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Does green HR management attention foster sustainability? A quantile-based analysis

1. Introduction

In recent years, the discourse on sustainability has evolved beyond traditional environmental conservation to encompass broader aspects of corporate responsibility and ethical business practices. At the heart of this transformation is the concept of Green Human Resource Management (HRM), which integrates sustainable practices into human resource management processes. Green HRM aims to foster an organizational culture that prioritizes environmental stewardship, social responsibility, and sustainable growth. As companies strive to align their operations with global sustainability goals, understanding the impact of Green HRM on corporate performance, particularly in terms of sustainability indices, becomes crucial.

The notion of sustainability is likely to be the top concern for managers and organizations in the next years. The social movements' pressures and environmental legislations force organizations to develop policies and directives to improve sustainability practices in various dimensions whether economic, social, or environmental (Jerónimo et al., 2020). Several organizations are practicing

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a proactive strategic tool known as an environmental management system (EMS) to win a competitive advantage (Dail and Huang, 2001). Currently, the business organizations are becoming eco-friendly organizations to the extent that they have become essential factors which integrate processes, technological adoption, and systems. The green companies have been more sustainable in their practices as compared to other traditional firms (Amjad et al., 2021).

Green HRM can be conceptualized at three main levels: operational, managerial, and strategic. The operational level involves day-to-day practices such as sustainable recruitment, eco-friendly training, and green office practices. The managerial level includes policy development, environmental performance management, and employee engagement in sustainability initiatives. At the strategic level, Green HRM encompasses the integration of sustainability into corporate strategy, leadership commitment to environmental goals, and long-term planning for sustainable growth.

In this context, the discourse on Green HRM emerges as pivotal in fostering organizational sustainability across various contexts. Jerónimo et al. (2020) underscore the influence of Green HR practices in shaping the organizational rationale for sustainability, highlighting its role in embedding environmental values into HRM strategies. This sentiment is echoed by Campos-García et al. (2024), who emphasize HRM's bridge to the 2030 sustainability agenda, underscoring its strategic importance in driving sustainable practices within organizations. Chatterjee et al. (2023) and Kar and Praharaj (2017) delve into the creation of organizational value through Green HRM, emphasizing the moderating role of top management support in amplifying its impact. These findings underscore the importance of leadership commitment in integrating sustainability into corporate culture and practices. Additionally, the study by Likhitkar and Verma (2017) emphasizes the positive impact of Green HRM practices on organizational sustainability and employee retention, suggesting that these practices contribute not only to environmental goals but also to overall organizational effectiveness. Furthermore, the study by Amjad et al. (2021) highlights the mediating role of environmental and employee performance in the relationship between Green HRM practices and organizational sustainability, emphasizing the dual benefits of such practices. Collectively, these studies underscore the evolving role of HRM in promoting environmental stewardship, advocating for sustainable practices, and driving organizational resilience in the face of global environmental challenges.

Therefore, with Green HRM emerging as a pivotal approach to integrating environmental responsibility into organizational practices, understanding its impact on corporate sustainability outcomes is paramount. By examining the levels of Green HRM attention, such as operational, managerial, and strategic, through the lens of Google Trends data and quantile regression analysis, this study aims to provide empirical insights into how these practices contribute to sustainability performance across different quantiles. Such insights are crucial for organizations seeking to enhance their environmental stewardship, attract socially responsible investors, and align with global sustainability agendas effectively. Ultimately, this research aims to inform more targeted and effective Green HRM strategies that can drive sustainable business practices in the face of mounting environmental challenges.

This study aims to investigate whether attention to Green HRM, measured through public interest as reflected in Google Trends data, fosters sustainability as evidenced by the performance of the S&P 500 ESG Index. Specifically, I utilize a quantile-based analysis to explore how the impact of Green HRM attention varies across different performance levels of the ESG index. By examining the effects at various quantiles, one can uncover nuanced relationships that might be obscured in mean-based analyses, offering a more comprehensive understanding of how Green HRM attention influences sustainability outcomes.

This study contributes to the existing literature on sustainability and human resource management by providing empirical evidence on the role of Green HRM in fostering corporate sustainability. By utilizing a quantile-based analysis, I offer insights into how Green HRM attention impacts different performance levels of the ESG index. In this context, while ordinary least square (OLS) model provides a single average estimate and assumes a constant effect across the entire distribution, QR estimates the impact of independent variables at different points of the dependent variable's distribution. This is particularly valuable in our context, as sustainability performance measured by the S&P 500 ESG Index can vary significantly across market conditions. Moreover, QR is robust to outliers and heteroscedasticity, yielding more reliable estimates in datasets with non-constant variability. By employing quantile regression, one can gain a comprehensive understanding of the relationship between Green HRM attention and corporate sustainability, allowing for more targeted HR strategies.

Additionally, the use of Google Trends to measure public attention toward Green HRM concepts, offering a novel approach to capturing societal interest

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in sustainability-focused HR practices. Google Trends provides a real-time measure of search activity, reflecting public awareness and concern about specific topics, making it a valuable proxy for societal attention. Unlike traditional surveys or secondary data, Google Trends captures spontaneous and organic interest, enabling researchers to gauge shifts in public awareness over time. This dynamic feature is especially relevant in today's fast-evolving sustainability landscape, where public sentiment can significantly influence corporate strategies and market performance. By focusing on Green HRM, this study leverages Google Trends to reveal how fluctuations in public interest align with changes in corporate sustainability performance, as measured by the S&P 500 ESG Index. The use of Google Trends enriches the study by introducing a real-time, public-driven dimension to the analysis of Green HRM, helping companies understand when and how societal expectations impact their sustainability initiatives.

This paper is organized as follows: The second section is reserved to the literature review. Section three presents the used data, variables collection and preliminary analysis. Section four is reserved for the empirical results and discussions. Finally, section five concludes the paper and provides policy implications.

2. Theoretical background and literature review

2.1. Theoretical background

The Green HRM and its impact on organizational sustainability is rooted in several key theoretical frameworks and perspectives from the literature. First, the Resource-Based View (RBV) of the firm provides a foundational perspective for understanding how Green HRM practices can contribute to organizational sustainability. According to RBV, sustainable competitive advantage arises from the firm's unique resources and capabilities that are valuable, rare, inimitable, and non-substitutable (VRIN criteria). Green HRM practices, such as eco-friendly recruitment, training on environmental sustainability, and the integration of green policies, can be seen as valuable resources that enhance organizational capabilities. These practices not only attract environmentally conscious employees but also foster a culture of sustainability within the organization, thereby contributing to long-term competitive advantage and sustainability performance (Kar & Praharaj, 2017).

Second, the present study is rooted on the Institutional Theory. This later provides insights into how organizations respond to external pressures, norms, and expectations related to sustainability. Organizations adopt Green HRM practices not only to comply with regulatory requirements but also to meet societal expectations and stakeholder demands for environmental responsibility. This theory suggests that organizations often mimic the practices of successful peers (isomorphic pressures) and respond to regulatory pressures by institutionalizing green practices into their HRM strategies. This institutionalization of Green HRM practices helps organizations enhance their legitimacy and reputation as environmentally responsible entities, thereby gaining competitive advantage in the market (Chatterjee et al., 2023).

Third, anther basis dealing with the green HRM – sustainability nexus is the Stakeholder Theory. In fact, this theory posits that organizations must consider the interests and expectations of all stakeholders, including employees, customers, communities, and investors. Green HRM practices demonstrate a commitment to stakeholders concerned with environmental issues by promoting sustainability within the organization. By engaging employees in sustainability initiatives, aligning HR policies with green values, and fostering a culture of environmental responsibility, organizations can enhance stakeholder trust and loyalty. This theory suggests that organizations with robust Green HRM practices are better positioned to attract and retain socially responsible employees, satisfy customer preferences for sustainable products and services, and maintain positive relationships with communities and investors (Likhitkar & Verma, 2017).

Finally, the study is based on the Triple Bottom Line approach expands the traditional economic bottom line to include social and environmental dimensions of performance. Green HRM practices contribute to the environmental dimension by reducing ecological footprints, promoting energy efficiency, and minimizing waste generation. By integrating sustainability goals into HRM practices at operational, managerial, and strategic levels, organizations can enhance their overall TBL performance. This approach emphasizes the interconnectedness of economic, social, and environmental outcomes, suggesting that Green HRM practices not only drive environmental sustainability but also contribute to organizational resilience and long-term viability (Amjad et al., 2021).

The theoretical background of this study integrates perspectives from RBV, Institutional Theory, Stakeholder Theory, and the Triple Bottom Line approach to explore how Green HRM practices influence organizational

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sustainability. By leveraging these theoretical frameworks, the study seeks to uncover the mechanisms through which Green HRM practices contribute to enhanced environmental performance, stakeholder engagement, and competitive advantage in today's increasingly sustainability-focused business environment.

2.2. Previous studies

The empirical literature suggests that the green human resources management (GHRM) practices can be employed to encourage employees to behave positively towards workplace environment and establishment of green organizations (Amjad et al., 2021). The more recent approach that addressing sustainability and HRM is being labelled as sustainable human resource management (sustainable HRM). The terms green and sustainable HRM have been theorized by different organizations in a different way. They have been referred to in different organizations and HRM related literatures and as follows:

Sustainability is a loose term that has been developed since its application in the settings of the environment and population growth. Conversation on sustainability was driven by the Brundtland Commission of the United Nations. The Brundtland Commission took a broad perspective of sustainable development which was characterized by being global, long term and stakeholders oriented with three pillars of sustainable development: economic, social and environmental. This approach is also concerned with the social impact and continued waste of HRs resulting from the prevailing nature of economic growth and development (Kramar, 2014). On the other hand, the green organization refers to organizations that offer environmentally friendly services and products, using of renewable energy, efficient using of resources, reducing all negative effect on the environment by using green activities (Jafri, 2015). In the same line, Ramnus (2012) indicated that green actions are defined as the activities that monitor an organization to reduce its damaging environmental effects and preserve natural resources. Accordingly, the main role of employees is to realize the organizational objectives by developing and implementing organization strategies. The purpose of sustainable HRM is to integrate sustainability principles into an organization's HR actions, with the objective of positively influencing the environment and society and promoting employee well-being and involvement. The following components are included: recruitment and selection, training and development, work-life balance, wellness initiatives, employee feedback and communication, diversity and inclusion,

performance management, rewards and recognition, employee feedback, and ethical leadership (Ren and Jackson, 2020).

The most significant factors in achieving green organization objectives and long-term performance is HRM strategies and this is why several investigations joined HRM procedures such as training, selection, recruiting, and remuneration to green practices. Moreover, the green performance is likely to require a green process in HRM practices, starting from hiring green personnel, to training them, to compensating them, resulting in full organizational green performance (Ulrich et al., 2009).

The association between sustainability and HRM occurred in the late 20th and first 21st century. This emerging stage was stimulated by the 'Map of the HRM Territory' or the 'Harvard model of HRM' which shows the causes and consequences of HRM policies (Campos-García et al., 2024). Throughout this phase, researchers, such as Gollan (2000) and Mariappanadar (2003) highlighted the applicability of sustainability in HRM. The main contribution concentrates both on the sustainable development of companies at the macro level and the promotion of the sustainability of the HR system at the micro level (Ehnert & Harry, 2012). Referring to these views, three different perspectives have developed based on the explanation of viewing HRM from a sustainability perspective simply because it is socially responsible and economically having visibility (Sustainable HRM).

The relationship between workplace environment and workforce from the view point of environmental HRM is under review. The significance of employee's environment for performance cannot be neglected. Though, management engagement is common and influences employees (Iqbal, 2020). A study of Spanish companies shown that high-involvement work practices shape employees to create proactive environmental strategies, which, in turn, facilitate high-involvement work practices and environmental performance within green strategies (Renwick & Rocca, 2015). A study of 5220 French organizations emphasized how labour productivity was higher among businesses that maintained environmental management standards than those that did not (Andersson, 2013). A study in two Australian-based firms concluded that involvement in the environmental initiative is linked with employee participation and green performances (Renwick & Rocca, 2015). Chatterjee et al. (2023) stated that Green human resource management (GHRM) attempts to integrate human resource strategy and practices into an organization's environmental sustainability goals. Some relevant research has revealed that GHRM is positively associated with organizational sustainability. Consistent

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with this study Campos-García et al. (2024) stated that the studies linked to human resource management (HRM) and sustainability have increased dramatically since 2015, concurrent with the establishment of the 2030 Agenda for Sustainable Development. In addition to that the HRM has genuine role in achieving organization sustainability while organization has to apply sustainable principles to HRM practices. 27.

Diri and Elisha, (2021) figured out several predicted advantages for adopting sustainability practices, such as organizational advantages, financial advantages, and human advantages in addition to other external benefits such as commercial, environmental, and communication advantages. Frequently companies confront a number of challenges when they come to address sustainability issue, and these challenges include a lack of leadership support, the cost of maintenance, and a lack of internal capability (Jackson et al., 2012). This study attempted seriously to examine the role of HRM attention in fostering sustainability as few studies addressed such issue according to the authors best knowledge the thing gives this study a novelty and significance in particular.

3. Data and methodology

3.1. The data

In this study, the S&P 500 ESG Index is used to measure sustainability. This index is chosen for this study due to its recognition as a comprehensive benchmark that evaluates large-cap companies based on strict environmental, social, and governance criteria. This index maintains a similar sector weight to the broader S&P 500, allowing for meaningful comparisons between ESG-focused companies and their non-ESG counterparts. Additionally, its regular updates reflect changing market dynamics and ESG standards, making it a relevant measure for assessing corporate sustainability performance. Thus, using the S&P 500 ESG Index effectively captures the nuanced relationships between Green HRM attention and sustainability outcomes in the current investment landscape.

On the other hand, I used Google Trends to capture the public attention toward "Green HR" concepts. Google Trends provides a measure of search interest over time, which can be considered a proxy for attention or concern regarding specific topics. The S&P 500 ESG Index is used as the dependent variable, representing the performance of securities meeting sustainability criteria. Firstly, I considered an aggregated measure of Green HR attention.

This measure encompasses a broad array of search terms related to Green HR practices, such as "Green recruitment," "Eco-friendly office practices," and "Sustainability training." By aggregating these search interests, I created a comprehensive indicator of overall attention to Green HR. This aggregated measure helps to understand the general trend and impact of Green HR attention on the S&P 500 ESG Index.

Secondly, I delved deeper into the nuances of Green HR. in addition to an aggregated concept, I decomposed the concept into three distinct levels: operational, managerial, and strategic. The operational level includes terms like "Green recruitment" and "Eco-friendly office practices," reflecting sustainable HR practices. The managerial level includes terms such as "Green HR policies" and "Environmental performance management," focusing on policy development and employee engagement. The strategic level includes terms like "Sustainable corporate strategy" and "Green HR leadership," representing the integration of sustainability into corporate strategy and long-term planning. By examining these levels separately, I can identify how different aspects of Green HR attention influence the ESG index, providing a more detailed understanding of their impact.

Data from Google Trends for each of these terms is collected over the same time period for which the S&P 500 ESG Index data is available. The average search interest for each set of terms is computed to create three independent variables representing the operational, managerial, and strategic levels of Green HR attention. This approach allows us to analyze both the overall and segmented impacts of Green HR attention on the performance of the ESG index.

3.2. Empirical methodology

This study employs the quantile regression (QR) model to investigate the impact of Green HRM attention on the sustainability performance of companies, as measured by the S&P 500 ESG Index. Quantile regression allows us to explore the varying influence of Green HRM practices across different quantiles of the ESG index, providing a more nuanced understanding of how these practices perform under diverse market conditions (e.g., bearish vs. bullish phases). This is particularly important because sustainability performance and investor behavior can respond differently depending on market trends, which OLS would overlook by focusing solely on the mean effect. By capturing these distributional variations, QR offers more

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comprehensive insights into the impact of Green HRM practices. The quantile regression model is specified as follows:

$$ESG_t(\tau) = \beta_0(\tau) + \beta_1(\tau).GreenHRM_t + \epsilon_t(\tau) \tag{1}$$

where: $ESG_t(\tau)$ represents the $\tau - th$ quantile of the S&P 500 ESG index at time t. $GreenHRM_t$ is the aggregated measure of the green HRM attention at time t. $\beta_0(\tau)$ and $\beta_1(\tau)$ are the intercept and the coefficient measuring the effect of green HGM on the ESG index at quantile τ, respectively. $\epsilon_t(\tau)$ is the error term at quantile τ.

In the second step, I proceed by disaggregating the Green HRM attention into three levels: operational (OPR), managerial (MAN), and strategic (STR). The quantile regression model in equation 1 is extended in the following form:

$$ESG_t(\tau) = \beta_0(\tau) + \beta_1(\tau).OPR_t + \beta_2(\tau).MAN_t + \beta_3(\tau).STR_t + \epsilon_t(\tau) \tag{2}$$

The effect of each level is measured by the These coefficients provide insights into how the impact of Green HRM attention varies across different levels of the ESG Index. A positive coefficient indicates that higher Green HRM attention is associated with higher ESG performance at that quantile, while a negative coefficient indicates the opposite. By analyzing these coefficients across different quantiles, I can identify whether the effects of Green HRM practices are more pronounced in certain segments of the ESG performance distribution.
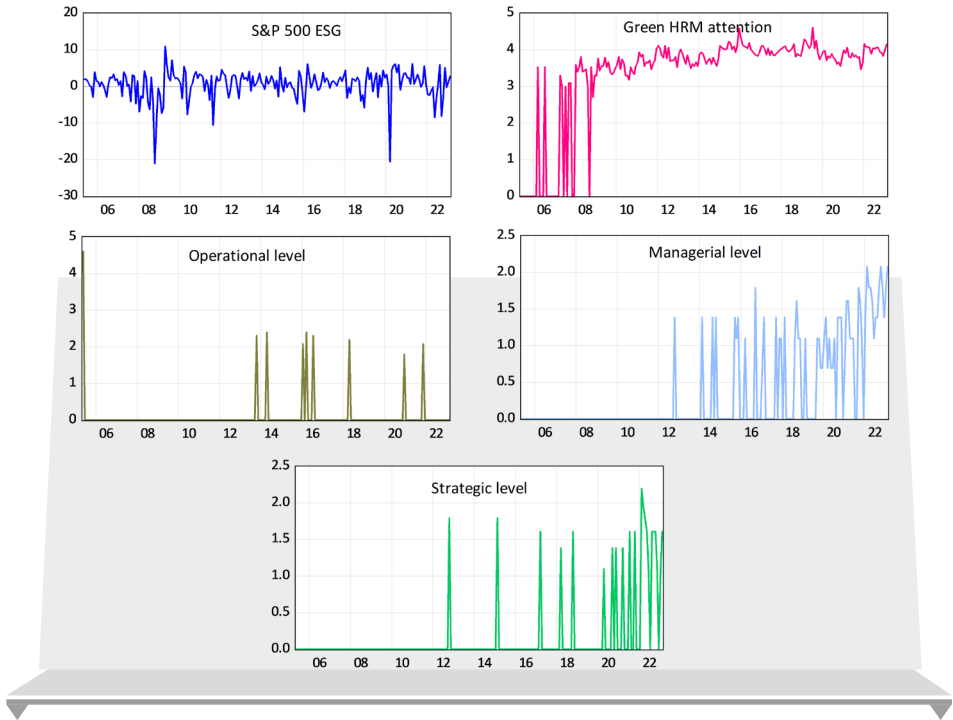
Figure 1. Graphical representation of the different variables

Notes: This figure plots the different variables of the study such as the sustainability index (dark blue), Green HR attention (red), HR attestation at different levels such as operational (gray), managerial (light blue), and strategic level (green)

Source: author's calculations

4. Results and discussion

The empirical analysis of this study is made in two steps. In the first one, I examine the effect of an aggregated measure of Green HRM attention on the S&P 500 ESG Index. In the second step, I proceed by disaggregating the Green HRM attention into three levels: operational (OPR), managerial (MAN),

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and strategic (STR). However, the empirical analysis started with a descriptive analysis and a preliminary testing procedure of the data to justify the used methodology.

4.1. Data description and preliminary analysis

Figure 1 plots the graphical representation of the different variables over the period of study. The S&P 500 ESG Index shows substantial variability with frequent fluctuations, indicating a dynamic performance of ESG-related metrics among the S&P 500 companies. The index exhibits sharp movements that reflect the market's response to various sustainability criteria over time. Moreover, the representation of the green HRM at an aggregated and disaggregated levels a growing trend attention across all levels, with managerial practices showing the most consistent increase. This trend is crucial for understanding how different levels of Green HRM practices influence the sustainability performance of organizations, as captured by the S&P 500 ESG Index.

The descriptive statistics and preliminary tests for the variables under study are given by table 1. The results provide insightful information regarding their distributional properties. The mean value of the ESG index is 0.60% with a high standard deviation of 3.787%, indicating significant variability in ESG performance among the companies.

Table 1. Descriptive statistics and preliminary tests

	Mean	Std. Dev.	kewness	Kurtosis	Jarque-Bera	ADF	PP
ESG	0.600	3.787	-2.047	11.708	825.487***	-11.955***	-11.979***
GreenHRM	3.334	1.273	-2.114	5.829	230.682***	-4.465***	-5.881***
OPR	0.104	0.520	5.535	36.679	11206.27***	-18.64***	-18.221***
MAN	0.351	0.612	1.361	3.263	66.643***	-4.033***	-7.814***
STR	0.159	0.478	2.785	9.119	610.646***	-8.612***	-11.807***

Notes: ADF is the Augmented Dickey Fuller test statistics. PP is the Phillip-Peron test statistics. (***) indicates the significance at 1% level.

Source: author's calculations

For the aggregated Green HRM attention, the mean is 3.334 with a standard deviation of 1.273. The data shows a negative skewness of -2.114 and kurtosis of 5.829, indicating a left-skewed distribution with a moderately peaked shape. The Jarque-Bera statistic is 230.682, which is significant, rejecting normality. The stationarity of the Green HRM variable is confirmed by significant ADF and PP test results.

By considering the different levels of the green HRM, I find that the managerial one has the highest mean (0.351) and standard deviation (0,612), while the operational has the lowest mean and variability by 0.351 and 0.104, respectively.

Regarding the normality analysis, the results reveals that all the variables under study have skewness and Kurtosis values different from those of the Normal distribution. In addition, the strong and significant Jarque-Bera statistics strongly reject the null hypothesis of Normality for all the variables, indicating that these variables are not normally distributed, which support the use of a quantile-based analysis.

To test the presence of unit root in the different series, I applied both the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests. The results from table 1 indicate that the test statistics are below the critical values, suggesting that all the considered series are stationary.

4.2. Aggregated analysis

In this section, I estimate the quantile regression (QR) model as specified in equation 1. The estimation results are presented in table 2. Figure 2 depicts the estimates of the coefficient from equation 1 (indicated by the red line) along with the upper and lower bounds of the confidence interval. Our analysis reveals that Green HRM attention has a significant positive impact only at the upper quantiles, specifically from 0,75 to 0,95. This indicates that Green HRM practices significantly foster sustainability when the market is bullish. Conversely, during bearish or normal market conditions, Green HRM attention does not have a noticeable effect on the ESG index.

Table 2. Estimation results of the impact of Green HRM on the ESG index

Quantile	Coefficient	Std. Error	t-Statistic	Prob.
0.05	-0.507	0.389	-1.305	0.194
0.1	0.215	0.267	0.806	0.421

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0.15	0.086	0.327	0.264	0.792
0.2	0.372	0.363	1.024	0.307
0.25	0.099	0.306	0.322	0.748
0.3	-0.060	0.187	-0.320	0.749
0.35	0.077	0.181	0.424	0.672
0.4	0.138	0.173	0.797	0.426
0.45	0.201	0.167	1.206	0.229
0.5	0.051	0.147	0.346	0.730
0.55	0.058	0.145	0.402	0.688
0.6	0.116	0.142	0.821	0.413
0.65	0.225	0.138	1.623	0.106
0.7	0.245*	0.136	1.804	0.073
0.75	0.246*	0.139	1.767	0.079
0.8	0.334**	0.132	2.541	0.012
0.85	0.353***	0.131	2.692	0.008
0.9	0.440***	0.128	3.431	0.001
0.95	0.616***	0.173	3.558	0.001

Notes: This table provides the coefficient estimates, their standard deviation, t-statistics, and probability (for parameter significance). (*), (**), and (***) denote the parameter significance at 1%, 5%, and 10%, respectively.

Source: author's calculations

The quantile regression results suggest that the influence of Green HRM attention on the S&P 500 ESG Index is contingent upon the market's performance. When the ESG index is at higher quantiles, reflecting a bullish market, increased attention to Green HRM practices is associated with improved sustainability performance. This finding implies that companies focusing on Green HRM practices may be more likely to achieve higher ESG scores during periods of strong market performance, potentially due to increased investor interest

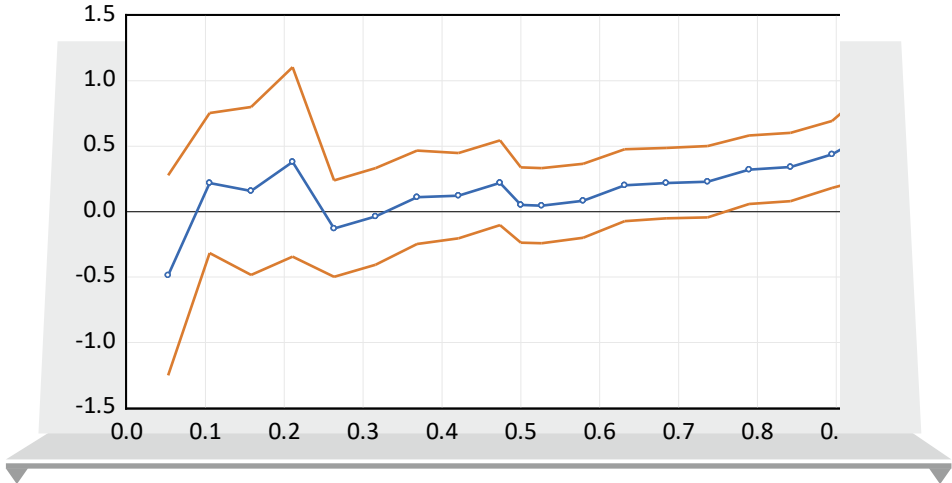in sustainability and heightened awareness of environmental, social, and governance issues during such times.

Figure 2. Coefficient estimation of the parameter β_1

Notes: The blue line represents the coefficient estimates of equation 1, red lines represents the upper and lower confidence interval

Source: author's calculations

On the other hand, the lack of significant impact at lower and median quantiles suggests that Green HRM attention does not markedly influence sustainability performance during bearish or average market conditions. This could be due to various factors, such as reduced investor confidence or lower prioritization of sustainability initiatives during market downturns. Consequently, while Green HRM practices are beneficial in enhancing sustainability during favorable market conditions, their effect may be muted during periods of market instability or average performance. These findings underscore the importance of market context in evaluating the effectiveness of Green HRM practices on corporate sustainability outcomes.

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4.3. Analysis at green HRM levels

At different levels of Green HRM attention, the estimation results of the and from QR model in equation 2 are presented in table 3. Figure 3 plots these coefficients with their confidence intervals. I observe varying impacts across quantiles. At the operational level, Green HRM attention exhibits a significant impact only at the 0,2 quantile. This suggests that operational-level Green HRM practices are effective in enhancing sustainability primarily when the ESG index is at its lower levels, indicating a bearish market or suboptimal ESG performance. In contrast, at the managerial level, a significant impact is observed only at the 0,95 quantile, signifying that managerial-level Green HRM practices foster sustainability in highly favorable, bullish market conditions. At the strategic level, no statistical effect is detected across all quantiles, indicating that strategic-level Green HRM practices do not have a discernible impact on the ESG index regardless of market conditions.

**Table 3. Estimation results of the impact of Green HRM
at different levels on the ESG index**

	Operational level			Managerial level			Strategic level	
	Coefficient	t-Statistic		Coefficient	t-Statistic		Coefficient	t-Statistic
0.05	-0.494	-0.382		0.779	0.385		-2.272	-1.006
0.1	0.860	1.072		0.675	0.767		-0.630	-0.604
0.15	0.456	0.318		0.484	0.560		-0.862	-0.780
0.2	0.704**	2.423		0.129	0.197		-1.059	-1.005
0.25	0.466	1.621		-0.220	-0.401		-0.648	-0.828
0.3	0.258	0.759		-0.188	-0.362		-0.516	-0.796
0.35	0.335	1.057		-0.304	-0.611		-0.530	-0.843
0.4	0.250	0.762		-0.329	-0.688		-0.707	-1.154
0.45	0.167	0.492		-0.114	-0.254		-0.692	-1.142
0.5	0.113	0.336		0.072	0.153		-0.974	-1.545
0.55	0.080	0.241		-0.013	-0.028		-0.641	-1.010
0.6	0.015	0.049		-0.072	-0.163		-0.591	-0.951
0.65	0.473	0.470		0.035	0.076		-0.907	-1.426
0.7	0.352	0.366		-0.139	-0.324		-0.074	-0.115

0.75	0.495	0.474		-0.015	-0.034		-0.209	-0.339
0.8	1.113	1.461		0.281	0.514		0.082	0.122
0.85	0.881	1.263		0.397	0.657		-0.031	-0.047
0.9	0.541	0.944		0.932	1.274		-0.314	-0.527
0.95	-0.003	-0.006		1.421*	1.929		-0.790	-1.614

Notes: This table provides the coefficient estimates. their standard deviation. t-statistics. and probability (for parameter significance) for different levels of green HRM. (*). (**). and (***) denote the parameter significance at 1%. 5%. and 10%. respectively.

Source: author's calculations

The findings from the operational level indicate that Green HRM practices at this level are particularly effective in less favorable market conditions. The
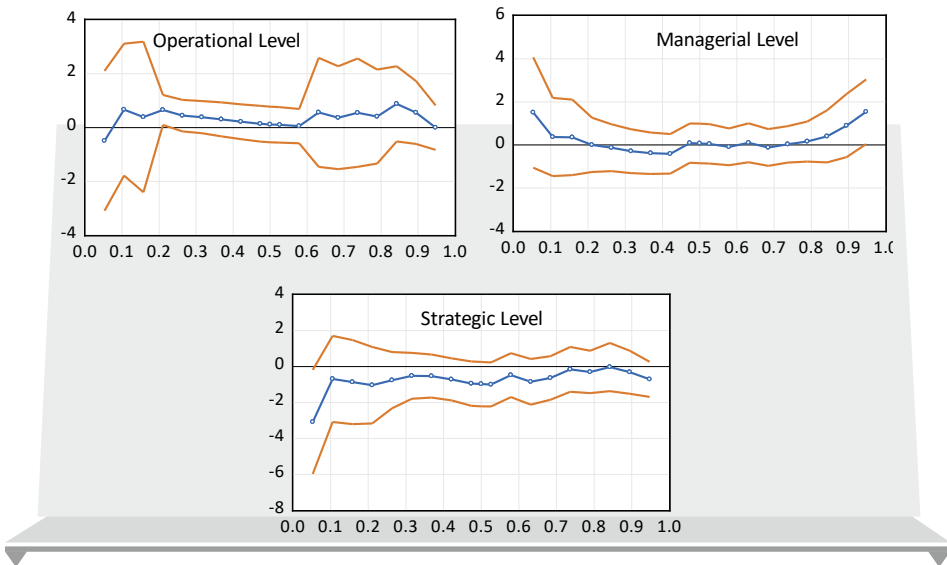

Figure 3. Coefficient estimation of the parameters $\beta_1. \beta_2$ **and** β_3

Notes: The blue lines represent the coefficient estimates of equation 2. red lines represents the upper and lower confidence interval

Source: author's calculations

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significant impact at the 0.2 quantile suggests that during periods of lower ESG performance. operational-level practices such as recycling programs. energy-saving measures. and waste reduction initiatives can play a crucial role in maintaining or slightly improving sustainability metrics. This could be because these practices are directly actionable and can lead to immediate. tangible improvements in operational efficiency and resource utilization. which are critical during challenging times.

At the managerial level, the significant impact at the 0.95 quantile underscores the importance of managerial support for sustainability initiatives during peak market conditions. Managerial-level practices may include implementing comprehensive environmental policies. promoting green leadership. and integrating sustainability goals into the company's strategic objectives. The effectiveness of these practices in bullish markets can be attributed to increased organizational resources and stakeholder support. allowing for more robust implementation and greater visibility of sustainability efforts. This highlights the role of management in driving substantial improvements in sustainability performance when the market environment is conducive to such initiatives.

The absence of a significant impact at the strategic level across all quantiles suggests that strategic-level Green HRM practices. such as long-term sustainability planning. investment in green technologies. and setting ambitious sustainability targets. do not have an immediate or direct effect on the ESG index. This could be due to the longer time horizon required for these practices to yield measurable outcomes or the potential disconnect between high-level strategic plans and day-to-day operational realities. It may also indicate that strategic initiatives are less responsive to short-term market fluctuations and more focused on long-term sustainability goals. which might not be captured in the immediate performance of the ESG index.

The quantile regression (QR) results indicate that Green HRM attention significantly enhances sustainability performance primarily at higher quantiles (0.75 to 0.95) of the S&P 500 ESG Index. This finding suggests that organizations focusing on Green HRM practices tend to achieve better sustainability outcomes during periods of strong market performance. In these bullish conditions. increased investor interest and heightened awareness of environmental. social. and governance (ESG) issues often align with corporate sustainability efforts. leading to a positive feedback loop where effective Green HRM practices are rewarded with improved ESG scores.

In contrast, the absence of significant impacts at lower quantiles (e.g. 0.05 to 0.6) implies that during average or bearish market conditions. the relationship between Green HRM and sustainability performance may be less pronounced. This could be attributed to several factors: during economic downturns. organizations may deprioritize sustainability initiatives in favor of immediate operational concerns. or investors might be less focused on ESG factors. thereby reducing the visibility and impact of Green HRM practices.

5. Conclusion and policy implications

This study investigates the impact of Green Human Resource Management (Green HRM) attention on the sustainability performance of companies. as measured by the S&P 500 ESG Index. Utilizing a quantile regression (QR) model. I analyze the overall effect of Green HRM attention and delve deeper into the specific effects of operational. managerial. and strategic levels of Green HRM practices. Our findings reveal that the influence of Green HRM attention is contingent upon market conditions. Overall Green HRM attention significantly boosts sustainability performance at the higher quantiles. indicating effectiveness in bullish markets. When examining the different levels. operational Green HRM practices show significant impact at lower quantiles. managerial practices at higher quantiles. and strategic practices exhibit no significant effect across all quantiles. These results underscore the importance of context and specificity in implementing Green HRM practices to enhance corporate sustainability.

The results of this study can carry out some policy implications.

The findings of this study offer several practical insights for organizations seeking to integrate Green HRM practices effectively under different market conditions. **During unfavorable market condition**, organizations should prioritize operational-level practices such as waste reduction, energy-saving initiatives. and recycling programs. These actions provide immediate. tangible benefits by improving efficiency and cutting costs, which is essential during economic downturns.

In contrast, bullish markets with strong sustainability performance provide an ideal context for emphasizing managerial-level initiatives. Organizations can focus on employee engagement, green leadership development. and policy implementation to capitalize on increased resources and stakeholder interest. Investing in managerial practices during favorable conditions can enhance visibility, build organizational momentum. and sustain long-term environmental commitments.

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While strategic-level practices. such as long-term sustainability planning and investment in green technologies, may not have immediate effects on ESG performance, they remain essential for future resilience. Companies should incorporate sustainability goals into corporate strategy and align HR policies with environmental values to ensure sustained progress regardless of market fluctuations. Moreover, adaptive resource allocation—shifting the focus between operational, managerial and strategic practices—will allow organizations to remain flexible and responsive across varying economic cycles.

These insights underscore the importance of context-sensitive Green HRM practices. By tailoring efforts to match market dynamics, organizations can maximize the impact of their sustainability initiatives and foster resilience in both favorable and challenging conditions. Additionally, policymakers can support these efforts by offering incentives, training programs and sustainability frameworks to encourage companies to maintain Green HRM practices during volatile market phases.

As any research, this study presents some limitations. Particularly, while Google Trends offers valuable insights into public attention toward Green HRM, it has some limitations. It reflects interest rather than actual behavior and search activity may be influenced by external events or media coverage, introducing noise. The data is aggregated, making it difficult to determine the intent behind searches, and it may have geographical biases due to varying internet access.

Future research could investigate the long-term impacts of strategic-level Green HRM practices on sustainability performance, analyze how industry-specific factors influence the effectiveness of these initiatives and explore the relationship between Green HRM practices and other corporate sustainability strategies. Furthermore, comparative studies across various regions and economic contexts could yield valuable insights into the global applicability of Green HRM practices.

Abstract

This study investigates the role of Green Human Resource Management (HRM) attention in fostering corporate sustainability. By using a quantile regression (QR) model, I explore Green HRM both as an aggregate measure and across three levels such as operational, managerial, and strategic to provide nuanced insights into how these practices influence sustainability under varying market conditions. The findings reveal that Green HRM attention enhances sustainability at

higher quantiles (0.75 to 0.95), underscoring its effectiveness during bullish market phases. Notably, operational-level Green HRM has a significant impact at lower quantiles (0.2), reflecting its relevance during unfavorable market conditions. Managerial-level practices drive sustainability at the 0.95 quantile, while strategic-level efforts show no statistically significant impact across quantiles. These results highlight the importance of tailoring Green HRM strategies to specific market contexts. This study contributes to the literature by offering a quantile-based perspective on Green HRM practices and demonstrating how targeted HR efforts can improve sustainability performance under different market dynamics. Practical implications include the need for adaptive Green HRM strategies and resource allocation to align with shifting market conditions for long-term corporate sustainability.

Keywords: *Green HR Management; Sustainability; S&P 500 ESG Index; Quantile Regression.*

JEL codes: C21; Q56; M12; M14.

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