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From Demand Stability to Environmental Responsibility: How Ordered Backlogs Shape Firm Behaviour

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ABSTRACT

Ordered backlogs are the confirmed and yet to be delivered customer orders, which may have multiple advantages to firms. We investigate how ordered backlogs influence firms' future environmental misconduct. Drawing on organisational slack theory, we argue that ordered backlogs as a form of demand-side slack can reduce environmental misconduct. We combine data from Violation Tracker, Compustat, ExecuComp and IBES to construct a longitudinal panel of US publicly traded firms spanning the period from 2000 to 2024. Using high-dimensional fixed effects models, we find that higher levels of ordered backlogs are associated with significantly lower future environmental misconduct. Building on resource orchestration theory, we further examine how internal resource configurations condition this relationship by altering managerial discretion and resource deployment. We show that the negative association between ordered backlogs and environmental misconduct is attenuated in firms with higher R&D intensity, greater gross profitability and higher current asset intensity, suggesting that active resource deployment can override the stabilising influence of demand-side slack. On the other hand, buffering capacity based on inventory makes the negative link between ordered backlogs and environmental misconduct even stronger. We use the Gaussian copula method to deal with endogeneity concerns. Our findings demonstrate that operational demand conditions and internal resource orchestration jointly shape firms' environmental behaviour.

1 | Introduction

Firms generally make deliberate planning decisions, using demand projections and capacity assessments, in order to satisfy customer demand. However, it may become challenging to execute all customer requests in a timely manner if there is an unexpected increase in demand. Ordered backlogs represent the accumulation of accepted orders pending delivery. They play a significant part in directing operational decision-making, including capacity planning, production scheduling and inventory management (Oliva et al. 2022). They are crucial in minimising firm risk and signal vital information on the anticipated future demand (Rajgopal et al. 2003; Singh et al. 2024). Most firms face this situation of having a substantial amount of ordered backlogs in their annual financial statements due to an increase in customer demand. Firms like Caterpillar ($39.8 billion in 2025), General Electric ($119 billion in 2025), HP Inc. (over $10 billion in 2021) and LG Electronics (over $74 billion in 2024) disclose their ordered backlog amounts to show their robust future demand (GuruFocus News 2025; Hwang 2024; Martin 2021; Seeking Alpha 2025). Aircraft manufacturers, Airbus, Boeing and COMAC, collectively have a backlog of almost 12,000 units in 2025 (Stone 2025). These examples from a variety of different industries suggest the importance of ordered backlogs as a

crucial operational indicator, which may affect expectations regarding future performance.

We argue that a high level of ordered backlogs can influence the incidence of firms' environmental misconduct. Environmental misconduct has become a prominent area of scholarly inquiry owing to the proliferation of numerous businesses. The early research focused on how environmental regulations affect businesses and how they respond to legal requirements and penalties (Clemens et al. 2008; Comyns et al. 2022; Martinez Hernandez et al. 2021). Subsequently, researchers turned their attention to the determinants of environmental misconduct and demonstrated that production-related pressures and misaligned managerial incentives are some of the major contributors to environmental noncompliance (Seroka-Stolka 2023; Silvestre et al. 2020; Thosuwanchot and Lee 2025). As a reaction, a significant amount of research has been conducted to investigate potential remedies that aim to reduce environmental misconduct. These options include activities related to governance mechanisms and management, including controls, increasing transparency, stakeholder monitoring and the use of environmental management systems (Hersel et al. 2019; Wong et al. 2021; Yu et al. 2018). Empirical studies in this field rely heavily on external measures of environmental misconduct, such as regulatory enforcement actions, fines, violation notices, toxic release inventories and third-party environmental ratings (Delmas and Blass 2010; Simpson and Evens 2024; Zhou et al. 2025). This reliance is largely driven by the limited availability and accessibility of internal firm-level environmental data, as such data are often proprietary, inconsistently disclosed, or subject to managerial discretion, which raises concerns regarding their comparability and reliability across firms and over time. Prior studies have also acknowledged that internally generated environmental data may suffer from reporting bias or selective disclosure (Tadros et al. 2020), thereby reinforcing the use of externally verified datasets in empirical research.

We fill this gap by investigating the impact of ordered backlogs on the environmental behaviour of businesses. In addition, while prior literature has primarily focused on direct determinants of environmental misconduct, relatively limited attention has been given to the boundary conditions under which such relationships may vary. This work makes a contribution to the existing body of research by demonstrating how demand-side slack can help in the reduction of future environmental hazards caused by pressure due to short-term goals. Importantly, we also theorise that this relationship is not uniform across firms and is contingent upon internal resource configurations, which may strengthen or weaken the behavioural effects of ordered backlogs. Accordingly, this study addresses the following research questions:

RQ1: What is the impact of ordered backlogs on environmental misconduct?

RQ2: How do organisational resource conditions moderate the relationship between ordered backlogs and environmental misconduct?

The moderating perspective is introduced here to explicitly capture how internal firm characteristics, such as resource availability and deployment, shape the effectiveness of demand-side slack, thereby addressing an important yet underexplored gap in the literature. We use a longitudinal panel of US publicly listed companies covering the period from 2000 to 2024 to support our hypotheses empirically. We combine Compustat, ExecuComp, IBES and Violation Tracker databases to construct this panel. We use high-dimensional fixed effects (HDFE) for estimation. The Gaussian copula method and clustered standard errors are used to address endogeneity and heteroscedasticity. The empirical results strongly and consistently support all of the proposed hypotheses. We find that higher ordered backlogs are strongly linked to less environmentally harmful behaviour in the future. In firms with high R&D intensity, higher gross profitability and higher current asset intensity, the negative link between ordered backlogs and environmental wrongdoing is weaker. However, an increased inventory ratio reinforces the influence of ordered backlogs on environmental misconduct. The robustness tests suggest that the models are devoid of multicollinearity and heteroscedasticity issues.

2 | Hypothesis Development

2.1 | Ordered Backlogs and Environmental Misconduct

Rooted in the behavioural theory of the firm (Cyert and March 2015), organisational slack denotes the surplus of organisational resources beyond what is minimally required for operations, insulates core operations from external shocks and maintains stability amid internal conflicts (Aronson and LaFont 2022; Conz et al. 2023; Khan and Mir 2019). Slack alleviates the strain that is placed on managers to meet short-term performance targets and provides them with more leeway during the decision-making process (Vanacker et al. 2017). The slack is of various types: demand-side, financial and operational slacks (Barr 2012; Voss et al. 2008). It has the ability to change the behaviour of managers by reducing stress and urgency, as well as the requirement for any noncompliant actions (Park and Kim 2024). Prior empirical studies have consistently shown that firms facing high performance pressure are more likely to engage in unethical or noncompliant behaviour, including environmental violations, to meet targets (Zhang and Gimeno 2010; Zhu et al. 2023). When companies are under great pressure from a lack of resources or an unpredictable demand, managers are more inclined to engage in actions that are dangerous or immoral, such as environmental misconduct, in order to satisfy production targets or cost limitations. Slack reduces the intensity of such demands and encourages behaviour that is more rule-abiding. This argument is further supported by studies demonstrating that reduced operational pressure improves regulatory compliance and ethical decision-making (Duque-Grisales and Aguilera-Caracuel 2021). Within the context of this approach, ordered backlogs are a type of demand-side slack because they give businesses visibility into future sales and income streams.

Drawing on the theory of organisational slack, ordered backlogs can be conceived of as a type of demand-side slack that lessens the vulnerability of businesses to short-term performance demands and uncertainty. Substantial backlogs signal a stable, secure future demand (Rajgopal et al. 2003). So, managers

would have less pressure to achieve current sales targets, which weakens the dominance of survival-oriented decision-making and strengthens firms' commitment to regulatory and ethical compliance norms. Empirical evidence suggests that firms with predictable demand structures are less likely to resort to cost-cutting strategies that compromise environmental standards (Patel et al. 2021). Moreover, the continuous monitoring of regulatory authorities makes firms comply with their norms. Furthermore, demand stability provided by substantial backlogs makes production planning more systematic. This facilitates greater investment of time and resources in environmentally responsible operations. Such planning stability has been linked to improved environmental management practices and reduced violation risks (Thaher & Jaaron, 2022). A high volume of ordered backlogs signals a consistent revenue expectation (Gilliam et al. 2024), which alleviates the pressure of firms to protect margins by avoiding regulatory compliance. If future revenues are expected, managers will not be involved in cost-reduction practices, which may be related to environmental noncompliance. Additionally, ordered backlogs serve as a buffer against demand volatility, which compels managers to avoid risky actions that are against regulatory sanctions (Singh et al. 2024). A high level of backlogs also indicates long-standing customer relationships and recurring transactions, which strengthen firms' concern for reputational standing and long-term stakeholder interests. Reputational considerations have been widely documented as a key driver of environmental responsibility (Wang and Zhao 2023). When these factors are considered jointly, greater ordered backlog functioning corresponds with a decreased likelihood of firms engaging in environmental misconduct. Therefore, we propose the following hypothesis:

Hypothesis 1. An increase in ordered backlogs leads to a decrease in environmental misconduct.

2.2 | Firm Resource Capacity

The amount of internal resources a company possesses that permit managerial discretion and strategic decision-making varies greatly from one company to the next. This type of company resource capacity is a reflection of the availability of financial and strategic resources that managers are able to actively employ in order to pursue organisational objectives, reallocate attention and respond to performance demands. Prior literature highlights that the increase in internal resources within the firm amplifies managerial discretion in directing organisational activities (Finkelstein and Hambrick 1990). Firms with stronger internal resources insulate managers from the effects of external demand circumstances and provide them with more discretion towards resource allocation to shape the strategic decision-making. In this scenario, the behavioural consequences of ordered backlogs are not entirely defined by their function as demand-side slack. However, they are conditioned by the manner in which managers orchestrate the available resources, a process central to the logic of resource orchestration theory, placing managerial resource deployment as central to firm outcomes (Sirmon et al. 2011). Hence, we investigate the intensity of research and development, gross profitability and current assets as critical characteristics of company resource capacity. These factors moderate the relationship between ordered backlogs and environmental misconduct by reshaping the boundaries of managerial discretion and resource allocation.

2.2.1 | R&D Intensity

R&D intensity refers to the extent to which a firm allocates resources to research and innovation development activities for creating a sustainable competitive advantage (Fu 2023). We utilise the resource orchestration theory to explain the influence of R&D intensity in the relationship between ordered backlogs and environmental misconduct. Resource orchestration theory emphasises that firm value is generated through managerial actions of structuring, integrating and leveraging firm resources, rather than simply from owning resources (Blackburn et al. 2023; Carton and Parigot 2024). Substantial R&D investment tends to foster an innovative and prospective organisational culture, granting managers wider latitude in directing how resources are utilised (Heubeck and Meckl 2024). Organisational slack theory suggests that ordered backlogs act primarily as passive demand-side slack that alleviates short-term performance demands. However, this is not the case in these companies. Instead, managers deliberately reallocate existing resources towards research and development projects, initiatives that include experimentation and long-term innovation goals. The stabilising influence that ordered backlogs would otherwise have on managerial behaviour can be neutralised through the strategic redistribution of resources in research and innovation. Thus, ordered backlogs provide stability in future demand certainty, but their ability to reduce environmental misconduct is diminished in R&D-intensive companies. In research-intensive firms, managers pay more attention to innovation activities and they have the pressure to fulfil technologically complex and resource-intensive projects. In this particular scenario, the resource orchestration strategy surpasses the buffering logic of organisational slack. The environmental outcomes do not depend solely on the consequences of demand-side slack but also on managerial strategies of resource allocation. Consequently, a high level of research and development intensity neutralises the behavioural restraint that is generally brought about by demand stability, which in turn diminishes the association between ordered backlogs and environmental misconduct. Furthermore, recent studies suggest that innovation-oriented firms often prioritise technological advancement over compliance in the short run due to resource reallocation pressures (Kabongo 2019). This provides empirical grounding for the moderating role of R&D intensity in weakening the stabilising effect of demand-side slack. Hence, we propose the following hypothesis:

Hypothesis 2. High R&D intensity reduces the impact of the accumulated backlogs on environmental misconduct.

2.2.2 | Gross Profitability

Gross profitability shows how efficiently a firm converts revenues into gross earnings after accounting for the cost of production (Cao et al. 2023; Dou et al. 2021). Companies that have a higher gross profitability have a stronger internal financial capacity (Almashhadani and Almashhadani 2022), which allows for more managerial discretion when it comes to distributing resources among competing objectives. From the point of view

of resource orchestration, increased profitability gives managers the capacity to actively arrange and redeploy resources towards strategic goals. While gross profitability is often conceptualised as an outcome of efficient resource utilisation (Novy-Marx 2013), it also reflects the availability of internally generated financial slack that can be strategically redeployed. The prior literature signals the importance of internal resources, which enhance managerial discretion and reduce firms' exposure to external financial and monitoring pressures (Finkelstein and Hambrick 1990; Shen and Cho 2005). Hence, firms' profitability may provide a discretionary financial capacity to the organisation and contribute to the resource orchestration framework. Empirical evidence further indicates that highly profitable firms often pursue aggressive growth or efficiency strategies, which may reintroduce performance pressure despite stable demand conditions (Hutzschenreuter et al. 2021). This supports the argument that profitability can weaken the behavioural stabilisation effect of ordered backlogs.

This is in contrast to the traditional approach of relying on passive demand-side slack to dictate behaviour. Consistent with this view, the stabilising role of ordered backlogs suggested by organisational slack theory becomes less effective in such firms. Instead, high profitability prompts managers to focus on growth-oriented initiatives to sustain the same position in the market, which can reintroduce performance pressures even when demand conditions are stable. As profitability increases, managers become less dependent on demand-side signals such as ordered backlogs, relying instead on internally generated financial resources to guide strategic decisions. Consequently, the influence of demand certainty on managerial behaviour diminishes. As environmental outcomes are jointly shaped by demand conditions and managerial resource allocation, the active deployment of financial resources can override the stabilising effects of demand-side slack. Thus, the constraining influence of ordered backlogs on environmental misconduct is weakened in firms with higher gross profitability. Hence, we propose the following:

Hypothesis 3. An increase in firms' gross profitability reduces the influence of ordered backlogs on environmental misconduct.

2.2.3 | Current Asset Intensity

The current asset intensity captures the extent to which a firm possesses readily available resources to handle short-term financial needs using its own internal resources (Chen 2022). An increase in current asset intensity makes liquid resources more accessible to firms (Akbar et al. 2021). When these liquid resources are available to managers, they are more dependent on these resources and rely less on future demand visibility when making short-term decisions. This is because internal liquidity offers an alternate method of absorbing uncertainty and performance demands. Hence, the presence of ordered backlogs provides future stability as demand-side slack is weakened. Managers redeploy liquid resources to pursue strategic goals or manage short-term performance pressures. Thus, managers' allocation of these resources limits the efficiency of ordered backlogs to influence the environmental behaviour. As a result, the absorbing effects of organisational slack are overruled by managerial resource allocation. This is due to the fact that environmental outcomes are moulded more by the manner in which liquid resources are coordinated than by the presence of demand stability. As a consequence of this, the influence of ordered backlogs on environmental misconduct is reduced when the current asset intensity is increased. Prior literature also suggests that firms with higher liquidity are less elastic to demand-side signals and maintain their strategic plans irrespective of demand volatility (Campello et al. 2010), suggesting the influence of current asset intensity over ordered backlogs. On this basis, we advance the following hypothesis:

Hypothesis 4. An increase in firms' current asset intensity diminishes the influence of ordered backlogs on environmental misconduct.

2.3 | Passive Buffering Capacity

The passive buffering capacity is the firm's ability to absorb short-term shocks or operational demands, and this capacity requires minimum managerial intervention (Saadaoui and Mokdadi 2023). Through the smoothing out of fluctuations in demand and production, this capability helps to stabilise ongoing operations, which in turn reduces the sense of urgency and stress that is associated with managerial decision-making. Hence, this capacity also acts as a slack through the operational process, which is different from strategic or financial resources that require purposeful intervention. It enables firms to satisfy customer needs and absorb sudden shocks without rapidly modifying resource allocations. We investigate the inventory ratio, which signals passive buffering capacity, as a moderator in the relationship between ordered backlogs and environmental misconduct. Prior research signals that adequate inventory levels allow firms to absorb fluctuations in demand, which enables managers to make more deliberate decisions (Mwangola et al. 2024). This buffering mechanism, which is facilitated by inventory, can help firms improve environmental compliance.

2.3.1 | Inventory Ratio

The inventory ratio reflects the rate at which a firm converts its inventory into sales over a given period (Clampit et al. 2021). This ratio describes the efficiency of inventory utilisation by indicating how frequently it is used in the production process (Lin et al. 2022). A heightened inventory ratio improves firms' operational buffering capacity and amplifies the stabilising influence of ordered backlogs on managerial conduct. When viewed from the point of view of the organisational slack framework, inventory functions as a type of operational slack that absorbs short-term changes in demand and output. As a result, it minimises the sense of urgency and performance pressure that managers are subjected to. Greater inventory holdings enable firms to more efficiently operationalise future demand information from ordered backlogs into more orderly production and operational processes. This combination of demand-side slack and operational slack

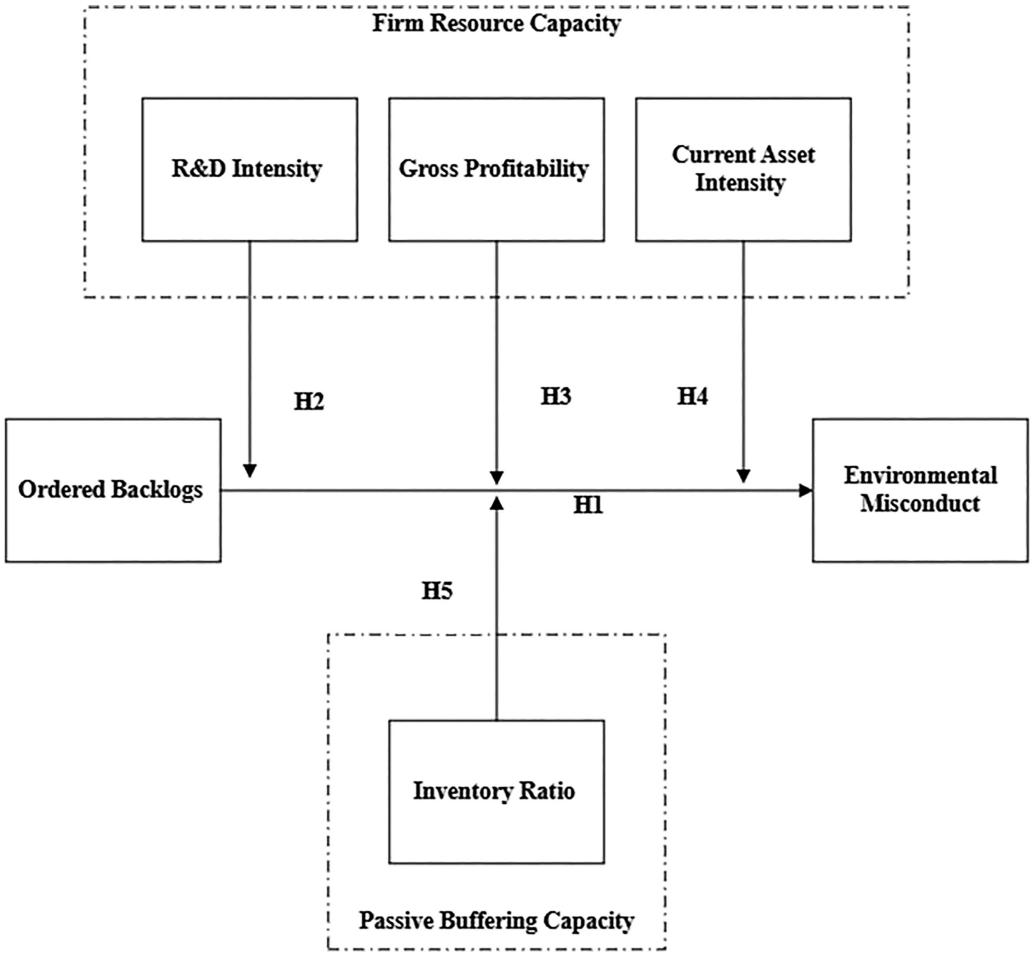

FIGURE 1 | Conceptual framework.

further reduces the need for hasty decisions or practices that save costs, both of which have the potential to result in environmental non-compliance. With increased inventory-based buffering, managers have less stress associated with fulfilling immediate delivery and production targets. This enables them to prioritise compliance with environmental rules and organisational norms, which is a significant benefit. As a result of the fact that operational disturbances can be absorbed without quick remedial efforts, inventory slack also reduces the possibility that businesses will respond to demand fluctuation by participating in behaviours that are hazardous to the environment or risky. The capacity of ordered backlogs to stabilise operations and alleviate short-term performance pressures is amplified by inventory, which in this context amplifies the mitigating effect of ordered backlogs. Thus, higher inventory ratios reinforce the disciplining effect of ordered backlogs, resulting in the reduction of environmental wrongdoings. Prior literature confirms that inventory level reduces production volatility and stabilises the demand fluctuations, which supports our reasoning (Blinder and Maccini 1991). Therefore, we propose the following hypothesis:

Hypothesis 5. An increase in inventory ratio strengthens the influence of ordered backlogs on environmental misconduct.

The conceptual framework is presented in Figure 1.

3 | Research Method

3.1 | Sample

We use the Violation Tracker dataset to extract our sample, which comprised publicly traded companies in the United States that have been found to have engaged in environmental wrongdoing (Chen et al. 2026a; Raghunandan 2024). We extract the data of firms involved in environmental misconduct and arrange them in a year-wise panel structure, which accurately captures regulatory violations of environmental laws at the firm level. This dataset is structured at the longitudinal level, capturing firm-level observations over time. All of these factors contribute to an increase in the reliability of the data and the ability to compare findings over time. We merge the Compustat, ExecuComp and IBES databases along with the Violation Tracker database to include firm and executive-related factors in our analysis (Abebe and Acharya 2022; Mahmoudian and Jermias 2022; Shevchenko 2021; Smith et al. 2019). Due to the variation in the availability of data across firms and years, we have an unbalanced panel of 31,438 year-wise observations covering the period from 2000 to 2024 after the integration of the three datasets. However, unbalanced panels do not bias the estimation as long as missingness is not systematically related to the error term (Baltagi 2021).

TABLE 1 | Operationalisation of variables.

Variables	Definition	Source
Environmental misconduct	Natural log of the penalty amount	Violation Tracker
Ordered backlogs	Ratio of ordered backlogs to assets	Compustat
R&D intensity	Ratio of R&D expenditures to sales	Compustat
Gross profitability	Ratio of sales minus cost of goods sold to assets	Compustat
Current asset intensity	Ratio of current assets to current liabilities	Compustat
Inventory ratio	Ratio of cost of goods sold to inventory	Compustat
Capital intensity ratio	Ratio of capital expenditure to assets	Compustat
Labour productivity	Ratio of sales to the number of employees	Compustat
Analyst coverage	Number of analysts' forecasts	IBES
Firm size	Log of the number of employees	Compustat
COO presence	= 1 if COO is present, otherwise 0	ExecuComp
CEO experience	Number of years serving as a CEO	ExecuComp

3.2 | Variables

3.2.1 | Dependent Variable

We use the natural log of the penalty amount imposed by the regulatory authority on firms involved in environmental violations to measure environmental misconduct (Foulon and Marsat 2023). Applying a logarithmic transformation limits the influence of extreme observations on the estimation results. The regulatory violation penalty amount for environmental misconduct captures the intensity of violations. It is appropriate to use a continuous variable rather than a binary indicator because it could reflect differences in the severity of misconduct. However, a dummy variable treats all instances of misconduct as being the same regardless of their magnitude.

3.2.2 | Independent and Moderating Variables

We measure ordered backlogs as the ratio of firms' ordered backlogs to total assets, following prior literature (Chang et al. 2018; Singh et al. 2024). There is a significant amount of variation in the magnitude of ordered backlogs between companies, and the standardisation improves comparability among enterprises of varying sizes. R&D intensity is measured by the ratio of research and development expenditures to sales, which helps in normalising the variables and provides a relative comparison in the analysis (Fuchs et al. 2024). We measure gross profitability as the ratio of sales minus cost of goods sold to a firm's total assets (Novy-Marx 2013). Scaling gross profit by total assets allows for meaningful comparisons across firms and better reflects the efficiency than unscaled profit measures. Current asset intensity is measured as current assets divided by current liabilities (DeFond and Jiambalvo 1994). Scaling current assets by current liabilities standardises liquidity across firms of different sizes and facilitates meaningful comparisons. The inventory ratio is measured as the ratio of cost of goods sold to inventory balance, following prior literature (Almashhadani and Almashhadani 2022).

3.2.3 | Control Variables

We have also included some control variables, which can affect our analysis. We use the capital expenditure to asset ratio as a capital intensity ratio indicating long-term expansion, which can affect the environment due to future pollution-heavy projects (Dudley 2012). We include labour productivity measured by the ratio of sales to the number of employees present in the firm (Mill 2008). Higher productivity may increase resource utilisation, potentially contributing to environmental impacts. Greater analyst coverage indicates increased external scrutiny, which may influence firm behaviour (Benlemlih et al. 2024). Thus, we incorporate analyst coverage measured as the number of analysts' forecasts (Wilson and Wu 2024). We include firm size, measured by the log of the total number of employees, as large production scale may correspond to greater resource consumption and emissions (De Meulenaere et al. 2021). We also include executive-related variables: the presence of the chief operating officer and the CEO's experience. The COO can optimise operational efficiency, which may affect ordered backlogs (Krause et al. 2013), and is measured as a binary variable (1 = present, 0 = absent). More experienced CEOs possess a stronger understanding of compliance requirements (Hamori and Koyuncu 2015), and we use years of experience served in the same firm as a proxy for CEO experience. Table 1 presents a description of variables, and Table 2 shows correlations and descriptive statistics.

3.3 | Endogeneity Correction

There is a possible risk of endogeneity in ordered backlogs due to omitted variables, reverse causality, or unobserved factors (Chen et al. 2026b). This is a potential concern that can affect our analysis. In order to overcome this issue, we make use of the Gaussian copula control-function technique, which is appropriate in situations where a valid external instrument is not available and the endogenous regressor is continuous and not regularly distributed (Becker et al. 2022). Using the empirical

TABLE 2 | Correlation matrix and descriptive statistics.

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. Environmental misconduct	1											
2. Ordered backlogs	0.01	1										
3. R&D intensity	−0.06*	0.00	1									
4. Gross profitability	−0.03*	−0.08*	−0.07*	1								
5. Current asset intensity	−0.05*	−0.06*	0.27*	0.01*	1							
6. Inventory ratio	−0.03*	−0.02*	−0.11*	−0.09*	−0.18*	1						
7. Capital intensity ratio	0.01	−0.11*	−0.09*	0.14*	−0.09*	0.20*	1					
8. Labour productivity	0.07*	0.00	−0.08*	−0.08*	−0.04*	−0.11*	−0.18*	1				
9. Analyst coverage	0.19*	−0.01*	0.01	0.01*	−0.01	−0.00	0.04*	0.10*	1			
10. Firm size	0.26*	−0.02*	−0.23*	0.03*	−0.21*	0.10*	0.12*	−0.04*	0.26*	1		
11. COO presence	0.07*	−0.04*	−0.02*	0.04*	0.00	0.01	0.05*	0.03*	0.15*	0.25*	1	
12. CEO experience	−0.15*	0.04*	0.03*	−0.05*	0.03	0.02*	−0.03*	−0.06*	−0.21*	−0.28*	−0.23*	1
Mean	0.42	0.36	0.05	0.35	2.25	10.89	0.04	259.26	2.46	1.41	0.14	3.38
SD	1.99	0.61	0.11	0.23	1.88	13.74	0.03	217.44	5.47	1.33	0.34	5.44
Min	0.001	0.003	0.00	−0.14	0.00	0.82	0.00	0.00	0.00	0.002	0.00	0.00
Max	11.16	4.01	0.79	1.31	9.54	45.54	0.25	854.06	27.00	5.35	1.00	34.00
Sample	31,438	31,438	31,438	31,438	31,438	31,438	31,438	31,438	31,438	31,438	31,438	31,438

*$p < 0.05$.

cumulative distribution function, we first convert the ordered backlog variable into a copula term by ranking the variable across all of the observations that are not missing (Li et al. 2026). After that, we convert the rank into a uniform distribution. This is done in accordance with the previous research that has been conducted (Dewick and Liu 2022). The values that have been rated are first scaled between zero and one, and then, they are projected into a typical normal distribution by employing the inverse normal transformation. Through the use of this approach, a Gaussian copula term is produced, which is capable of capturing the endogenous component of ordered backlogs while maintaining its dependent structure. In the subsequent step, we incorporate the copula term into the primary analysis to address the endogeneity issue.

3.4 | Estimation Method

We use the HDFE regression method, which is able to absorb many layers of fixed effects in an effective manner and is ideally suited for large panel datasets (Correia et al. 2020). This allows it to adjust for time-invariant firm features as well as common temporal shocks that have the potential to confound the estimated relationships. The firm and year fixed effects are absorbed during the estimation. The dependent variable, environmental misconduct, is evaluated in the future period $(t+1)$, whereas the ordered backlogs, moderating variables and all control variables are measured at time t. This ensures that concerns surrounding reverse causality are mitigated and that causal inference is strengthened (Godfrey et al. 2024; Zahid et al. 2020). This is in line with the idea that environmental misconduct is a reflection of the outcomes of previous managerial decisions and production practices (Casu et al. 2023). In addition, the fact that regulatory infractions and the fines that are linked with them often take place with a lag following operational activities is taken into consideration when measuring environmental misconduct at the time. With the empirical design, simultaneity bias is reduced, and confidence is increased that the estimated effects capture the influence of predictor variables on future environmental misconduct rather than contemporaneous or reverse effects. This is accomplished by lagging the predictor variables and aligning all explanatory variables at time t. We use the following equation for estimation:

$$\begin{aligned}
&Environmental\ Misconduct_{i(t+1)} = \xi_0 + \xi_1 * Ordered\ Backlogs_{it} \\
&+ \xi_2 * Ordered\ Backlogs_{it} * R\&D\ Intensity_{it} \\
&+ \xi_3 * Ordered\ Backlogs_{it} * Gross\ Profitability_{it} \\
&+ \xi_4 * Ordered\ Backlogs_{it} * Current\ Asset\ Intensity_{it} \\
&+ \xi_5 * Ordered\ Backlogs_{it} * Inventory\ Ratio_{it} \\
&+ \xi_6 * R\&D\ Intensity_{it} + \xi_7 * Gross\ Profitability_{it} \\
&+ \xi_8 * Current\ Asset\ Intensity_{it} + \xi_9 * Inventory\ Ratio_{it} \\
&+ \xi_{10} * Capital\ Intensity\ Ratio_{it} + \xi_{11} * Labour\ Productivity_{it} \\
&+ \xi_{12} * Analyst\ Coverage_{it} + \xi_{13} * Firm\ Size_{it} + \xi_{14} * COO\ Presence_{it} \\
&+ \xi_{15} * CEO\ Experience_{it} + \xi_{16} * GC(OB)_{it} + \varepsilon
\end{aligned} \tag{1}$$

We analyse this model, and the outcomes are discussed in the results section.

4 | Results

4.1 | Hypothesis Testing

The findings of the estimated results are presented in Table 3. Model 1 is the baseline specification, which includes control variables along with the Gaussian copula term, year and firm fixed effects. We insert our primary independent variable in Model 2 along with all the variables present in Model 1. The full specification is presented in Model 3, which includes all interaction terms along with ordered backlogs associated with our hypotheses. We discuss each result with respect to the hypotheses.

4.1.1 | Evidence Supporting Hypothesis 1

The coefficient of the ordered backlog variable is negative and significant ($\xi = -0.14$, $p < 0.05$). Hence, Hypothesis 1 is supported. Thus, firms with higher backlogs are responsible for the decrease in environmental misconduct.

4.1.2 | Evidence Supporting Hypothesis 2

The coefficient of the interaction of ordered backlogs and R&D intensity is positive and significant ($\xi = 0.005$, $p < 0.1$). Therefore, Hypothesis 2 is supported, suggesting that an increase in R&D intensity diminishes the effect of ordered backlogs on environmental misconduct.

4.1.3 | Evidence Supporting Hypothesis 3

The coefficient of the interaction of ordered backlogs and gross profitability is positive and significant ($\xi = 0.14$, $p < 0.05$). So, Hypothesis 3 is supported, which indicates that an increase in gross profitability undermines the impact of ordered backlogs on environmental misconduct.

4.1.4 | Evidence Supporting Hypothesis 4

The coefficient of the interaction of ordered backlogs and current asset intensity is positive and significant ($\xi = 0.03$, $p < 0.05$). Therefore, Hypothesis 4 is supported, which signals that a rise in current asset intensity dilutes the effect of ordered backlogs on environmental misconduct.

4.1.5 | Evidence Supporting Hypothesis 5

The coefficient of the interaction of ordered backlogs and inventory ratio is negative and significant ($\xi = -0.013$, $p < 0.05$). It follows that Hypothesis 5 is empirically supported. Hence, an increase in the inventory ratio reinforces the influence of ordered backlogs on environmental misconduct.

TABLE 3 | Main regression results.

Variables	Model 1	Model 2	Model 3
Ordered backlogs		−0.06* (0.035)	−0.14** (0.06)
Ordered backlogs × R&D intensity			0.005* (0.003)
Ordered backlogs × gross profitability			0.14** (0.07)
Ordered backlogs × current asset intensity			0.03** (0.01)
Ordered backlogs × inventory ratio			−0.013** (0.006)
R&D intensity	0.04 (0.09)	0.05 (0.10)	0.05 (0.10)
Gross profitability	0.05 (0.08)	0.06 (0.09)	−0.004 (0.09)
Current asset intensity	−0.007 (0.006)	−0.01 (0.01)	−0.013* (0.007)
Inventory ratio	−0.002 (0.008)	−0.003 (0.008)	0.01 (0.01)
Capital intensity ratio	0.24 (0.28)	0.25 (0.29)	0.26 (0.29)
Labour productivity	0.00 (0.00)	0.01 (0.00)	0.01 (0.01)
Analyst coverage	0.01* (0.006)	0.01* (0.006)	0.01* (0.006)
Firm size	0.11*** (0.03)	0.11*** (0.03)	0.11*** (0.03)
COO presence	0.03 (0.06)	0.04 (0.06)	0.04 (0.06)
CEO experience	−0.009 (0.009)	−0.01 (0.01)	−0.01 (0.01)
Gaussian copula control	0.15** (0.07)	0.10 (0.08)	0.12 (0.09)
Constant	0.35*** (0.11)	0.36*** (0.11)	0.38*** (0.11)
Temporal fixed effects	Present	Present	Present
Firm specific effects	Present	Present	Present
R-squared	0.31	0.33	0.38

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

The R^2 values show a clear improvement across the models, increasing from 31% to 38%. The overall value of R^2 is 38%, suggesting that the explanatory variables collectively explain a substantial proportion of the variation in the environmental misconduct. In this way, all of our hypotheses are empirically supported.

4.2 | Robustness Analysis

We perform a robustness analysis to strengthen our conceptualisation. For that purpose, we incorporate additional executive-level variables that may plausibly influence decisions associated with environmental compliance. We add the CEO gender variable, as prior literature suggests that gender diversity in leadership may influence decision-making associated with environmental compliance (Rao and Tilt 2016). We include the CMO presence, who are responsible for aligning marketing strategies with broader corporate objectives, which could increase demand and create operational pressure for firms (Nath and Bharadwaj 2020). Similarly, the size of the executive team may cause operational pressures within the organisation due to an increase in the decision-making complexity (Papadakis and Barwise 2002). Additionally, we include some firm-level factors like return on assets (ROA), sales growth and industry concentration for the robustness test. ROA captures the firm's financial health and the extent of internally generated resources (Ahsan et al. 2023). Sales growth captures pressures arising from expansion activities and industry concentration captures competitive dynamics that shape firm behaviour (Polemis and Stengos 2019; Ye et al. 2020). The results of this analysis are reported in Table 4. We find that the inclusion of executive characteristics and additional firm-level conditions does not alter our theoretical arguments.

4.3 | Multicollinearity and Heteroscedasticity

We also calculate the variance inflation factor, and its value is 2.00. The VIF value is far lower than the threshold levels that are generally accepted (Park et al. 2020), which indicates that the estimated coefficients are not disproportionately influenced by linear dependency among the explanatory variables. As a result, multicollinearity is not expected to be a concern in our models. In addition, all models are estimated by employing clustered standard errors at the firm level (Leyva-de la Hiz

TABLE 4 | Robustness analysis.

Variables	Estimates (SE)
Ordered backlogs	−0.15** (0.07)
Ordered backlogs × R&D Intensity	0.005* (0.003)
Ordered backlogs × gross profitability	0.15** (0.07)
Ordered backlogs × current asset intensity	0.03** (0.01)
Ordered backlogs × inventory ratio	−0.014** (0.006)
R&D intensity	0.05 (0.11)
Gross profitability	−0.001 (0.10)
Current asset intensity	−0.02** (0.01)
Inventory ratio	0.01 (0.01)
Capital intensity ratio	0.32 (0.31)
Labour productivity	0.01 (0.01)
Analyst coverage	0.02** (0.01)
Firm size	0.12*** (0.04)
COO presence	0.04 (0.06)
CEO experience	−0.01 (0.01)
CEO gender	0.07 (0.10)
CMO presence	0.02 (0.09)
Executive team size	−0.01 (0.02)
ROA	0.02 (0.04)
Sales growth	−0.05 (0.04)
Industry concentration	0.04 (0.12)
Gaussian copula control	0.12 (0.09)
Constant	0.40** (0.16)
Temporal fixed effects	Present
Firm specific effects	Present
R-squared	0.39

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

et al. 2019; Yuan et al. 2025). These errors adjust for the possibility of heteroscedasticity and within-firm correlation over time, ensuring that statistical inference is resistant to these problems. Hence, our analysis is free from the concerns associated with multicollinearity and heteroscedasticity.

5 | Discussion and Conclusion

The purpose of this study is to analyse the ways in which ordered backlogs influence environmental misconduct committed by businesses, and also the ways in which internal resource configurations influence this relationship. Our framework draws on the organisational slack theory to provide explanations for the relationship between ordered backlogs and environmental misconduct. Additionally, we use the resource orchestration theory to explain the influence of moderators on this relationship. We investigate whether this effect varies across companies that have different resource capacities and buffering mechanisms. In doing so, the study is a response to the growing calls in the field of organisation and environment to move beyond explanations of environmental wrongdoing that are centred on governance and finance (Duchin et al. 2025; Khalid et al. 2024; Ouyang et al. 2023) and to integrate operational and behavioural drivers of misconduct. Ordered backlogs are a form of demand-side slack, which helps relieve the strain on short-term performance. We also investigate the ways in which the firm-related resources regulate the relationship between ordered backlogs and environmental misconduct. These issues, when taken together, make it possible for us to differentiate between situations in which ordered backlogs serve as a passive behavioural stabiliser and situations in which their influence is either overridden or exacerbated by managerial resource orchestration. We use a longitudinal panel of US publicly traded firms by combining data from Violation Tracker on environmental penalties with data from Compustat, ExecuComp and IBES. Through the use of lagged explanatory variables, the utilisation of company and year fixed effects and the utilisation of a Gaussian copula technique to adjust for endogeneity, we are able to identify the impact of ordered backlogs on environmental misconduct.

The findings give evidence that is consistent with the hypothesis that higher ordered backlogs are related to reduced future environmental malfeasance. This research lends conceptual support to the hypothesis of organisational slack by indicating that demand-side slack can regulate managerial behaviour beyond the outcomes of financial performance. Previously conducted studies have mostly considered ordered backlogs to be informational signals for profit prediction or market value (Rajgopal et al. 2003; Chang et al. 2018). Additionally, ordered backlogs have been utilised as tools for revenue management (Gilliam et al. 2024). Our research contributes to the existing body of literature by demonstrating that ordered backlogs also have behavioural effects, which in turn influence the degree to which businesses comply with environmental rules. Due to the fact that it illustrates how operational stability lessens the urgency that frequently motivates rule-bending behaviour under production pressure, this contribution is particularly relevant for organisation and environment. It is consistent with the behavioural theory of the company (Cyert and March 2015) that demand certainty reduces the likelihood of survival-oriented decision-making and enables managers to prioritise actions that adhere to norms over longer periods of time instead. While existing research focuses more on governance or financial failures as the culprits for environmental violations (Raghunandan 2024; Chen et al. 2026a), we demonstrate that typical business operations can have a powerful influence on environmental performance.

Additionally, the findings indicate that the punishing effect of ordered backlogs is not consistent across all companies, which is an important finding. An alternative explanation is that it is systematically conditioned by internal resource configurations, which highlights the importance of resource orchestration theory (Blackburn et al. 2023; Carton and Parigot 2024). There is

a weakening of the negative correlation between ordered backlogs and environmental misconduct in businesses that have a high level of R&D intensity. The conclusion that can be drawn from this is that demand-side slack ceases to serve as a passive behavioural buffer when managers actively reallocate resources towards innovation and experimentation. An increase in R&D intensity brings technological complexity and strategic ambition, which have the potential to reintroduce performance stress. Our results differ from prior research, which connects innovation investments with long-term orientation and regulatory compliance (Hoppmann 2018; Fu 2023). Rather, our findings point to a more nuanced view, which is that businesses that are focused on innovation may place a higher priority on growth ambitions and experimentation, which in turn reduces the influence of demand certainty that is stabilising.

When firms have higher current asset intensity and gross profitability, a pattern that is comparable appears. There is a reduction in the mitigating effect that ordered backlogs have on environmental malfeasance within both of these scenarios. The findings imply that when companies have significant internal financial capacity, managers rely less on future demand visibility as a behavioural anchor. This is because managers want to be able to plan for the future. On the other hand, profitability and liquidity make it possible to deploy resources at will, which can allow them to bypass the passive buffering function that ordered backlogs otherwise perform. Previous research that establishes a connection between profitability and liquidity and managerial discretion (Dou et al. 2021; Akbar et al. 2021) is expanded upon by this study, which demonstrates that managerial discretion can reduce the compliance-enhancing impacts of operational slack. It is essential to note that this does not imply that inappropriate behaviour is directly correlated with profitability or liquidity. It is more accurate to say that it demonstrates how the mechanisms via which demand-side slack influences behaviour are altered when internal financial strength is present. The outcomes of environmental processes are therefore influenced not only by the existence of slack but also by the manner in which managers actively orchestrate the resources that are available. This distinction contributes to the advancement of organisational slack theory by incorporating it with a dynamic perspective of managerial agency, which is a topic that is being highlighted more in the organisation and environment academic field (Conz et al. 2023).

Inventory-based buffering, on the other hand, bolsters the unfavourable association that exists between ordered backlogs and environmental malfeasance. Inventory ratio is a form of passive operational buffering that absorbs demand changes and reinforces the impact of ordered backlogs. A high inventory ratio reduces operational pressure due to the combined effect of demand-side and operational slack. The recent research emphasises the significance of buffering mechanisms in determining the results of sustainability, and our findings align with the same idea (Clampit et al. 2021; Lin et al. 2022). Our research contributes to this body of literature by demonstrating that not all slack resources function in the same manner. However, deliberately coordinated resources have the potential to dilute the disciplining impacts of demand certainty, while passive buffering mechanisms serve to enhance those effects. This distinction is especially important regarding the formulation of business strategy because it highlights the importance of differentiating between slack that acts as a behavioural constraint and slack that enables managerial discretion.

5.1 | Theoretical Contributions

Previous research has largely conceptualised slack as financial or discretionary resources. However, our findings advance theory by establishing future demand certainty as a distinct form of slack. We redefine slack as a future-oriented operational condition rather than a static resource reserve and expand the theoretical domain of slack in shaping ethical and regulatory consequences. This reconceptualisation aligns with recent calls to broaden the understanding of slack beyond financial buffers to include operational and demand-based dimensions (Leuridan and Demil 2022; Wiengarten et al. 2017). We advance theory by showing that slack's influence on misconduct varies with managerial resource orchestration. We demonstrate that managers' resource orchestration may influence the behavioural impacts of slack. Consistent with resource orchestration theory, our findings emphasise that managerial actions in structuring and deploying resources are central to shaping firm outcomes (Andersén 2023; Sirmon et al. 2011). Because of management discretion and strategic reallocation, the passive buffering role of demand-side slack is overridden in companies that have a high R&D intensity, profitability, or liquidity. This results in the demand-side slack's stabilising influence on environmental behaviour being diminished. We extend resource orchestration theory beyond value creation, and its explanatory power expands to organisational misconduct and regulatory compliance. In doing so, we respond to recent scholarly efforts that call for extending strategic management theories to explain nonmarket and ethical outcomes (Robertson 2008). Thirdly, we present the distinction and contribution of active slack and passive buffering capacity towards the influence of ordered backlogs. We find that slacks of all types do not have the same behavioural mechanisms. Passive operational slack, such as inventory ratio, reinforces the disciplinary influence of ordered backlogs by smoothing operational pressures without requiring managerial intervention. This distinction resonates with prior work highlighting that different forms of slack may produce heterogeneous behavioural outcomes (Bourgeois 1981; Carnes et al. 2019). This suggests that organisational slack theory can undermine the resource orchestration framework when there is an increase in the inventory ratio. We provide the insight that slack can act as a behavioural safeguard and more theoretical attention should be given to internal operational conditions, which may also contribute to the firm's environmental behaviour. Our findings also complement emerging research in business strategy and environment that emphasises the role of internal processes and routines in shaping environmental outcomes (Aragón-Correa et al. 2025; Shah and Soomro 2021). These approaches conceptualise environmental consequences as products of everyday organisational processes and resource configurations, rather than solely in formal policies or institutional pressures. These findings advance theory by explicating how operational realities, when embedded in organisational processes, generate environmental malfeasance. The results enrich theory by offering a behaviourally grounded perspective on corporate environmental responsibility.

5.2 | Managerial Implications

The findings have direct implications for management. Following our first hypothesis, managers should consider the importance of ordered backlogs that can ease short-term performance constraints and support environmental compliance. They should not view ordered backlogs as a mere instrument for production planning. They act as a signal to careful decision-making centred on compliance. Utilising demand visibility to streamline production schedules, deploy compliance-related resources in a proactive manner and avoid lowering costs in a reactive manner are all beneficial ways for businesses to lessen the likelihood of engaging in environmental misbehaviour. Secondly, the findings emphasise to managers of resource-rich firms that internal resources, including R&D intensity, profitability or current asset availability, may not lead to improved environmental outcomes. While these resources offer flexibility and strategic freedom to firms, they undermine the impact of ordered backlogs and reintroduce a sense of urgency and ambition. Thus, managers should ensure that a high level of innovation, profitability and current assets align with environmental compliance. This is necessary in order to prevent the deployment of discretionary resources from undermining responsible conduct. Third, the findings suggest that the inventory ratio as a passive operational buffer strengthens the impact of ordered backlogs on environmental misconduct. Managers can invest more resources to maintain a high inventory ratio, which may support ordered backlogs to absorb short-term shocks. This minimises the risk of sacrificing environmental considerations. Our research advises managers to redirect their focus from formal policies to alleviate workload pressures and reduce operational strain, which may foster environmental responsibility. This allows managers to avoid treating environmental responsibility as a burden coming from the outside. The optimisation of internal operations can reduce the possibility of environmental misconduct.

5.3 | Societal Implications

The findings of this study carry important societal implications by highlighting how everyday operational conditions within firms can shape environmental outcomes that directly affect public welfare. Environmental misconduct is not only a regulatory or firm-level issue but also a societal concern, as it contributes to pollution, public health risks and ecological degradation. By demonstrating that demand-side stability, reflected through ordered backlogs, can reduce the likelihood of environmental misconduct, this study suggests that firms operating under less short-term pressure are more likely to adhere to environmental regulations and responsible practices. This has broader implications for communities and stakeholders who are directly impacted by corporate environmental behaviour. At the same time, the findings indicate that internal resource abundance, such as high profitability, liquidity or R&D intensity, may weaken this positive effect by increasing managerial discretion and strategic risk-taking. This suggests that simply having more resources does not automatically translate into better societal outcomes and, in some cases, may even create conditions that allow firms to deprioritise compliance. From a societal perspective, this underscores the importance of strengthening monitoring mechanisms and accountability structures, particularly for resource-rich firms that may otherwise have greater flexibility in their actions. Furthermore, the role of inventory as a stabilising buffer highlights how operational preparedness can indirectly support environmental responsibility, thereby benefiting society through reduced environmental harm. Overall, the study emphasises that societal well-being is closely tied to how firms manage operational pressures and internal resources, and it calls for a broader understanding of corporate environmental responsibility as an outcome of both organisational processes and managerial decision-making rather than solely regulatory enforcement.

5.4 | Methodological Implications

Our research provides useful methodological implications. Our analysis relies on the HDFE estimator, which is designed to absorb multiple dimensions of unobserved heterogeneity to mitigate biased estimates. The HDFE method effectively handles a large-scale panel dataset more efficiently than any other statistical method. The use of the Gaussian copula technique to account for endogeneity concerns is well-suited to this empirical setting, where valid external instruments are not available. These are conditions that are frequently encountered in operational and sustainability research. The combination of the Gaussian copula approach for capturing the endogenous component and the HDFE method to absorb unobserved firm and time-specific variability contributes to an improvement in the identification of causal relationships. However, the traditional fixed effects model provides a restricted amount of flexibility when we consider high-dimensional interactions in the analysis. Furthermore, lagged explanatory variables, combined with clustered standard errors, reduce bias stemming from reverse causality and heteroscedasticity. The integration of HDFE with a Gaussian copula correction offers a more reliable estimation to account for endogeneity and unobserved heterogeneity, which pose significant threats to the empirical validity.

5.5 | Limitations and Future Research Directions

Our study uses an unbalanced panel by merging different datasets to empirically evaluate our hypotheses. Researchers can collect qualitative datasets and perform a subsequent study in order to gain a deeper comprehension of the temporal patterns. The in-depth interviews with executives could provide insights into the reaction and adaptation of changing organisational situations due to violations. Qualitative interviews may indicate the changes in executives' evaluations during the violation, which cannot be directly captured through longitudinal quantitative data. Researchers can use a survey questionnaire to collect data from managers and obtain shifts in managerial practices during demand fluctuations.

The availability of data from private companies would also help the investigation of a variety of ownership, governance and disclosure situations, which can influence the impact of ordered backlogs and provide new insights into this area. Hence, future research may incorporate data from privately held firms to broaden the scope of analysis.

Furthermore, the empirical validity and generalisation of this study may be increased by performing a comparison analysis using different countries. For instance, cross-market comparisons between emerging and developed markets can shed light on how variations in regulatory and institutional contexts influence longitudinal patterns. While we focus on all types of industries, one of the possible extensions of this research could be sector-specific analysis to understand the industry-level dynamics. This will provide more nuanced and context-specific insights for firms within individual industries. Furthermore, researchers can collect the dataset regarding the opinions of investors, which may provide conceptual insight into this area. Investors' perception of environmental violations provides useful information to firms, and they can allocate their resources accordingly. These perceptions can be extracted from the earnings call transcripts dataset, which can help researchers in evaluating the heterogeneity of various stakeholders' reactions. This can provide additional insight into how organisational structures influence market-based responses. Investors' interviews may provide additional insights into transparency and expectations, which affect the dynamic relationship between managerial actions and investor interpretation within the organisation.

Author Contributions

Ashutosh Singh: conceptualization, writing – original draft, methodology, writing – review and editing, software. **Salwa Saleh Almasabi:** writing – original draft, writing – review and editing, validation. **Ajay Kumar Patel:** conceptualization, writing – review and editing, visualization. **Judit Petra Koltai:** conceptualization, methodology, formal analysis. **Debanjana Dey:** writing – original draft, writing – review and editing, formal analysis.

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