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Inter-Firm ESG Rivalry: A Competitive Dynamics View

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Abstract: Sustainability literature has largely focused on business practices that result in environmental benefits that might not always be profitable to the firm, and thus, tend to be less appealing to the corporate board rooms. In this study, I examine if the rival firm's sustainability behavior is driven by the focal firm's behavior. Although a growing number of firms globally have voluntarily adopted and carried out a wide range of sustainability practices, there are firms that are driven by the position taken by industry competitors. Here, I examine such phenomena, to determine if a focal firm's sustainability behavior is influenced by the rival's sustainability behavior. In addition, I also examine how the competitive landscape of the focal firm, in the form of the focal firm's size, the rival's sustainability reputation, and industry concentration moderates the behavioral influence. I find a positive association between the rival firm's sustainability performance and the focal firm's sustainability performance. I also find that the focal firm's size and industry concentration positively moderate the rivalry. Rival firms' sustainability reputation does not have an impact on the rivalry.

Keywords: sustainability; competitive dynamics; ESG

1. Introduction

According to a survey by McKinsey & Co., many firms are increasingly integrating the principles of Environmental, Social, and Governance (ESG) in their supply chains and business processes [1]. For example, Apple Inc., in its new iPhone, used 100% recycled tungsten in the taptic engine, and reduced the carbon footprint by 34% by using their new M1 processors [2]. In another famous example, Google Inc. is helping more than 500 cities across the globe to measure, track, and reduce carbon emissions by as much as 1 gigaton by 2030 [3]. In addition to these examples, more and more companies are taking sustainable actions in the form of developing environment-friendly products, saving energy, and reducing emissions. According to the World Commission on Environment and Development (WCED) [4], sustainability, or sustainable development, is defined as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs". Likewise, ESG principles refer to the three key entities of Environmental, Social, and Governance, and measure the sustainability and ethical impact in corporate strategies. In this research, I study sustainability in relation to social, governance, and environmental dimensions [5,6].

It is well established that ESG (Henceforth, I use the words 'ESG' and 'Sustainability' interchangeably) initiatives can help firms stand out among the competitors and help a focal firm gain a competitive advantage over its rivals [7–9]. For example, ESG actions enable firms to be competitive in their industries by bringing in new innovations [10]. More and more firms are moving towards taking sustainable initiatives to gain traction in shifting consumer demands [11]. As the intensity of competition defines the competitive position in the market, industry rivals are emulating the sustainability formula their competitors are following to gain a market advantage [12,13].

Past literature suggests that firms prioritize ESG activities for multiple reasons. First, firms will invest in ESG activities for strategic reasons [14]. There is a good amount of support in the literature linking a positive impact of ESG activities on firm performance [12,15].

For example, Benlemlih and Bitar [16] identified a positive relationship between corporate social responsibility (CSR) initiatives and investment efficiency. Similarly, Kumar et al. [17] found that a firm's EM (environmental management) activities resulted in a better corporate reputation and higher return on assets.

Second, managers might invest in ESG initiatives for altruistic reasons [18]. Bagnoli and Watts [19] considered ESG activities as socially responsible and modeled that firms will compete in the market for socially responsible consumers. They identified that these types of firms link public goods (social responsibility activities) with private goods to drive their sales. Third, firms will also focus on ESG activities to reduce pressures from government and non-profit institutions [20]. In recent years, firms are under continuous pressure from these organizations to release their ESG disclosures. Since ESG issues are increasingly being seen by society as critical issues, firms are increasingly investing in these activities to maintain a good corporate reputation and comply with government rules and regulations [21].

Sustainability literature has largely focused on business practices that result in environmental benefits [22,23]. These business practices might not always be profitable to the firm, and thus, tend to be less attractive to the decision-making corporate board rooms [24,25]. Hence, additional research is required in this area on what can motivate the firm to implement sustainable actions. Despite the great interest shown by scholars across disciplines in studying the motivating factors behind a firm's sustainability activity, there is one critical gap in the literature: motivation driven by the competitive pressure arising from rivals' behavior. There is limited evidence in the sustainability literature that examines this gap. For example, Hofer et al. [12] used Schumpeterian economics to study the competitive interactions between the leader and the challenger firms in the domain of environmental management (EM) activities. Another study by Kumar et al. [17] tested how inter-firm rivalry in EM activities can affect a firm's environmental image and further its financial performance. However, these studies do not document the reaction of focal firms in response to rival firms' ESG activities and do not examine the catalytic factors that aid the rivalry.

In this study, to fill the above-documented important vacuum in the literature, I examine if the rival firm's ESG behavior is driven by the focal firm's behavior. In doing so, I contribute to the literature on multiple fronts. First, although a growing number of firms, globally, have voluntarily adopted and carried out a wide range of sustainability practices, there are firms that are driven by the position taken by industry competitors. Here, I examine such phenomena, to examine if a focal firm's sustainability behavior is influenced by the rival's sustainability behavior. Specifically, I investigate how the rival firm's exposure to ESG risk, measured using the RepRisk Index (RRI), influences the focal firm's exposure to such risks. I use the nearest neighbor approach with 4-digit North American Industry Classification System (NAICS) code, assets, and market capitalization as the matching factors to identify rival firms to the focal firms with similar characteristics.

Second, I also examine how the competitive landscape of the focal firm, in the form of the rival's supply chain reputation, industry concentration, and focal firm size moderates the behavioral influence. Literature in the past has extensively examined the role of firm-level competitive determinants of sustainability actions. For example, Hofer et al. [12] studied the role of focal firms' market leadership and profitability in enhancing a firm's EM activity. Another study by Kumar et al. [17], demonstrated that a focal firm's signal will have a positive impact on its environmental image while the rival's signal will have an opposite effect. Along similar lines, I add to this burgeoning literature by examining the role of the competitive landscape of the focal firm in enhancing its ability to undertake sustainability actions.

I organize the rest of the paper as follows. First, I discuss competitive dynamics as the overarching theory and present relevant literature in the area. Next, I develop four hypotheses related to the competitive behavior of focal firms in response to the rival firms' actions, along with three moderating factors in the form of focal firm size, rival firm

sustainability reputation, and industry concentration. Then, I discuss the data, variables, and econometric model used to test the hypotheses. Finally, I conclude by providing theoretical implications, limitations of the study, and future research directions.

2. Literature Review and Overarching Theory

Competitive Dynamics

Competitive dynamics is the study of interfirm rivalry where one firm undertakes a competitive move, action, and a rival firm responds by taking a competitive response [26]. The study of competitive dynamics provides a detailed understanding of a firm's behavior in a competitive environment [27]. Competitive dynamics is derived from the Austrian School of economics, which considers competition to be "dynamic", thus, developing the idea of action/response dyads [28]. Competitive action is defined as any strategic or tactical activity by a firm to build or defend its competitive position in the market [29]. Likewise, a competitive response is defined as a countermove by the rival firm in response to the focal firm's competitive action to undercut the consequences of emerging from it [30].

The three entities in the competitive dynamics are the 'actor', the 'responder', and the competitive environment (industry) in which their rivalry takes place [31] which are depicted in Figure 1. The characteristic of each entity defines how the rivalry evolves between the actors and the responder. First, the 'actor' is defined as the firm that carries out an initial competitive action [26]. 'Actor' is an important element in competitive dynamics research as he/she/it is the source of an action and the beneficiary (both negative and positive) of the consequences of the action. According to extensive competitive dynamics literature, the important characteristics that influence an actor's strategic action are its size, age, past organizational performance, slack resources, market share, top management team (TMT) demographics, and perceived gains and losses [27,32,33].
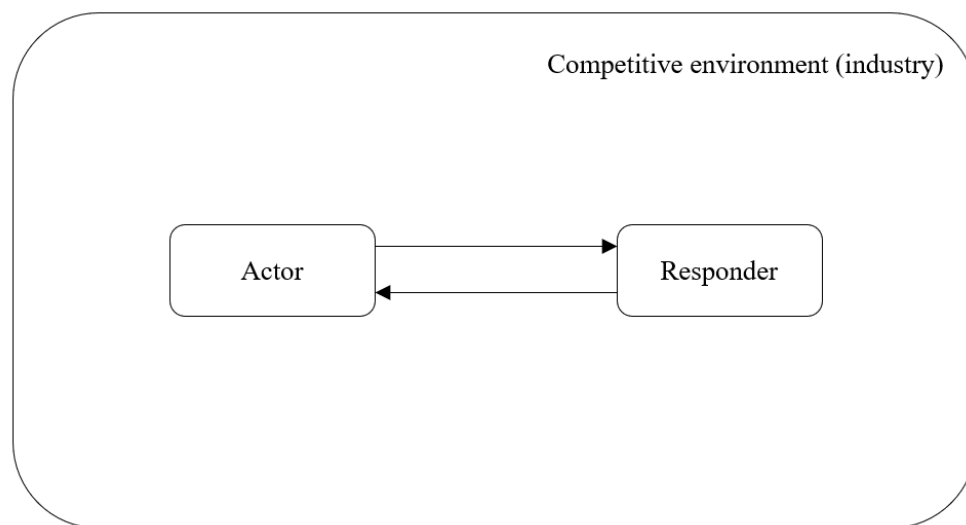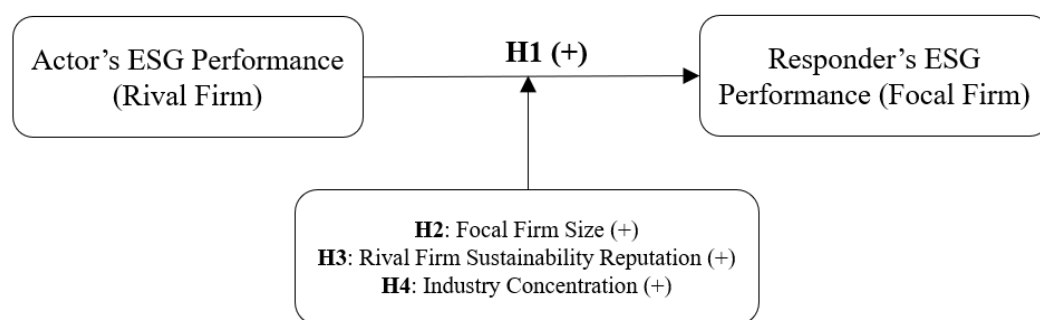

Figure 1. Entities of Competitive Dynamics.

Second, the 'responder' is the firm that responds to the actor's competitive actions. While firms are capable of conducting actions, they are also able to respond to the actions of the actors [31]. This implies that the responders have all the organizational characteristics that pertain to the actor firms. However, the competitive dynamics literature identified certain characteristics that are specific to the responder firms. These characteristics include but are not limited to its structural complexity, market dependence, the external orientation of the organization, and a firm's environmental scanning capability [34,35]. These additional capabilities help firms to identify competitive actions by the actors and undertake a competitive response.

Finally, the third part of competitive rivalry is the industry competitive environment, where the competitive interaction between the actor and the responder occurs [36]. Ex-

tensive literature in strategy and competitive dynamics has shown that the characteristics of the competitive environment influence the awareness, motivation, and capability of an actor to undertake a competitive action, and a rival firm to respond [37]. The key characteristics of the competitive landscape include market size, industry concentration, market commonality, rate of new entry, and barriers to entry [38–40].

In this study, first, I explore if there is any interfirm rivalry in the sustainability landscape. I argue that the responder (focal firm) undertakes a competitive response against the actor (rival firm). In doing so, I hypothesize that the focal firm's ESG performance follows and is dependent on the rival firm's ESG performance. Then, I explore how the characteristics of each of the competitive dynamics entities moderates this rivalry (actor, responder, competitive industry environment). Specifically, I examine the sustainability reputation of the rival firm (actor) as a motivating factor for the responder (focal firm) to undertake a competitive response. Next, I hypothesize the size of the responder (focal firm's size) related to its capability to respond against the rival firm. Finally, I hypothesize that industry concentration is a catalyst that breeds the competitive response. Figure 2 demonstrates my theoretical model.

Figure 2. Theoretical Model.

3. Hypotheses

3.1. Inter-Firm Competitive Rivalry

According to competitive dynamics literature, firms create and erode competitive advantage by taking competitive actions [29]. A competitive action can be any observable behavior by a firm, such as a product introduction, price cut, advertising, or increased production, which can create profits for the focal firm by providing a competitive edge over its rivals [41]. Likewise, firms that undertake successful competitive actions can perform better than firms that do not act competitively. Hence, firms that are complacent are likely to see a market share erosion and decline in their business [42]. Therefore, I am contending that a focal firm acting rationally will be aware of the rival's performance and act accordingly to maintain its competitive advantage.

It is well established in the literature that a rival firm's ESG activities can harm the performance of a focal firm. Kumar et al. [17] established that the environmental image of the focal firm is damaged when a rival takes aggressive ESG actions. As noted by Porter [38], competition can be a zero-sum game, where a competitive advantage of one firm comes at an expense of another firm's loss. For example, to attract environmentally conscious customers, a firm in the coffee industry might introduce the use of coffee dispensers made of paper. This can result in customers moving away from the firm's rivals who are not similarly conscious about the environment. In such a case, the rivals of the firm will have to take action to make sure there is no shift in their customer base. In addition, rivals taking competitive actions can also develop unique capabilities which can help them in attracting more customers and better employees [43], thus, eliciting a response from focal firms.

According to the competitive dynamics theoretical framework, given the downside of competitive actions taken by rival firms against focal firms, they lead to competitive responses [35]. Rival firms implement ESG actions to seize opportunities arising in the sustainability space, create operational efficiency, or cater to stakeholder pressures, and

therefore, gain a competitive advantage [12]. Hence, it is expected that the focal firm will respond to these actions to undercut the competitive gains created by the rival's actions. Therefore, I argue that a rival firm's ESG performance in the previous year will drive a focal firm's ESG performance in the current year:

H1. *The greater the rival firm's ESG performance, the greater the focal firm's ESG performance.*

3.2. Focal Firm Size

The first moderating factor of our study is the size of the focal firm, which is an important characteristic of a firm's competitive behavior [44]. There are a number of arguments that point to an increased response activity by a larger firm in response to focal firms' actions. First, large firms have vast resources that they can use to invest in different types of actions, which also include ESG activities [45]. These large firms benefit from diversified physical and human resources that are required to promote ESG activities within the firm boundaries. These resources and expertise are necessary to respond to rivals' competitive actions. As an example, in responding to a rival firm, if a focal firm has to invest in developing an environmental management system (EMS), the firm has to have access to substantial resources [12].

Second, larger firms tend to have higher sensing capabilities of what is going on in the industry and their supply chain [46]. They can use these abilities to identify potential rival actions in the market that threaten their competitive position [33]. Large firms are generally associated with extensive upstream, downstream, and horizontal network partnerships and invest in network detection technologies that generate increased awareness of challenges that arise from the network [47]. This increased awareness enables the firm to act swiftly against any attack coming from rivals.

Next, large firms tend to have appropriate slack resources that help them in countering any sudden attacks by rival firms [48]. Literature has extensively demonstrated that firms use slack resources to address risks emerging in their competitive landscape [49]. Since larger firms have generally higher slack resources, I argue that they can compete efficiently against a rival firm that is acting aggressively. Finally, larger firms are typically engaged in multiple ESG activities [13]. This will help larger firms reap advantages from economies of scale when undertaking further ESG actions. Hence, I hypothesize that firm size will enable focal firms to undertake competitive ESG responses against rival firms' ESG actions. Formally,

H2. *The focal firm's size positively moderates the relationship between the rival firm's ESG performance and the focal firm's ESG performance.*

3.3. Rival Firm's Sustainability Reputation

My next moderating factor is the characteristic of the rival firm, in the form of a sustainability reputation. I use the arguments from awareness–motivation–capability (AMC) theory to argue that a rival firm's reputation in the sustainability space will motivate the focal firm to hit back at the rival firm's action. According to the AMC theory, awareness of the situation, motivation to respond, and capability to respond are the three behavioral drivers that will result in a firm responding to a rival's action [37,50]. I argue here that the focal firm is aware of the sustainability reputation of the rival firm, and the reputation, in turn, motivates the focal firm to utilize its capabilities to respond to the rival firm's actions.

The focal firm will be aware of the rival firm's sustainability reputation because of the following reasons. With the advent of today's communications network, including computers, mobile phones, and social media, information is rapidly disseminating [51]. Given the advancement of information-centric societies, focal firms have a number of channels that result in the reception of the rival firm's reputation. For example, when a firm makes it to Gartner's 25 best sustainable supply chain list, they promote their success through methods like sending out news releases, physical and digital, sharing with their clients and email subscribers, using blog posts, and sharing on social media and

handles [52,53]. With the amount of publicity firms undertake, focal firms are highly likely to learn and be aware of the reputation of the rival firms.

A rival's sustainability reputation motivates the focal firm to respond to the rival firm's ESG actions in several ways. First, firms with a good reputation have good potential to undertake competitive actions and affect the profitability of their rivals [54]. Second, the stakeholders in an industry are aware of the rival firm's reputation and will have higher confidence in the firm to accomplish its actions [55]. For example, when a rival firm preannounces a new ESG product, its customers, suppliers, and general consumers will have higher confidence in the firm to deliver, owing to its superior sustainability reputation. This can in turn erode the market share of the focal firm if it is complacent without responding to the rival's action [56]. Third, the sustainability reputation of a firm is an intangible asset, which is invaluable and provides the firm with a greater competitive advantage [57]. A focal firm in an industry will be directly motivated to utilize any chance to undercut the competitive advantage of its rivals.

Finally, a firm's sustainability reputation is evidence of its ESG capabilities. Rivals in the industry perceive firms with capabilities as a competitive threat [58]. Thus, when a rival firm with a good sustainability reputation takes an action, focal firms pool their resources to reduce the competitive threat they face in the market. Hence,

H3. *The rival firm's sustainability reputation positively moderates the relationship between the rival firm's ESG performance and the focal firm's ESG performance.*

3.4. Industry Competitive Environment (Industry Concentration)

Industry concentration is generally measured using the Herfindahl–Hirschman index (HHI). It is calculated as the percentage of the market share held by the firms in an industry [59]. Market concentration is a very important structural element of the industry as it relates to the market power of firms, and their competitive behavior [60]. Scherer and Ross [61] suggest that a few dominant firms within an industry recognize their interdependence. This interdependence can result in firms implicitly coordinating their actions to limit competition as increased competition can result in a decline in the performance of the firms [62].

In high-concentration industries, as there are a few dominant firms, it is easier for the firms to identify and apprehend the actions and associated consequences of the rival firms [28]. In addition, in highly concentrated industries, consumers have fewer choices of products and services, and when a rival firm undertakes a new action, it is highly likely that the consumers are attracted to the action [63]. Hence, firms are more likely to be profitable in high-concentration industries when they take competitive actions. At the same time, as there are few firms in the industry, it is highly likely that the focal firm will learn about the profitability of the rival firm's actions and be motivated to respond to cut down their (rival firm's) gains [64]. Focal firms are inclined to respond against rival firms to teach them that breaking the unwritten implicit coordination in the industry is punishable.

In a less concentrated industry, there are several rivals to keep track of, and any actions taken by competitor firms are less likely to garner attention and result in a response by the focal firm [28]. From the consumer's point of view, as they have a number of options to choose from, it is also likely that they will ignore the actions taken by specific firms in the industry [65]. Hence, responding to the rival's actions might not seem as attractive to the focal firm as they have to expend a significant amount of resources to undertake a response action.

With the help of the above statements, I argue that in a highly concentrated industry, firms are more likely to respond to rivals than in an industry with low concentration. Hence, I hypothesize,

H4. *The industry concentration positively moderates the relationship between the rival firm's ESG performance and the focal firm's ESG performance.*

4. Methods

4.1. Data and Sample

The setting of my study is the manufacturing industry, which provides me with multiple advantages for a focused ESG study to test my hypotheses. First, there is increased pressure from purchasers and consumers for more information on the sustainability goals of the suppliers before they purchase a product [66]. According to a survey, there is a 24% increase in purchasers requesting environmental data from suppliers in 2020, compared to 2019 [67]. The result is firms in the manufacturing sector pushing for more advancements in ESG initiatives compared to other industries. Second, manufacturers are under continuous scrutiny from government agencies to comply with ESG initiatives. Additionally, in 2021, the Securities and Exchange Commission (SEC) announced the creation of a Climate and ESG task force within its Division of Enforcement to develop strategies to proactively uncover ESG-related misconduct by firms, further prompting firms to disclose their ESG initiatives [68]. Hence, ESG initiatives are highly visible in the manufacturing industry, which thus provides an ideal setting for this study.

I collected data from three different sources to build the sample for my analyses. First, I used the Compustat data from Wharton Research Data Services (WRDS) to identify the focal firms and competitors, along with their characteristics, in the manufacturing industry [69]. Second, I used RepRisk data to identify the ESG risk management performance of the focal and rival firms [23]. Finally, I used Gartner's rankings to identify the supply chain reputation of the focal firm and its rival [70].

The unit of analysis of this study is a focal firm–rival pair. I identified this pair in two steps. First, I identified the focal firms in the manufacturing industry using the 2-digit NAICS classification provided in the Compustat database. The 2-digit NAICS codes '31', '32', and '33' are classified as the firms in the manufacturing industry [71,72]. Second, for each focal firm listed using the NAICS code, a rival firm is identified with the nearest neighbor approach. It is documented that firms with a similar size and market profile compete fiercely against each other. Hence, I use the firm assets to measure its size and market capitalization to measure the market profile [17]. I identified the rival firm as the nearest neighbor to a focal firm in the same 4-digit NAICS code using its assets and market capitalization.

4.2. Dependent Variable

The dependent variable of this study is the ESG activity of the focal firm. I utilize the RepRisk Index (RRI) to measure this construct. RRI is calculated by RepRisk using a proprietary algorithm that quantifies the ESG activity of a firm and measures its exposure to ESG issues. This index is calculated purely based on the firm's risk incidents and reflects the actual performance of a firm in the domain of ESG risk as opposed to the firm's communication of policies and goals in its sustainability reports [73]. Traditionally, researchers have used data sources from Morgan Stanley's ESG (KLD), Thompson Reuter's ESG, and Sustainalytics ratings to measure the ESG performance of a firm. One shortcoming of these data sources is that they are based on the data that is self-reported by the firms, which can result in inconsistencies based on the transparency of the reporting firm [74]. In fact, Morgan Stanley Capital International (MSCI) and Sustainalytics reported that there are comparability and consistency issues with the ESG disclosures of many reporting firms and are now changing their research methodology to include external information [75]. As opposed to these self-reported measures, RepRisk uses artificial intelligence and machine learning techniques to mine data from a wide variety of external sources like news articles and government reports to provide better insights into a firm's ESG actions given what they say, "walking the walk, instead of just talking the talk" (More information on the RepRisk ESG index calculation can be accessed at https://www.reprisk.com/news-research/news-and-media-coverage/responding-to-criticisms-of-esg-ratings, accessed on 2 September 2022). Hence, researchers are increasingly using this index to measure the ESG risk exposure of firms. For example, Li and Wu [76] used RepRisk ESG events to identify the difference

in CSR engagements between public and private firms. Cui, Jo, and Na [77] used RRI to measure the risks associated with ESG business relationships and investments.

The RRI score ranges from 0 to 100 with 100 being a firm with high exposure to ESG risks. The higher the score, the less the ESG activity from the firm and the higher its risk exposure. As the purpose of this study is to test the hypothesis of a focal firm's higher ESG activity in response to that of rivals, for the sake of simplicity, I invert the RRI score and convert it to the range between −0 to 1. In doing so, now, a higher RRI score (towards 1) represents higher ESG activity by the firm, and a lower RRI score (towards 0) indicates lower ESG activity.

4.3. Independent and Moderating Variables

My independent variable is the RRI score for the rival firm. This score is calculated as described in the previous section. I test hypotheses for three moderating characteristics representing the focal firm, rival firm, and the competitive landscape. First, the factor that I use to represent the focal firm's characteristics is its size. I use the focal firm's assets to measure the size.

The second moderating variable is the rival firm's supply chain reputation. I utilized the Gartner global supply chain rankings to measure the supply chain reputation. Gartner Inc. is a technological consulting and research firm based in Stamford, Connecticut. They annually report supply chain reputation rankings of firms across several industries [78]. Gartner publishes 25 firms in the world with the best supply chain practices in different sectors including manufacturing, retail, and distribution sectors, and these rankings are considered prestigious by executives. Researchers are increasingly using these rankings to measure the supply chain reputation of firms. For example, Ellinger et al. [70] used the Gartner rankings to assess the supply chain competency of firms. I code this construct as a dummy variable with a value of 1 if the rival firm is present in Gartner's list or 0, otherwise.

My last moderating factor is the concentration of the industry of the focal–rival pair measured using the Herfindahl–Hirschman Index (HHI). It is calculated as the sum of squared shares of a firm's market shares in an industry. I used the 4-digit NAICS code to define an industry [59]. The higher the *HHI*, the higher the concentration in the industry. The *HHI* of an industry j with n firms in year t is calculated as follows

$$HHI_{jt} = \sum_{i=1}^{n} market\_share_{it}^2 \tag{1}$$

As an example, if an industry 'X' has two firms with 50% market share each, its *HHI* is $(0.5)^2 + (0.5)^2 = 0.5$. An industry 'Y' with three firms with market shares of 40%, 30%, and 30% would have an *HHI* of $(0.4)^2 + (0.3)^2 + (0.3)^2 = 0.16 + 0.09 + 0.09 = 0.34$. Hence, industry 'X' (*HHI* = 0.5) is more concentrated than industry 'Y' (*HHI* = 0.34).

4.4. Control Variables

To control for any unobserved effects in our regression model, I control for several firm-level and industry-level factors. First, I control the performance of the focal firm in the form of return on assets. According to the competitive dynamics theory, a firm's performance is a measure of its stability and stronghold in the industry [39]. A firm with superior performance feels less threatened by rivals and does not see harm to its market position in the industry. Hence, a well-performing firm is less likely to respond to a rival's aggression [79]. Hence, I expect a negative sign on this variable. My second control variable is the sustainability reputation of the focal firm. Strategy literature has, for ages, documented the positive impact of corporate reputation on the firm performance, and re-emphasizing competitive dynamics literature's stand on lower competitive activity by a well-performing firm, I expect the sustainability reputation of the focal firm to have a negative impact on the rivalry outcome [80]. In other words, a focal firm with a good sustainability reputation can be more complacent and less likely to pay attention to a rival's moves [81].

My third control variable is the inventory turnover ratio which indicates the rate of inventory sold or replaced. It is calculated as the ratio of net sales and average inventory at the selling price. An efficient inventory principle in the form of lean management can lead to greater firm performance, resulting in lower competitive activity [82]. Hence, a negative sign on this variable is expected. My next control variable is the cost of goods sold by the focal firm each year. Similar to the inventory turnover ratio, a higher cost of goods sold indicates higher revenues and a better performance by the focal firm resulting in decreased competitive activity [83]. The final performance indicator I use in this study to control is the TobinQ ratio. TobinQ, calculated as the ratio of a firm's total market value to its total assets, indicates if a firm is overvalued or undervalued [84]. Finally, I use control for industry and time (year) fixed-effects.

Variables, their descriptions, and descriptive statistics are provided in Table 1. Pairwise correlations between the independent variables are presented in Table 2. I observe that all the correlations are less than the accepted maximum of 0.6. In addition, the variance inflation factor (VIF) is 1.76 indicating that multi-collinearity is not an issue in my study.

Table 1. Variable Descriptions (N = 1951).

Variable	Description	Source	Mean	Std. Dev.
Focal firm ESG performance (*Focal_ESG*)	Reciprocal of RepRisk index of the focal firm	RepRisk	0.68	0.39
Rival firm ESG performance (*Rival_ESG*)	Reciprocal of RepRisk index of the rival firm	RepRisk	0.61	0.41
Focal firm size (*Focal_size*)	Log of total assets of the focal firm	Compustat	9.96	1.62
Rival firm sustainability reputation (*Rival_reputation*)	Binary variable coded as 1 if the rival firm is present in Gartner's supply chain rankings	Gartner	0.34	0.47
Industry concentration (*HHI*)	Sum of squared shares of firm's market shares in an industry	Compustat	0.29	0.24
Focal firm performance (*Focal_ROA*)	Net income divided by total assets of the focal firm	Compustat	0.10	0.14
Focal firm sustainability reputation (*Focal_reputation*)	Binary variable coded as 1 if the focal firm is present in Gartner's supply chain rankings	Gartner	0.15	0.35
Inventory turnover (*Inventory_turnover*)	Net sales divided by average inventory at selling price	Compustat	12.63	38.31
Cost of goods sold (*COGS*)	Costs directly related to products sold (log)	Compustat	8.96	1.67
TobinQ	Firm's total market value divided by total assets	Compustat	1.82	1.20

Table 2. Pairwise Correlations.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Rival firm ESG performance (1)	1								
Focal firm size (2)	−0.09 ***	1							
Rival firm sustainability reputation (3)	−0.48 ***	0.01	1						
Industry concentration (4)	0.04 ***	0.02 **	−0.20 ***	1					
Focal firm performance (5)	−0.09 ***	0.40 ***	0.04 ***	0.07 ***	1				
Focal firm sustainability reputation (6)	−0.17 ***	0.32 ***	0.26 ***	0.04 ***	0.13 ***	1			
Inventory turnover (7)	0.03 ***	0.04 ***	−0.03 ***	−0.01	0.01	−0.01 *	1		
Cost of goods sold (8)	−0.14 ***	0.52 ***	0.02 *	0.14 ***	0.20 ***	0.37 ***	0.0008	1	
TobinQ (9)	0.04 ***	−0.17 ***	0.01	−0.14 ***	−0.18 ***	0.04 ***	−0.01	−0.05 ***	1

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

4.5. Model Specification and Results

As the dependent variable of this study is bounded between 0 and 1, ordinary least squares (OLS) regression is no longer the appropriate estimation technique [85]. Hence, I use a Tobit regression model for estimation. Results are presented in Table 3. Model 1 is run with control variables. Later, I added direct effects in Model 2. Finally, interactions are added in Model 3. All independent variables are lagged by one year so as to study the impact of the competitive landscape in year *t* on the manifestation of the focal firm's performance of year *t* + 1.

Table 3. Tobit Regression Results.

D.V.: $Focal\_ESG_t$	Model 1: Control Variables	Model 2: Direct Effects	Model 3: Interaction Effects
$Focal\_size_{t-1}$	−0.19 *** (0.02)	−0.17 *** (0.02)	−0.16 *** (0.02)
$Rival\_reputation_{t-1}$	0.19 *** (0.04)	0.34 *** (0.04)	0.34 *** (0.04)
HHI_{t-1}	−0.11 (0.07)	−0.06 ** (0.06)	−0.46 *** (0.11)
$Focal\_ROA_{t-1}$	0.24 (0.15)	0.35 ** (0.14)	0.43 *** (0.14)
$Focal\_reputation_{t-1}$	−0.49 *** (0.04)	−0.48 *** (0.04)	−0.47 *** (0.04)
$Inventory\_turnover_{t-1}$	−0.001 (0.001)	−0.001 (0.001)	−0.001 (0.001)
$COGS_{t-1}$	−0.06 *** (0.02)	−0.06 *** (0.02)	−0.05 ** (0.02)
$TobinQ_{t-1}$	−0.10 *** (0.01)	−0.08 *** (0.01)	−0.08 *** (0.01)
$Rival\_ESG_{t-1}$		0.41 *** (0.05)	0.14 *** (0.05)
$Rival\_ESG_{t-1}$ * $Focal\_size_{t-1}$			0.01 ** (0.006)
$Rival\_ESG_{t-1}$ * $Rival\_reputation_{t-1}$			0.05 (0.09)
$Rival\_ESG_{t-1}$ * HHI_{t-1}			0.83 *** (0.16)
Year fixed effects	Included	Included	Included
Industry fixed effects	Included	Included	Included
Constant	3.34 *** (0.17)	2.64 *** (0.17)	2.53 *** (0.16)
Log-likelihood	−1040.93	−996.86	−948.54
Pseudo R-squared	0.40	0.43	0.46

*** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$; Robust standard errors reported in parentheses.

First, I observe that, in Model 2, the sign on *Rival_ESG* is positive and highly significant ($\beta_{Rival\_ESG} = 0.41$, $p < 0.01$) indicating that the higher the Rival ESG score, the higher the focal firm's ESG score. The result is consistent in Model 3 where I add interaction terms. This result provides strong support to my first hypothesis about the presence of competitive rivalry of action responses between the competitors in an industry.

Second, in Model 3, I observe a positive sign on the interaction of *Rival_ESG* and *Focal_size* ($\beta_{Rival\_ESG* Focal\_size} = 0.01$, $p < 0.05$) indicating that the first competitive landscape element, focal size, does in fact aggravate the response from the firm, providing strong support to my hypothesis 2. Likewise, I also observe a positive and highly significant sign on the interaction of *Rival_ESG* and *HHI* ($\beta_{Rival\_ESG* HHI} = 0.83$, $p < 0.01$), providing strong support for hypothesis 3. Interestingly, I do not find any support for another competitive landscape element, *Rival_reputation*, indicating that the rival firm's sustainability reputation might not play a significant role in the competitive rivalry of the focal firm.

Finally, turning to the control variables, as expected, *Focal_reputation* and *COGS* are negative and highly significant (Model 1: $\beta_{Focal\_reputation} = -0.49$, $p < 0.01$; $\beta_{COGS} = -0.06$, $p < 0.01$), indicating that better performing firms have less motivation to react to rival firms.

However, surprisingly, the *Focal_ROA* is positive and highly significant ($\beta_{\text{Focal\_ROA}}$ = 0.24, $p < 0.01$), indicating a strong positive correlation between a firm's financial performance and ESG performance. The inventory turnover ratio appears to have an insignificant impact on the focal firm's ESG performance, and a negative sign on the *TobinQ* (β_{TobinQ} = −0.10, $p < 0.01$) variable indicates that under-valued firms have a better ESG performance.

5. Discussion

5.1. Theoretical Implications

The purpose of this study is, first, to examine if a rival firm's sustainability performance impacts the focal firm's sustainability performance. Second, to identify the competitive landscape elements of the focal firm, rival firm, and the competitive environment in the form of focal firm size, rival firm sustainability reputation, and industry concentration that can accelerate the focal firm's sustainability activity intensity. I find that the empirical results are largely consistent with the theoretical arguments of competitive dynamics, which highlights the importance of the paper in contributing towards sustainability and competitive dynamics literature [12,17]. Thus, my study makes an important contribution to sustainability literature by examining a crucial factor in the form of inter-firm rivalry at the intersection of sustainability and business success.

There are relatively few studies in the sustainability literature that examined the motivating factors for firms to undertake competitive sustainability actions. For example, Ge et al. [22] empirically examined how green innovation strategies can enable sustainable competitive advantage. Another study, by Koh et al. [11], looked at how brand credibility, image, and perceived quality moderate the relationship between a firm's perceived ESG and consumers' responses. Along similar lines, Siyal et al. [57] studied the impact of corporate culture on the firm's corporate social responsibility. Through my study, I contribute to this growing yet nascent stream of literature by providing evidence of inter-firm sustainability rivalry and focal firms' increased response rate to that of rivals' ESG actions.

Consistent with the literature on competitive dynamics, I find a positive association between the rival firm sustainability performance and the focal firm's sustainability performance. In fact, the ESG signals arising from the rival firm shaped the competitive ESG strategy of the focal firm. This finding strongly indicates that firms in the industry are threatened by their rivals when they take ESG activities, which have the potential of eradicating the leadership of firms if they are complacent. Hence, sustainability and ESG strategies have become an integral part of overall firm strategies when they design and market the product. Many firms have now started to showcase their ESG initiatives in their annual expos, and by creating annual sustainability reports available to various stakeholders [86,87].

My second hypothesis stated that a larger firm will be more motivated to react against the rival's ESG activity. This point of view is consistent with the Austrian economic view and competitive dynamics literature which argues that firms lose their market share and witness their industry dethronement when they are less competitively aggressive [22,42]. Large firms have ample resources to act aggressively against any ESG signals that threaten their existence. For example, Tesla was able to use its financial might to thwart its competitors by acquiring a number of companies like Solar City, Maxwell technologies, and Hibar systems, which puts the firm far ahead of its industry competitors in developing electric cars [88].

My next finding of the study is the impact of industry concentration on the competitive rivalry between the focal and rival firms. In hypothesis 4, I stated that firms in highly concentrated industries are more likely to respond to rivals' actions owing to the visibility of these actions by industry actors, given that there are few dominant firms in those industries. I find strong empirical support for this hypothesis. An example of a highly concentrated industry is the soda industry, with a 93.7% market share among three firms, Coca-Cola, PepsiCo, and the Dr. Pepper Snapple group [89]. The intensity of rivalry is evident in this industry as firms compete to gain market share by introducing new products that counter

rivals' products. For example, the race to capture the 'Diet' market share by Coca-Cola and PepsiCo is well known [90].

Finally, I do not find any support for my hypothesis 3, which indicates that a rival firm's reputation is not a driving factor for the focal firm to take competitive actions against them. The main reason behind this result could be that a firm's reputation may not always be easily accessed by rival firms. For example, Lenox and Toffel [91] identify that successful sustainable practices do not easily propagate across subsidiaries of the same parent firm that have access to the reputation of these units. So, it is reasonable to think that there is a lesser penetration of the sustainability reputation of a rival into the competitive strategies of a focal firm. As opposed to the Gartner ranking data used in this study, firms might use their own experience from the interaction with their rivals to gauge the supply chain capabilities of the rivals and react accordingly.

5.2. Practical Implications

My findings in this research have direct implications for practitioners and managers in the industry. First, my study clearly identifies that a firms' sustainability initiatives are, in part, driven by the competitor's activities. This indicates the strategic importance of sustainable operations, showcasing that firms do in fact consider sustainability initiatives as a source of competitive advantage. Hence, managers and practitioners should carefully observe rivals' sustainability actions and be prepared to respond to maintain a competitive edge in the business. Second, I find that firm size accelerates ESG activity which indicates that large firms are crucial in the development of sustainable business practices as these firms have the required resources to identify, develop, and implement sustainable actions. Finally, I find that industry concentration increases the rivalry between two firms. This finding is consistent with the literature, which indicates that firms in concentrated industries are more efficient than in less concentrated industries [17]. This finding provides a key implication to policy-makers in regulating industry competition.

6. Conclusions

Limitations and Future Research

Although my findings provide unique insights into how the ESG activities of a focal firm are driven by the rival's ESG actions and competitive landscape elements that provide a catalyst to this rivalry, my study includes a few limitations. First, my study is limited to examining the combined ESG dimension of a firm's sustainability. Future research can head in the direction of exploring if the same rules of competitive rivalry apply to each dimension of the environment, social, and governance activities. Second, in this study, I investigate the response of the focal firm reacting to the rival's actions. Competitive dynamics has vastly explored the realm of inter-firm rivalry by expanding into elements like response speed, action timing, action/response simplicity, and much more [27,56]. Researchers can look into these action and response characteristics and their application to ESG actions. My research method is based using action–response pairs traditionally used in competitive dynamics literature where one firm acts and the other responds [26,42]. However, based on the context, the actor–responder roles can change dynamically. Hence, future research can explore this dynamic nature of competition in the sustainability space. Next, although Gartner rankings are well recognized and respected in the industry, the list is limited to 25 firms. Future research has a great scope in exploring the sustainability reputation by building on top of this research in calculating the sustainability reputation using sophisticated data analytics using archival data sources like RepRisk, Factset, and Bloomberg [92,93]. Finally, in addition to the three moderators (focal firm size, rival firm sustainability reputation, and industry concentration) discussed in this study, future research can examine other contextual factors like market leadership, firm profitability, action aggressiveness, and supply chain integration.

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