** implies significance at 5% and *** at 1% level.

Larger firms were more likely to score higher on ESG, which may reflect greater resources for sustainability investments and more public attention. Resource management within firms appeared strategic, as seen in the positive correlation between utilized and available resources, suggesting a balance between current use and future potential.

Higher ESG scores correlated with fewer controversies, underscoring effective risk management via ESG frameworks. Despite a moderate average ESG score across the sample, the variation pointed to differing degrees of sustainability integration. TBQ averaged at 1.83 signalled that firms are generally valued beyond their asset replacement costs, yet this average lay across a broad spectrum and proved the presence of a normalized data set (Financial Times, 2014).

Table 3 shows the regression results obtained with equations one, two, and three, respectively. The entirety of the dataset was used. Rows one to three show regression using HASF as the main independent variable and rows four to six show results on SASF.

Control variables such as firm age and size showed a highly significant and positive relationship with ESG scores, suggesting that larger and older firms may invest more in ESG practices. This can be explained by legitimization theory, which states that established firms may seek to safeguard their reputations by adhering more closely to societal and environmental norms. These firms, fearing the consequences of perceived illegitimacy, might actively pursue ESG initiatives to maintain their social license to operate and manage reputational risks (Meyer & Rowan, 1977). Absorbed slack was also significantly positive, hinting at the inclusion of ESG-related expenses within operational budgets. This could encompass activities directly related to employee well-being, development, and various sustainability efforts, aligning operational spending with ESG performance enhancement.

Tobin's Q did not emerge as a significant predictor of ESG scores, indicating that market valuation, did not drive ESG activities. The same held true for ESGCON, where coefficients showed a negative but not significant effect on ESG. This relationship might suggest that while ESG controversies typically can negatively affect ESG scores, the degree of impact may be contingent on how firms respond to and manage these controversies. This aspect will be further discussed when examining the results on models four to six.

The analysis produced interesting observations on the role of financial shortfalls. Shortfall indicators are statistically significant, and, positively associated with ESG when using equation 1 on both HASF and SASF. Shortfall indicators are statistically significant and positively

associated with ESG when using equation one on both HASF and SASF. This was in line with the initial assumptions and further proves the findings of DasGupta, (2022), showing that firms invest more in ESG activities when facing times of financial difficulties.

Using equations two and three with the interaction terms, the coefficients of HASF and SASF changed. Suddenly, a financial shortfall no longer led to a higher ESG score or had no significant impact. The interaction term between ESGCON and HASF was positive but not statistically significant. This could imply that firms should invest in higher ESG activities, especially when facing high ESG controversies and financial shortfalls[18].

The non-significance of potential slack, indicated by the ratio of long-term debt to total assets, might also reflect a firm's strategic priorities and risk appetite. Firms exhibiting lower ratios of long-term debt may be more conservative, potentially leading to a cautious approach to ESG investment. This cautiousness could stem from risk aversion or relate to the perceptions of uncertain returns associated with ESG projects.

The analysis also reveals that financial control variables, including R&D investments and operating margins, do not significantly affect ESG scores. This suggested that such financial health indicators might not directly contribute to ESG initiatives, implying that firms with higher profitability may not allocate their financial gains to ESG-related activities, potentially choosing instead to distribute dividends or make other types of reinvestments.

Preliminary findings allow for relevant conclusions. It can be assumed, that firms are aware of market valuation patterns, in line with the relative valuation theory. This becomes evident, as firms especially in times of aspirational shortfall, potentially try to reduce their chance of risking their business by scandals and bad press, mainly through ESG activities (De Franco, 2019). These findings are consistent with those of DasGupta (2022). However, it remains unclear whether these firm’s actions actually achieve the desired effect and gain legitimacy.

[18] The reverse effect might be true for SASF, as the coefficients are negative.

Table 3: ESG as dependent variable

	Historical based			Social based		
	Fixed Effects	**Fixed Effects * Interaction**	**Fixed Effects + 2SLS**	**Fixed Effects**	**Fixed Effects * Interaction**	**Fixed Effects + 2SLS**
	(Model 1)	*(Model 2)*	*(Model 3)*	*(Model 4)*	*(Model 5)*	*(Model 6)*
TBQ	0.118	0.134	0.148	0.161	0.175	0.173
	(0.227)	(0.227)	(0.220)	(0.219)	(0.224)	(0.224)
HASF / SASF	0.389*	0.477	0.630	0.238*	0.815	0.252
	(0.216)	(0.752)	(0.743)	(0.285)	(0.509)	(0.568)
ESGLAGG	0.571***	0.571***	0.572***	0.573***	0.572***	0.572***
	(0.028)	(0.029)	(0.028)	(0.028)	(0.028)	(0.029)
R&DINT%	0.062	0.076	0.060	0.046	0.086	0.070
	(0.211)	(0.208)	(0.208)	(0.212)	(0.219)	(0.221)
CAPEXINT%	-0.143	-0.143	-0.136	-0.134	-0.128	-0.126
	(0.133)	(0.131)	(0.127)	(0.126)	(0.122)	(0.123)
REVG%	0.011	0.011	0.009	0.008	0.007	0.007
	(0.018)	(0.018)	(0.017)	(0.018)	(0.017)	(0.017)
OM%	0.026	0.029	0.029	0.034	0.039	0.035
	(0.078)	(0.078)	(0.077)	(0.078)	(0.077)	(0.078)
ROA%	0.055	0.056	0.062	0.043	0.034	0.027
	(0.066)	(0.066)	(0.065)	(0.064)	(0.063)	(0.064)
Age	4.571***	4.432***	4.329***	4.500***	4.437***	4.438***
	(1.336)	(1.333)	(1.155)	(1.150)	(1.142)	(1.152)
Size	3.283***	3.199***	3.232***	3.274***	3.199***	3.240***
	(0.784)	(0.793)	(0.761)	(0.755)	(0.766)	(0.768)
ABSlack	0.353***	0.351***	0.376***	0.374***	0.379***	0.379***
	(0.103)	(0.103)	(0.100)	(0.099)	(0.099)	(0.099)
PSlack	-0.424	-0.425	-0.285	-0.330	-0.391	-0.310
	(3.399)	(3.422)	(3.373)	(3.390)	(3.401)	(3.403)
ESGCON		-0.983	-0.920		-0.640	-0.831
		(0.743)	(0.719)		(0.689)	(0.721)
HASF / SASF:ESGCON		0.130	0.099		-0.378	-0.031
		(0.845)	(0.824)		(0.991)	(0.993)
Instruments			3			3
Observations	5,413	5,413	5,413	5,413	5,413	5,413
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.756	0.757	0.759	0.758	0.759	0.759
Adjusted R^2	0.749	0.750	0.752	0.751	0.752	0.752

Notes: Coefficients are calculated with robust standard errors, using Arellano method. Standard errors as shown in parenthesis. Asterisk *, ** and *** indicate significance level for 10%, 5% and 1% level respectively. This holds true for all subsequent regression outputs.

Table 4 shows the results from the regression results obtained with equations four, five, and six. As the next step, the entirety of the dataset was used to understand the overall implications of changing the dependent variable. Again, rows one to three show regression using HASF as the main indicator variable, and rows four to six show results on SASF.

Using the fourth equation, one notices that TBQ was significant and positively related to revenue growth and return on assets. Historical aspiration shortfall and social aspiration shortfalls were negative, as the theory suggests, indicating that the market notices and reflects the shortfall by adjusting the company valuations accordingly. Investors could be concerned about the firm's ability to recover or its likelihood of underperforming again (Chari et al., 2018).

Adding equations five and six with interaction terms, a shift in signs was observed. Interestingly, a historical or social shortfall was positively correlated with TBQ, indicating that the market values firms higher when they experience a shortfall. Whilst this may seem counterintuitive, it allows for meaningful interpretation. The positive coefficient of HASF and SASF, when using equations five and six indicated that the market differentiates and values the response to a shortfall more than the shortfall itself. The interaction terms effectively change the impact that a shortfall has on TBQ, showing that the relationship is not uniform across all firms but depends on other factors such as ESG performance and financial health. This indicates that the context in which the shortfall occurs plays a crucial role in influencing TBQ.

The interaction terms in the model, especially ESG, REVG%, and ROA%, mediated (weakened) the impact on TBQ. Although high ESG scores and robust financial metrics are generally viewed favorably, they do not fully offset the negative impact of financial shortfalls on TBQ. Therefore, the presence of negative interaction terms implies that when firms with strong ESG or financial track records underperform, the market reaction is notably adverse, likely due to heightened expectations placed on these firms.

The implications of these findings are multifaceted. On the one hand, they imply that investors hold companies with high ESG ratings to a higher standard, and any deviation from expected financial performance could disproportionately penalize their valuation. On the other hand, despite such penalties for shortfalls, the market seems to maintain an overall positive stance on the firm's future prospects. This could be due to a range of unobserved factors, suggesting that firms are not solely judged on their financial performance but also on other qualitative aspects that might influence long-term potential.

Table 4: Tobin's Q as dependent variable

	Historical based			Social based		
	Fixed Effects	**Fixed Effects + Interaction**	**Fixed Effects + 2SLS**	**Fixed Effects**	**Fixed Effects + Interaction**	**Fixed Effects + 2SLS**
	(Model 7)	*(Model 8)*	*(Model 9)*	*(Model 10)*	*(Model 11)*	*(Model 12)*
ESG	-0.0002	0.001	0.001	-0.0003	0.003	0.002
	(0.002)	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
HASF / SASF	-0.056*	0.385***	0.414***	-0.034*	0.745***	0.750***
	(0.026)	(0.121)	(0.121)	(0.021)	(0.201)	(0.200)
TBQLAGG	0.641***	0.649***	0.647***	0.636***	0.617***	0.614***
	(0.045)	(0.044)	(0.044)	(0.044)	(0.043)	(0.043)
R&DINT%	0.016	0.025	0.025	0.015	0.018	0.020
	(0.023)	(0.023)	(0.023)	(0.023)	(0.025)	(0.025)
CAPEXINT%	0.001	0.010	0.011	-0.0001	0.014	0.015
	(0.015)	(0.014)	(0.014)	(0.015)	(0.013)	(0.015)
REVG%	0.005**	0.011***	0.011***	0.006**	0.020***	0.020***
	(0.002)	(0.003)	(0.003)	(0.002)	(0.005)	(0.005)
OM%	0.016*	0.011	0.011	0.015*	0.009	0.010
	(0.009)	(0.009)	(0.010)	(0.009)	(0.009)	(0.009)
ROA%	0.037***	0.047***	0.048***	0.038***	0.047***	0.047***
	(0.008)	(0.010)	(0.010)	(0.009)	(0.014)	(0.015)
Age	0.176	0.131	0.133	0.179	0.142	0.135
	(0.289)	(0.286)	(0.288)	(0.290)	(0.291)	(0.290)
Size	-0.021	-0.001	-0.001	-0.015	0.031	0.022
	(0.129)	(0.130)	(0.131)	(0.130)	(0.128)	(0.126)
ABSlack	-0.010	-0.009	-0.009	-0.010	-0.008	-0.008
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.011)
PSlack	-0.134	-0.150	-0.192	-0.132	-0.029	-0.038
	(0.420)	(0.451)	(0.447)	(0.421)	(0.448)	(0.447)
HASF / SASF:ESG		-0.004**	-0.003*		-0.006**	-0.005**
		(0.002)	(0.002)		(0.003)	(0.003)
HASF / SASF:R&DINT%		-0.003	-0.003		0.006	0.006
		(0.005)	(0.006)		(0.008)	(0.009)
HASF / SASF:CAPEXINT%		-0.013	-0.016		-0.020	-0.022
		(0.011)	(0.010)		(0.014)	(0.016)
HASF / SASF:REVG%		-0.011***	-0.011***		-0.024***	-0.024***
		(0.004)	(0.004)		(0.007)	(0.007)
HASF / SASF:OM%		0.008	0.008		0.007	0.005
		(0.005)	(0.006)		(0.009)	(0.010)
HASF / SASF:ROA%		-0.022***	-0.024***		-0.025*	-0.023
		(0.007)	(0.008)		(0.014)	(0.015)
HASF / SASF:ABSlack		-0.003	-0.003		-0.003	-0.002
		(0.002)	(0.002)		(0.003)	(0.003)
HASF / SASF:PSlack		0.102	0.135		-0.315	-0.351
		(0.237)	(0.244)		(0.356)	(0.365)
Number of instruments used			3			3
Observations	5,373	5,373	5,373	5,373	5,373	5,373
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.607	0.616	0.616	0.607	0.630	0.630
Adjusted R^2	0.596	0.604	0.605	0.595	0.618	0.619

The omitted observations that may cause the identified effect could be that firms experiencing a performance shortfall may increase their investment in ESG. This strategic shift could enhance the firm's reputation and operational efficiencies, which the market may view favorably, potentially leading to a higher TBQ. In addition, investments in ESG following a shortfall could signal that the firm is proactively addressing underperformance. This would suggest a commitment to long-term sustainability and governance practices, which could lead to a reassessment of the firm's future prospects and an increase in TBQ.

The applied methods also showed potential implications. The instrumental variables used in the 2SLS model aimed to isolate the exogenous components of the relationship between ESG investment following a shortfall and firm valuation, thus controlling for external factors that might influence both ESG investment and TBQ. The positive correlation when using the 2SLS model might also reflect broader industry growth trends and market conditions captured by the instrumental variables. If the industry is growing, investing in ESG could be seen as a firm positioning to capitalize on future opportunities.

Using dynamic panel data with a fixed effects model meant that the main independent variables HASF and SASF had temporal dimensions. The change from negative to positive suggested, that the context of the occurrence of shortfall matters. A positive relationship might indicate that investors were looking at the firm's response to the shortfall over time, especially in the context of ESG efforts and other financial health indicators.

Interactions between shortfall indicators, ESG, and financial metrics were used to capture the cumulative effects of strategic responses. A firm's consistent investment in ESG following a shortfall could build up reputation and operational efficiency, leading to increased TBQ over time. Also, it could be that positive effects and strategic ESG investments take time to materialize.

The results suggest that shortfalls and firm valuation have a more complex, multifaceted relationship. This complexity is rooted in the evolution of investor perceptions and firm strategies over time, leading to situations in which positive strategic actions and omitted observations can offset the adverse effects of shortfalls.

Table 5: Tobin's Q as a dependent variable and using HASF as main independent variable

	Fixed Effects HIGH	Fixed Effects LOW	Fixed Effects + Interaction HIGH	Fixed Effects + Interaction LOW	Fixed Effects + 2SLS HIGH	Fixed Effects + 2SLS LOW
	(Model 13)	*(Model 14)*	*(Model 15)*	*(Model 16)*	*(Model 17)*	*(Model 18)*
ESG	-0.0002	-0.005	0.001	-0.004	0.001	-0.004
	(0.003)	(0.004)	(0.003)	(0.004)	(0.003)	(0.004)
HASF	-0.052	-0.002	0.157	0.346**	0.220*	0.378**
	(0.034)	(0.062)	(0.119)	(0.170)	(0.124)	(0.182)
TBQLAGG	0.503***	0.628***	0.517***	0.631***	0.517***	0.629***
	(0.082)	(0.062)	(0.083)	(0.063)	(0.083)	(0.063)
R&DINT%	-0.044	0.016	-0.037	0.021	-0.036	0.022
	(0.027)	(0.020)	(0.028)	(0.023)	(0.028)	(0.024)
CAPEXINT%	0.012	0.029	0.019	0.028	0.020	0.031
	(0.010)	(0.019)	(0.013)	(0.021)	(0.012)	(0.021)
REVG%	0.003	0.007**	0.009**	0.011***	0.009**	0.010**
	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
OM%	0.020	0.017*	0.015	0.013	0.015	0.013
	(0.012)	(0.009)	(0.013)	(0.010)	(0.013)	(0.011)
ROA%	0.041***	0.032***	0.048**	0.041***	0.050**	0.042***
	(0.015)	(0.010)	(0.019)	(0.012)	(0.020)	(0.013)
Age	-0.352	0.001	-0.233	0.016	-0.225	0.016
	(0.310)	(0.288)	(0.338)	(0.279)	(0.340)	(0.279)
Size	0.019	0.058	0.040	0.077	0.041	0.080
	(0.140)	(0.178)	(0.139)	(0.171)	(0.139)	(0.172)
ABSlack	0.006	0.030*	0.009**	0.031*	0.009**	0.032*
	(0.005)	(0.017)	(0.004)	(0.017)	(0.004)	(0.017)
PSlack	-0.067	-0.439	-0.092	-0.379	-0.113	-0.437
	(0.363)	(0.461)	(0.530)	(0.426)	(0.535)	(0.427)
HASF:ESG			0.004*	-0.002	0.007**	-0.002
			(0.002)	(0.002)	(0.003)	(0.003)
HASF:R&DINT%			0.003	-0.004	0.002	-0.005
			(0.010)	(0.007)	(0.010)	(0.008)
HASF:CAPEXINT%			-0.021**	0.005	-0.024***	-0.001
			(0.009)	(0.009)	(0.009)	(0.008)
HASF:REVG%			-0.010**	-0.006	-0.011**	-0.006
			(0.005)	(0.004)	(0.005)	(0.004)
HASF:OM%			0.007	0.008	0.008	0.008
			(0.007)	(0.007)	(0.007)	(0.010)
HASF:ROA%			-0.015	-0.024**	-0.019	-0.025**
			(0.013)	(0.010)	(0.015)	(0.013)
HASF:ABSlack			-0.004*	-0.004	-0.004	-0.004
			(0.002)	(0.004)	(0.003)	(0.004)
HASF:PSlack			-0.118	-0.003	-0.100	0.037
			(0.457)	(0.217)	(0.472)	(0.257)
Instrumenst					3	3
Observations	2,836	2,695	2,836	2,695	2,836	2,695
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.610	0.665	0.619	0.669	0.620	0.669
Adjusted R^2	0.594	0.649	0.601	0.653	0.603	0.653

Table 6: Tobin's Q as a dependent variable and using SASF as main independent variable

	Fixed Effects HIGH	**Fixed Effects LOW**	**Fixed Effects + Interaction HIGH**	**Fixed Effects + Interaction LOW**	**Fixed Effects + 2SLS HIGH**	**Fixed Effects + 2SLS LOW**
	(Model 19)	*(Model 20)*	*(Model 21)*	*(Model 22)*	*(Model 23)*	*(Model 24)*
ESG	0.004	0.0004	0.007*	0.003	0.006	0.003
	(0.003)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)
SASF	-0.104*	-0.066	0.611*	0.485*	0.538	0.633**
	(0.060)	(0.109)	(0.346)	(0.289)	(0.339)	(0.301)
TBQLAGG	0.417***	0.620***	0.406***	0.608***	0.404***	0.601***
	(0.101)	(0.048)	(0.095)	(0.052)	(0.096)	(0.053)
R&DINT%	-0.094**	0.002	-0.137***	-0.0004	-0.128***	0.003
	(0.044)	(0.032)	(0.046)	(0.032)	(0.047)	(0.031)
CAPEXINT%	-0.014	0.022	-0.016*	0.036*	-0.017**	0.059**
	(0.009)	(0.014)	(0.010)	(0.021)	(0.009)	(0.028)
REVG%	0.002	0.007***	0.013***	0.016***	0.013**	0.015***
	(0.002)	(0.003)	(0.005)	(0.005)	(0.005)	(0.005)
OM%	0.017	0.009	0.033*	0.006	0.030	0.006
	(0.013)	(0.012)	(0.018)	(0.013)	(0.018)	(0.013)
ROA%	0.023*	0.038***	0.052*	0.044***	0.051*	0.044***
	(0.012)	(0.013)	(0.029)	(0.016)	(0.026)	(0.015)
Age	0.223	-0.335*	0.179	-0.344*	0.185	-0.330*
	(0.286)	(0.183)	(0.246)	(0.183)	(0.263)	(0.174)
Size	-0.214**	-0.029	-0.221**	-0.050	-0.232**	- 0.069
	(0.094)	(0.149)	(0.096)	(0.149)	(0.095)	(0.143)
ABSlack	0.053***	0.024*	0.051***	0.022*	0.049***	0.024*
	(0.015)	(0.012)	(0.016)	(0.013)	(0.015)	(0.013)
PSlack	0.591	-0.276	0.452	-0.321	0.826	-0.376
	(0.549)	(0.371)	(0.962)	(0.412)	(0.962)	(0.402)
SASF:ESG			0.003	-0.006*	0.001	-0.006*
			(0.003)	(0.003)	(0.004)	(0.003)
SASF:R&DINT%			0.051***	0.014	0.039**	0.017
			(0.018)	(0.011)	(0.017)	(0.011)
SASF:CAPEXINT%			0.010	-0.029	0.011*	-0.062**
			(0.007)	(0.020)	(0.007)	(0.027)
SASF:REVG%			-0.013***	-0.018***	-0.012***	-0.017***
			(0.004)	(0.006)	(0.005)	(0.005)
SASF:OM%			-0.021*	0.004	-0.014	0.002
			(0.013)	(0.010)	(0.012)	(0.011)
SASF:ROA%			-0.036	-0.017	-0.034	-0.020
			(0.030)	(0.015)	(0.028)	(0.015)
SASF:ABSlack			-0.004	-0.0001	-0.001	0.001
			(0.006)	(0.004)	(0.006)	(0.004)
SASF:PSlack			0.051	0.166	-0.497	0.027
			(0.819)	(0.431)	(0.841)	(0.445)
Number of instruments used					3	3
Observations	2,634	2,897	2,634	2,897	2,634	2,897
Firm fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
R^2	0.549	0.678	0.573	0.689	0.567	0.692
Adjusted R^2	0.529	0.664	0.553	0.675	0.547	0.677

Table 5 shows the regression results for HASF and **table 6** for SASF. The equations used are four, five, and six. The data, on which the regressions were run, are the 'Low Shortfall' data set and 'High Shortfall' data set, both for HASF and SASF. The regression results are presented next to each other, allowing for better comparison.

This allowed for further interpretation and shed light on observations from table 4. Both social and historical shortfall indicators turned positive when using interaction terms, consistent with previous observations.

ESG was a positive and significant coefficient for the high social shortfall firms indicating, that for firms experiencing above average social shortfalls, TBQ reacted positively to higher ESG activities, reversing the observed effects in table 4 and correlation in table 2 when using the modified data set.

Clarification can be found in the interaction terms. The interaction between HASF and ESG was reversed to previous observations for high shortfall firms, indicating a positive mediating effect for high shortfall firms. The Interaction between low historical shortfall firms and ESG was still negative, although not significant[19]. This suggested that high shortfall firms could be investing higher amounts into ESG activities or that ESG had a positive impact on perceived market valuation.

Moreover, both HASF and SASF were less significant for low shortfall firms. This could mean that other financial metrics like ROA% and REVG% may be more significant in determining market valuation and could overshadow the shortfall implications. Also, the lack of significance could reflect market efficiency, where shortfalls are quickly reflected by equity value, leaving no further association with TBQ (Fama, 1970).

R&D intensity and CAPEX intensity were negative for all high shortfall firms and positive for all low shortfall firms (table 6). This could imply that R&D investments do not translate into immediate market upticks for high shortfall firms. Perhaps the market is skeptical of the firm's ability to manage these investments. Putting this in the context of prospect theory and the research question, firms experiencing shortfalls do indeed invest in ESG activities but do not pursue R&D activities due to risk aversion (Cyert & March, 1963). In addition, ROA was less

[19] For SASF, the interaction between ESG was negative and statistically significant, proving the reversed observation.

significant for high social shortfall firms, indicating that investors might prioritize other signals of a turnaround. ESG activities may be one such indicator.

Size was negative and was only significant for high social shortfall firms, implying that larger high social shortfall firms might be perceived as less agile or responsive, negatively impacting their valuation as reflected in TBQ. Absorbed slack was still significant and interestingly higher for high social shortfall firms, meaning that investors paid more attention to financial flexibility for firms with above average shortfall.

In summary, across all models, profitability metrics showed a positive relationship to TBQ, underscoring their importance in overall firm valuation. This showed that investors' primary focus appears to be on current and potential profitability, operational efficiency, and effective asset use (Chen & Xie, 2022). The models showed that a shortfall alone does not imply a negative valuation. Instead, investors seemed to care about the context in which the shortfall occurred and how the firms responded. Indicated by the lack of significance for ESG and growth. In addition, investors seemed to have high expectations for firms that perform well and have high ESG scores. However, differences among high and low shortfall firms show, that during times of financial shortfall, investors may indeed focus more on ESG activities. This is especially true for high shortfall firms[20].

4 Conclusion

With firms experiencing performance downturns and ESG rising in importance, the relationship between these two phenomena is important to unpack. We investigated whether firms in a financial decline can use ESG activities as a mitigating factor. We sought to capture ESG as a management tool that can be employed in times of financial difficulty, drawing on the work of Cornell & Damodaran (2020), Das Gupta (2022), and Meyer & Rowan (1977a).

In the first part of the analysis, regressions led to results consistent with extant scholarship, such as Das Gupta (2022), showing that financial shortfalls led companies to engage in higher ESG activities. This contradicts traditional prospect theory views concerning risk aversion (Chen & Miller, 2007; Cyert & March, 1963; Levinthal & March, 1981). Clear patterns among social and historical aspiration shortfalls could not be observed; however, results were comparable

[20] Shown in model 15, 17 and 21.

and complemented each other, which proves the appropriateness of using both (Bromiley & Harris, 2014; Lucas et al., 2018).

The second part showed that the implications of ESG activities on market value are more nuanced. When observing the full dataset and controlling for interactions between shortfall indicators along financial metrics, it was observed that the market values how firms respond to shortfalls more than the shortfall itself, and ESG did not positively impact Tobin's Q. Additionally, higher ESG scores and healthy financial metrics amplified overall negative perceptions of the shortfall.

When separating the data into firms with above average shortfalls and firms with below average shortfalls, the mediating effect of ESG became more evident. For low shortfall firms, the initially observed implications held true. For high shortfall firms, however, ESG activities showed a positive effect, which agreed with the considerations of Marsat et al. (2021). Additionally, ESG actions were particularly impactful for firms experiencing a social aspiration shortfall, in fact helping them to maintain relative market value and thus legitimacy.

Reflecting on the initial hypothesis, we can conclude that ESG activities are a positively associated signaling tool (*H1*).

But a clear positive relationship between firm value, financial performance, and ESG activities as stated in $H2_a$ and $H2_b$ could not be proven, showing that the virtuous cycle for the most part cannot be proven and remains theory.

However, the findings prove that financial performance, flexibility, and efficiency are the most dominant levers for firm value (*H3*), as foreseen by Cornell and Damodaran (2020).

Interestingly, the analysis indicates that firms anticipate market reactions to underperformance in key areas relevant to relative valuation models and proactively employ ESG activities to counteract potential losses of legitimacy. It appears that firms effectively leverage ESG activities to mitigate the negative impact on their valuation, supporting the fourth hypothesis (*H4*). This suggests that engaging in ESG activities can enhance a firm's competencies and perceived legitimacy, as reflected in Tobin's Q. This further proves the foreseen applicability of Meyer and Rowan's (1977) concept of institutionalized myths. This study demonstrated that ESG activities have the potential to serve as a strategic instrument that could be employed alongside efforts to drive growth, operating margin, or investment efficiency, all for the sake of driving firm legitimacy and value.

4.1 Limitations and future research

Future research could investigate whether observations change among different industries or countries. The observed period might also have relevance, and it would be interesting to see if ESG activities are more effective as a short-term mediator.

Other methodologies, such as a case study, could offer insights at the firm level. In addition, it might be interesting to investigate potentially unobserved effects in this study. These might be the responses and justifications that firms articulate during earnings calls after a social or historical shortfall in theory occurred.

Complex statistical methods, such as using a GMM estimator, could further improve the robustness of the findings.

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