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Investigating the Relationship Between ESG Performance and Financial Performance During the COVID-19 Pandemic: Evidence from the Hotel Industry

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Abstract: The global economy was profoundly impacted by the emergence of the COVID-19 pandemic, with the hotel industry being among the sectors most severely affected. This study explores the relationship between environmental, social, and governance (ESG) performance and financial performance during the pandemic, focusing on 35 of the world's largest hotel companies. A structured methodology was employed to assess short-term financial resilience using the shock depth (SD) and recovery rate (RR) indicators and long-term performance through the value-added weekly index (VAWI) and K-ratio. The findings of this study indicated that faster recovery was associated with greater capitalization. Furthermore, analysis of ESG scores indicated a median increase from 2019 to 2022, particularly in the figures of the environmental component. Despite these increases, pre-pandemic ESG scores demonstrated limited influence on short-term financial performance, though a correlation was observed between governance scores (as ESG score subscores) and long-term K-ratios. This finding suggests potential trade-offs between improving financial performance and maintaining governance standards in the sense of ESG scores. This study points to the intricate interplay between ESG and financial metrics during systemic crises, providing valuable insights for risk management and strategic planning in the hospitality business. The implications of these findings extend to the enhancement of resilience and the alignment of ESG strategies with financial sustainability.



Academic Editor: Thanasis Stengos

Received: 11 January 2025

Revised: 25 February 2025

Accepted: 27 February 2025

Published: 28 February 2025

Citation: Kaminskyi, A., Osetskyi, V., Almeida, N., & Nehrey, M. (2025).

Investigating the Relationship Between ESG Performance and Financial Performance During the COVID-19 Pandemic: Evidence from the Hotel Industry. *Journal of Risk and Financial Management*, 18(3), 126. <https://doi.org/10.3390/jrfm18030126>

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Keywords: ESG performance; financial resilience; hotel industry; COVID-19 pandemic; shock depth; recovery rate; value-added weekly index; K-ratio; risk–return correspondence; sustainability

1. Introduction

The global economy has been significantly impacted by the novel coronavirus pandemic (COVID-19). This event can be considered a “black swan” event, as defined by the theory developed by Nassim Nicholas Taleb (2010). The pandemic resulted in social isolation, border closures, and economic uncertainty, leading to a decline in financial resilience and significant declines in stock markets. For instance, the S&P Composite 1500 (which encompasses approximately 90% of U.S. market capitalization) experienced a decline of

more than 30% from 20 February 2020 to 20 March 2020. Parallel indicators in other global markets also exhibited a similar trend.

The impact of the shock, particularly in terms of stock market fluctuations, was relatively brief. Markets began to adjust and recover, with some stock indices reaching pre-pandemic levels within 6 to 9 months of the initial shock. However, it is logical to distinguish between a rapid recovery in the absolute values of indices and the long-term effects of the shock. In this regard, two dimensions should be noted. Firstly, the impact of the shock differed across various industries. Secondly, the effects of the shock manifested in diverse ways over time, extending beyond the return of indices to their pre-shock performance levels. A notable indicator of this is the post-shock change in risk level. A study by [Kaminskyi and Nehrey \(2021\)](#) of the change in the risk–return correspondence for the Polish stock market revealed significant changes in this correspondence.

In this paper, we present our research on the pandemic transition of the world’s largest hotel companies. The global pandemic has had a significantly negative impact on the hotel industry, with hotels, resorts, restaurants, cruise ships, and other hotel-related businesses being particularly affected. This industry was the most impacted during the pandemic due to the widespread closure of businesses. During the pandemic, people worldwide favored homemade food and avoided going out. The hospitality industry’s financial resilience was significantly impacted by the pandemic, as evidenced by a decline of over 40% in the S&P 500 Hotels, Restaurants & Leisure (Industry) index.

The objective of this study is to provide a comprehensive analysis of the response of the world’s largest hotel companies to the pandemic. The complexity of the analysis is characterized by its multifaceted approach, encompassing both stock market and ESG indicators. Methods for analyzing real empirical data were applied in the process of research. The integrated analysis approach enables us to identify several key insights.

The methodological approaches that were elaborated encompassed viewpoints deemed crucial for investigating the impact of the pandemic. The analysis framework identified two distinct periods: the initial period encompassed the immediate aftermath of the shock, while the subsequent period focused on the recovery behavior following the shock. The correspondence between two indicators, namely the shock depth (SD) and recovery rate (RR), was investigated, with some patterns being detected. The subsequent period covered the years 2021–2022, with the analysis of this period centering on resilience and consistency. The K-ratio indicator was employed to this end. Another component of our research methodology incorporated ESG scores for selected hotel industry companies, with the dynamics of the ESG score and its basic components investigated through the passage of the pandemic. Moreover, we investigated the following question: what are the interrelations between ESG factors, risk–return correspondence, and financial resilience? The findings of our research are as follows: There are different correspondences of down-fall and recovery. The E and S components have increased, while the G component has decreased. The value-added weekly index (VAWI) has revealed very poor performance during the recovery period in 2021–2022.

This study’s findings can be utilized in two ways. Firstly, the reaction of this stock market segment to strong systematic risk can be studied. Patterns of reaction can be used to model such risks. Secondly, the dynamic changes in the ESG ratings of large hotel companies can be understood.

2. Literature Review

The impact of the COVID-19 pandemic on financial markets and corporate resilience has been the focus of extensive research across various industries, including the hospitality sector. A growing volume of literature has explored the relationship between environmen-

tal, social, and governance performance and financial resilience, particularly during crises. This section reviews key studies that inform the current research.

2.1. ESG Performance and Financial Resilience

A number of studies have been conducted on the impact of ESG performance on financial resilience. [Chen et al. \(2022\)](#) investigated whether hotels with strong ESG commitments exhibited greater financial stability during the pandemic. Their findings suggested that ESG-conscious hotels demonstrated reduced financial distress and more stable stock returns. In a similar vein, [Al Amosh and Khatib \(2023\)](#) analyzed firms in G20 countries, finding that those with robust ESG frameworks experienced less adverse impacts from the pandemic. This lends further support to the notion that ESG factors play a role in enhancing corporate resilience over time.

In addition, [Jahns and Toora \(2021\)](#) emphasized the mediating role of financial distress and strategic change in the relationship between ESG scores and financial performance in the hospitality industry. Their study suggested that while ESG principles can enhance stability, firms need to integrate ESG into broader corporate strategies for meaningful impact.

[Milovanović \(2021\)](#) provided a comprehensive overview of the impact of the pandemic on the hotel industry, theorizing that the crisis led to increased implementation of ESG-related strategies, including technological innovation, service quality improvement, and supply chain management. Building on these findings, [Alotaibi and Khan \(2022\)](#) expanded the analysis by examining automation and digital transformation in hospitality services, demonstrating their correlation with ESG adoption and financial resilience.

2.2. Risk–Return Dynamics in Crisis Periods

The relationship between ESG performance and financial resilience is consistent with previous research on risk–return dynamics during crises. [Kaminskyi and Nehrey \(2021\)](#) examined how the crisis caused by COVID-19 affected the Polish stock market, demonstrating significant shifts in risk–return correlations. Building on this, [Kaminskyi et al. \(2022\)](#) expanded the analysis to encompass ETFs, demonstrating that higher ESG-rated funds exhibited distinct recovery patterns compared to lower ESG-rated counterparts.

In a related study, [Fotiadis et al. \(2021\)](#) utilized machine learning models to assess financial resilience and predict tourism demand recovery in the post-pandemic era. Their work underscores the need for advanced quantitative methodologies in analyzing industry-specific recovery patterns. Furthermore, [Foroudi et al. \(2021\)](#) explored how customer perceptions of risk in the hospitality industry shifted during the pandemic, linking consumer confidence to firms' ESG commitments.

The study by [Liwe \(2023\)](#) evaluated stock risk and return before and during the pandemic, using the Capital Asset Pricing Model to analyze shifts in financial stability. In a similar vein, [Tabatabaei Poudeh et al. \(2022\)](#) examined the relationship between idiosyncratic volatility and expected stock returns, revealing that ESG investments played a role in shaping financial resilience during periods of market distress.

2.3. The Role of ESG Components

A more detailed analysis of the various elements that comprise ESG reveals that these factors can have distinct financial consequences ([Zhang et al. \(2024\)](#); [Lu et al. \(2025\)](#)). [Clerici et al. \(2024\)](#) examined wellness tourism trends in the post-pandemic era, discussing how sustainability and ESG adoption could drive long-term sectoral transformation. Their insights provide an important perspective on the evolving expectations of investors and consumers regarding sustainability initiatives.

[Davydenko et al. \(2020\)](#) assessed the components of the financial potential of the regions of Ukraine, highlighting regional disparities in financial capacity and the role of

fiscal policies in stabilizing economic resilience. The authors' findings provide a broader macroeconomic perspective relevant to financial stability discussions.

In a subsequent study, [Davydenko et al. \(2023\)](#) explored the impact of fiscal regulation policy and financial incentives on environmental management, emphasizing the link between governmental interventions and sustainability practices. The research underscores the necessity for integrated fiscal and environmental, social, and governance policies to promote long-term environmental resilience.

2.4. Methodological Approaches in ESG Research

Methodologically, several studies have contributed to the understanding of ESG impacts using empirical models. [Kestner \(2013\)](#) introduced the K-ratio, a widely used indicator for assessing financial sustainability over time. [Liwe \(2023\)](#) applied the Capital Asset Pricing Model to analyze risk–return relationships before and during the pandemic, revealing shifts in market behavior. Additionally, [Rezaei Soufi et al. \(2023\)](#) proposed new financial resilience measures, offering alternative methodologies for evaluating corporate stability.

Recent discussions in ESG performance measurement suggest incorporating additional environmental indicators, such as carbon emissions, waste management strategies, carbon tax policies, and emissions trading systems. Future studies should integrate these factors for a more comprehensive financial assessment.

Despite the extensive literature on ESG and financial resilience, key gaps remain. A significant proportion of studies focus on short-term financial performance, neglecting long-term sustainability metrics such as the value-added weekly index (VAWI) and K-ratio. Furthermore, although correlation analyses have been widely employed, causal inference techniques such as the Difference-in-Differences method used in [Ayachi et al. \(2019\)](#) remain underexplored in the context of ESG research. The integration of DiD into future studies has the potential to provide more robust evidence on the causal effects of ESG practices on financial performance.

3. Materials and Methods

A methodology has been developed for the conduct of our research goals. The methodology comprises multiple sections. The initial section encompasses the evaluation of the repercussions engendered by the COVID-19 pandemic on financial markets. The term “shock” is used to denote a precipitous decline in the stock prices of the companies under study. The methodology entails the establishment of three distinct temporal intervals, with the incorporation of two indicators. The determination of these intervals was based on two key indicators: the date of the World Health Organization's declaration of the pandemic on 1 March 2020, and the level of subsequent rapid decline in stock prices over the ensuing days (and weeks). The time intervals for analysis were defined as follows:

- The first time interval (named “pre-shock”) is the time interval preceding the shock, characterized by a certain degree of stability. This interval is defined as a 26-week period (i.e., half a year): 1 August 2019–31 January 2020.
- The second time interval (named “shock”) is characterized by the occurrence of the shock itself. This interval corresponds precisely to the period of the shock. This period is typified by a precipitous decline in stock prices, followed by a “rebound” from the depths of the fall towards recovery. This interval comprises 18 weeks: 1 February 2020–31 May 2020.
- The third time interval (named “after-shock”) covers the period from 1 June 2020 to 30 November 2020.

The methodology employed in this study involved the following rationale. The fundamental concept was to seek a balance between long-term span tendency in stock prices

and short-term span, which can be influenced by random market deviations. Through statistical analysis and expert estimations, semi-annual intervals were identified as “pre-shock” and “after-shock” time intervals. By averaging out random deviations in stock prices, it was possible to eliminate these random fluctuations. The “shock” interval was defined as a period of four months.

Two numeral indicators were utilized to evaluate the shock: shock depth (SD) and recovery rate (RR).

$$\text{Shock Depth} = \frac{\text{Min price in "shock" time interval}}{\text{Average price "pre-shock" time interval}} - 1, \quad (1)$$

$$\text{Recovery Rate} = \frac{\text{Average price "after-shock" time interval}}{\text{Average price "pre-shock" time interval}}. \quad (2)$$

In addition, the methodology for shock assessment was implemented in the context of a “full recovery” of the stock price. This is defined as the time period commencing from the onset of the “after-shock” interval and concluding with the week in which the price returns to the “pre-shock” level. The impact of each company’s shock was assessed depending on its capitalization in 2019 (before the shock).

It should be noted that the correspondence of SD-RR and its analysis were introduced by the authors in the papers [Kaminskyi and Nehrey \(2021, 2023\)](#). In the first paper, the effect of the COVID-19 crisis on the Polish stock market was visualized (in the context of the WIG index (Warsaw Stock Exchange General Index) investment environment). In the second study, SD-RR was applied by the authors to a sample of ETFs with different levels of ESG scores provided by the MSCI ESG Fund Metrics Methodology.

The second part of the methodology comprised an analysis of changes in ESG scores during the 2018–2022 period. The methodology is centered on the identification of the impact of the pandemic, in numerical form, on the application of ESG criteria in business. The methodology is based on the dynamics of ESG scoring changes. The ESG scoring data are provided by a number of independent research vendors (ESG rating providers). This approach facilitates enhanced comprehension of ESG risks, as these rating providers specialize in the selection of quantitative metrics that reflect various characteristics in a predominantly ESG-significant manner. Furthermore, the methodology employed by these providers is adapted to the specificities of each industry.

A general list accompanied by brief descriptions of ESG rating providers can be found in [ESG Voices \(2024\)](#). The completeness of the data (according to the available access possibilities) from the different ESG providers was analyzed. The following ESG ratings were considered: Sustainalytics’ ESG Risk Ratings, S&P Global ESG Score, ISS Ratings and Rankings, and LSEG ESG Scores (previously Refinitiv ESG Scores). The selection of the last rating was made on the basis of the assessment being, in the opinion of the authors, the most transparent and objective measurement of a company’s relative ESG performance. The score provides a comprehensive evaluation of a company’s commitment and effectiveness in ESG practices, centering around 10 primary themes using publicly available and auditable data. The following layout has been used to present the criteria that were analyzed.

The present empirical study is based on statistical analysis of changes in the dynamic aspect of the provider of data.

The third component of the methodology involves evaluating financial resilience within a long-term recovery period. The period 2021–2022 was selected for the resilience analysis. The methodology employed reflects not only the question of whether the hotel industry has recovered from the impact of the shock but also extends to other considerations.

However, the methodology also encompasses a broader question: was its development during the recovery period stable?

The K-ratio was utilized as a metric for evaluating financial resilience. This indicator was developed by Lars Kestner and has been subject to multiple refinements. The “2003-year type” was utilized for the K-ratio analysis. The K-ratio is grounded in the VAWI (value-added weekly index), which is utilized to assess the performance of an investment based on a hypothetical USD 1000 investment over the period in question.

This index is designed to present the consistency of an investment. Furthermore, it is a particularly efficient tool for visualizing the entire consideration period. The construction of the VAWI facilitates the comprehension and visualization of the dynamic recovery process. It is important to note that such an index construction can be used not only for weeks, but also for months or quarters. In the context of the present study, a two-year period was selected for analysis, and consequently, a weekly-based index was employed.

The mathematical formulation of the value-added weekly index is as follows:

$$VAWI = 1000 \prod_1^T (1 + r_{(t-1),t}), \quad (3)$$

where $r_{(t-1),t}$ denotes the return for period $[(t-1); t]$.

The K-ratio is presented in the following way:

$$K - ratio = \frac{\text{Slope of Least Squares Regression Trendline}}{\text{Standard Error of Slope}} \cdot \frac{\sqrt{NOPY}}{NO}, \quad (4)$$

where NO is the number of observations and NOPY is the number of observations per calendar year.

The K-ratio (2003) is the K-ratio from Formula (4) without \sqrt{NOPY} .

The rationale behind our selection of the K-ratio indicator is twofold: firstly, it reflects profitability and risk dynamics, which contrasts with the classical performance measures of Sharp and Treynor; secondly, its calculation includes deviations from the linear trend of the VAWI, which, according to our approach, characterizes sustainable recovery. The fourth part of the methodology concerns segmentation techniques. It involves the comparison of the indicators across specific segments. The studies employed various segmentation techniques, such as regional and capitalization-based segmentation of companies. Segmentation facilitates a more nuanced understanding of the factors influencing the nature of the transition due to pandemic shock and the rate of recovery. The fifth part of the methodology concerns the interrelationships between the aforementioned indicators and ESG scoring values. Methodologically, we separate the absolute values of such scores and the scores' increments. This methodological approach is significant in that it captures the dependency from a “static” state, thereby providing a basis for analysis. This study sought to address the following research question: how did the indicators behave for companies with such ESG scores? Concurrently, relative changes were used to demonstrate how scoring values have changed as a result of the shock transition process, as well as the activity of the companies themselves in these conditions. Therefore, the dependency on two factors of ESG and Δ ESG was considered.

The primary focus of this research was on the world's leading hotel industry companies. This study commenced with a sample of the 50 companies with the largest capitalization in the fourth quarter of 2023, utilizing the information resource [CompaniesMarketCap \(2024\)](#) to ascertain the company's capitalization levels across various time periods. It is noteworthy that several of these companies also operate within the entertainment, travel, gambling, real estate, investments, and REITs (real estate investment trusts) sectors. This

information was also collected from the aforementioned source. Investing.com was used for companies’ stock price data, which were utilized for return rate analysis, risk estimation, and financial resilience indicators. This research encompassed the time frame of 2019–2023 for analyzing these data.

The data analysis of ESG levels was based on ESG scores provided by the information resource LSEG Data & Analytics (<https://www.lseg.com>, formerly Refinitiv), which is a global provider of financial market data. From this resource, detailed values of ESG scores in the 10 directions presented in Figure 1 were used. These data were processed from the time period 2018–2022.

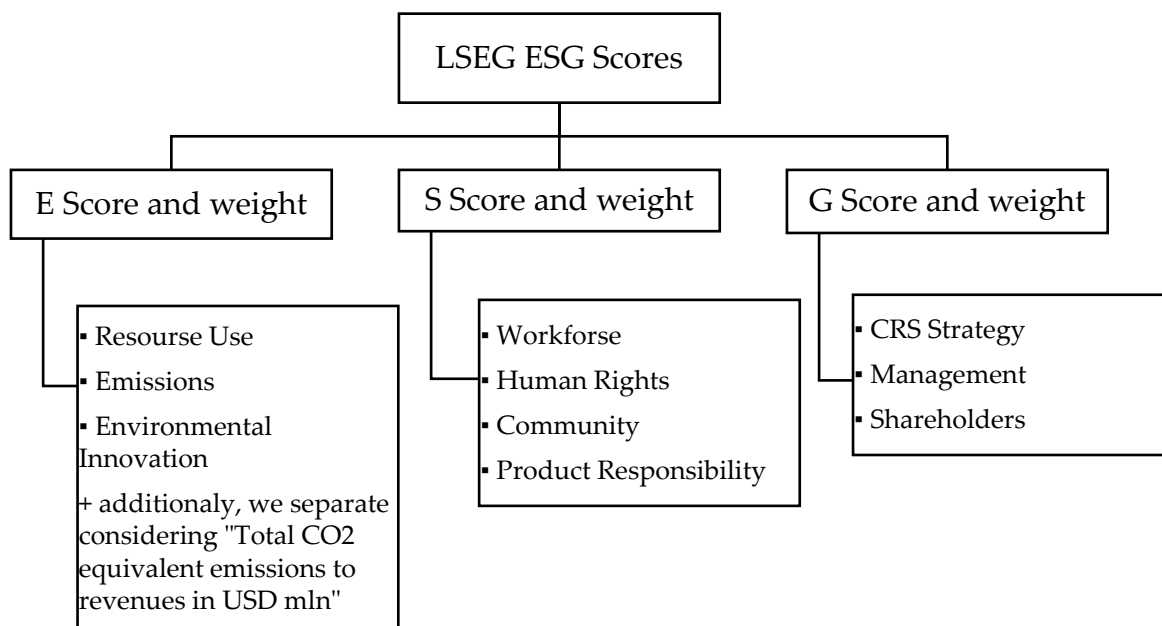


Figure 1. LSEG ESG scoring system structure.

Following a thorough analysis of the completeness of the data, 36 companies were included in this study, as presented in Table 1.

Table 1. List of the largest hotel companies by market capitalization and associated business segments.

| Company | Country | Cap 2019 | Hotels | Entertainment | Travel | Gambling | Real Estate | Investments | REITs |
|---------------------------------------|-----------|-------------|--------|---------------|--------|----------|-------------|-------------|-------|
| 1 Marriott International (MAR) | USA | USD 49.50 B | 1 | | 1 | | | | |
| 2 Oriental Land | Japan | USD 44.93 B | 1 | 1 | 1 | | | | |
| 3 Hilton Worldwide Holdings Inc. | USA | USD 30.94 B | 1 | | 1 | | | | |
| 4 Las Vegas Sands (LVS) | USA | USD 52.74 B | 1 | 1 | 1 | 1 | | | |
| 5 Galaxy Entertainment | Hong Kong | USD 31.94 B | 1 | | 1 | | | | |
| 6 MGM Resorts (MGM) | USA | USD 16.73 B | 1 | 1 | 1 | 1 | | | |
| 7 InterContinental Hotels Group (IHG) | GB | USD 12.43 B | 1 | | 1 | | | | |
| 8 Host Hotels & Resorts (HST) | USA | USD 13.23 B | 1 | | 1 | | 1 | 1 | |
| 9 Hyatt Hotels (H) | USA | USD 9.17 B | 1 | | 1 | | | | |
| 10 Huazhu Hotels (HTHT) | China | USD 11.87 B | 1 | 1 | | | | | |
| 11 Accor (AC.PA) | France | USD 12.67 B | 1 | | 1 | | | | |

Table 1. Cont.

| Company | Country | Cap 2019 | Hotels | Entertainment | Travel | Gambling | Real Estate | Investments | REITs |
|---------------------------------------|-------------|-------------|--------|---------------|--------|----------|-------------|-------------|-------|
| 12 Wynn Resorts (WYNN) | Wynn | USD 14.90 B | 1 | 1 | 1 | 1 | | | |
| 13 Genting Singapore (G13.SI) | Singapore | USD 8.22 B | 1 | 1 | 1 | | | | |
| 14 Whitbread (WTB.L) | GB | USD 8.49 B | 1 | | 1 | | | | |
| 15 Vail Resorts (MTN) | USA | USD 9.66 B | 1 | | 1 | | | | |
| 16 Wyndham Hotels & Resorts (WH) | USA | USD 5.89 B | 1 | | 1 | | | | |
| 17 Ryman Hospitality Properties (RHP) | USA | USD 4.75 B | 1 | 1 | 1 | | 1 | | |
| 18 Choice Hotels International | USA | USD 5.76 B | 1 | | 1 | | | | |
| 19 MGM China Holdings | Macau | no info | 1 | 1 | | 1 | | | |
| 20 Hilton Grand Vacations | USA | USD 2.94 B | 1 | | 1 | | | | |
| 21 Minor International | Thailand | no info | 1 | | 1 | | | | |
| 22 Wynn Macau | Macau | USD 12.81 B | 1 | | 1 | | | | |
| 23 Genting Berhad | Malaysia | USD 5.67 B | 1 | 1 | 1 | | | | |
| 24 Melco Resorts & Entertainment | Hong Kong | USD 11.58 B | 1 | 1 | 1 | 1 | | | |
| 25 Covivio Hotels | France | USD 3.86 B | 1 | | 1 | | 1 | 1 | 1 |
| 26 Kangwon Land | South Korea | USD 5.18 B | 1 | 1 | 1 | 1 | | | |
| 27 Shangri-La Asia | Hong Kong | USD 3.74 B | 1 | | 1 | | | | |
| 28 Sunstone Hotel Investors | USA | USD 3.12 B | 1 | | 1 | | 1 | 1 | 1 |
| 29 SJM Holdings | Hong Kong | USD 6.45 B | 1 | 1 | 1 | 1 | | | |
| 30 NH Hotel Group | Spain | USD 2.05 B | 1 | | 1 | | | | |
| 31 Pebblebrook Hotel Trust | USA | USD 3.49 B | 1 | | 1 | | 1 | 1 | 1 |
| 32 Meliá Hotels International | Spain | USD 1.99 B | 1 | | 1 | | | | |
| 33 Xenia Hotels & Resorts | USA | USD 2.43 B | 1 | | 1 | | 1 | 1 | 1 |
| 34 Dalata Hotel Group (DHG.IR) | Ireland | USD 1.06 B | 1 | | 1 | | | | |
| 35 Melco International Development | Hong Kong | USD 4.25 B | 1 | 1 | 1 | 1 | | 1 | |
| 36 Bluegreen Vacations (BVH) | USA | USD 0.43 B | 1 | | 1 | | | | |

The overarching concept and primary phases of the methodology are presented in Figure 2 below.

| Data collection: selection of 35 hotel companies | | |
|--|---|---|
| Capitalization of companies | → | Using resource https://companies-marketcap.com/hotels/largest-hotel-companies-by-market-cap/ (accessed on 5 December 2024) and verification of data availability (Table 1). |
| Stock prices | → | Using resource Investing.com (Stock Market Quotes & Financial News) and data availability analysis. |
| ESG scores (2018–2022) | → | Using resource https://www.lseg.com/en/data-analytics/products/workspace/download-workspace for ESG and subscore values of ESG (according to Figure 1) for analyzed companies. Data availability analysis. |
| Data analysis for shock manifestation by prices changing | | |
| Shock depth (SD) | → | Estimated by proposed methodology using real data from Investing.com (Formula (1)). |
| Recovery rate (RR) | → | Estimated by proposed methodology using real data from Investing.com (Formula (2)). |
| Data analysis for long-term performance | | |
| Value-added weekly index | → | Estimated by proposed methodology using real data from Investing.com (Formula (3)). |
| K-ratio | → | Estimated by proposed methodology using value-added weekly index and methodology of L. Kestner (Formula (4)). |

Figure 2. Description of data which were used in empirical modeling in this research.

4. Data Analysis and Empirical Modeling

The results of our study are largely based on the empirical modeling approach applied. In this aspect, the use of real data in finding empirical patterns is an important additional element of theoretical approaches in the construction of economic models. Data collection and the following analysis of new real data (as the impact of COVID-19’s manifestation) made it possible to find statistical patterns for understanding the economic processes studied. This approach makes empirical modeling particularly powerful in dealing with new economic issues, expressed by COVID-19.

The data that were used by us are presented in Figure 2.

Data collection allows for more comprehensive statistical research. In particular, it may be effective by using adaptive and predictive approaches.

The structured information which is presented in Figure 2 essentially provides clarification of empirical modeling, first through a better understanding of the relationships between these indicators. Our research discovered that capitalization of company indicators is one of the most relevant factors in the pandemic. The input values of capitalization were used for 2019 as a “calm” year before the pandemic. However, our methodological approach to carrying out the analysis dynamically showed that data on ESG for this year are available for only 36 companies. It is also noteworthy that Hilton Grand Vacations Inc. acquired Bluegreen Vacations¹ in January 2024, leading to the current sample size of 35 companies.

It should be noted that in this process, we identified a data collection problem. The ability to dynamically use ESG analysis for all companies in the sample is still limited. ESG score coverage has been developing in recent years. At the same time, as the ESG score coverage gradually increases, the “window of time analysis” increases. Also, it

should be noted that empirical modeling using ESG scores has certain limitations due to the relatively long-time evaluation of the components of this scoring by the corresponding rating agencies.

Empirical modeling for the 35 abovementioned companies (which already had ESG score values in 2018–2021) represented an effective approach to transparently understanding the change in scoring values during the COVID-19 “passing” by the companies. In the analysis, we reflected the effect on the results of both absolute and relative increases in the increments of the main ESG scoring.

Data related to stock prices in the vast majority of cases fully covered the time interval of our research. Therefore, the correlation and prediction results for the SD, RR, K-ratio, and VAWI demonstrate the higher accuracy of the analysis.

5. Results

5.1. Fall and Recovery at the Beginning of the Pandemic

Initially, an analysis was conducted concerning the transition of the investigated companies through the pandemic at the beginning of its dissemination. A pair of indicators, SD and RR, was specially constructed for this purpose (the construction of these indicators is described above in the Materials and Methods Section). The application of these indicators is illustrated in Figure 2 (see the upper part of the figure). This figure reflects a certain tendency that can be figuratively termed “more fall, less recovery”. However, it is important to note that certain deviations from this general pattern can be observed, including both upward (rapid recovery) and downward movements (very slow recovery). To analyze these features, a linear trend was constructed, which is effective in demonstrating the general pattern. Subsequent analysis focused on deviations from this trend. The deviations were evaluated by adding and subtracting the standard deviation σ to and from the trend line. The resultant strips are illustrated in the lowermost section of Figure 3.

The analysis of the diagrams in Figure 3 provides insights into the interrelationship between SD-RR correspondence and ESG scores. A comparison of companies situated above the upper line and those located below the lower line reveals significant differences, as illustrated in Table 2.

Table 2. Market capitalization and ESG metrics of selected hotel companies in 2019.

| Companies | Country | Market Capitalization | $\Delta(\text{ESG}) = \text{ESG}_{2019} - \text{ESG}_{2018}$ | ESG 2019 | E 2019 | S 2019 | G 2019 |
|---|-----------|-----------------------|--|----------|--------|--------|--------|
| Companies pictured above the upper line in Figure 3 | | | | | | | |
| MGM Resorts (MGM) | USA | USD 12,371,538,944 | 3 | 65 | 86 | 52 | 64 |
| Wyndham Hotels & Resorts (WH) | USA | USD 5,662,138,368 | 0 | 40 | 38 | 47 | 30 |
| Vail Resorts (MTN) | USA | USD 7,343,429,632 | 6 | 55 | 60 | 33 | 81 |
| Choice Hotels International | USA | USD 5,415,827,968 | −4 | 53 | 30 | 54 | 72 |
| Huazhu Hotels (HTHT) | China | USD 11,563,176,960 | 6 | 34 | 7 | 31 | 62 |
| SJM Holdings | Hong Kong | USD 2,654,433,785 | −4 | 48 | 44 | 37 | 68 |
| Average values | | USD 7,501,757,610 | 1.17 | 49.17 | 44.17 | 42.33 | 62.83 |
| Companies pictured below the lower line in Figure 3 | | | | | | | |
| Meliá Hotels International | Spain | USD 1,933,497,397 | −10 | 78 | 98 | 89 | 42 |
| Sunstone Hotel Investors | USA | USD 2,075,437,952 | 16 | 77 | 76 | 70 | 84 |
| NH Hotel Group | Spain | USD 2,005,695,777 | −2 | 88 | 92 | 94 | 76 |
| Genting Berhad | Malaysia | USD 3,195,640,810 | 7 | 50 | 63 | 56 | 30 |
| Covivio Hotels | France | USD 2,577,303,962 | 11 | 74 | 97 | 45 | 73 |
| Average values | | USD 2,357,515,180 | 4.40 | 73.40 | 85.20 | 70.80 | 61.00 |

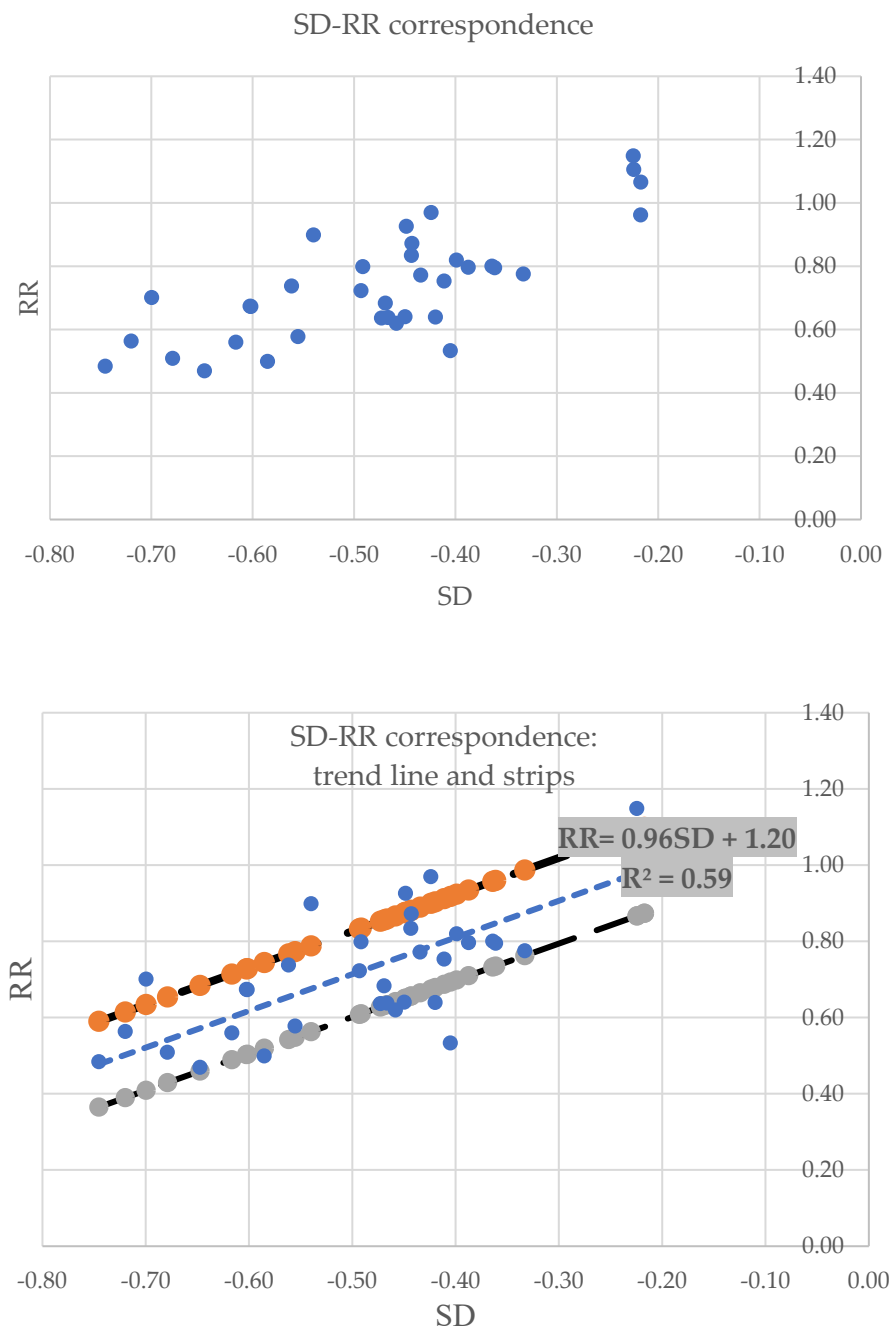


Figure 3. Correspondence between falling (SD) and recovery (RR).

As demonstrated in Table 2, there is a discrepancy between the two models in terms of the consequences of the passage of the shock of COVID-19 (as presented in the framework of SD-RR correspondence in Figure 3):

- The companies that demonstrated a rapid recovery were characterized by significantly higher capitalization than those that experienced a decline. The market capitalization of the companies demonstrated a rapid recovery averaged at USD 7.5 billion. Furthermore, the decline in capitalization for the first group in 2020 was approximately -6% (except for Huazhu Hotels (HTHT), whose market capitalization exhibited substantial growth). The decline in capitalization for the second group was more pronounced, ranging from -20% to -25% .
- The analysis further reveals that six of the companies demonstrating rapid recovery were headquartered in the USA (four companies), China (one company), and Hong

Kong (one company). In contrast, companies from the second group were predominantly European (three companies), with one each from the USA and Malaysia.

- The ESG scores of these entities, as determined at the conclusion of 2019, i.e., based on data collected prior to the pandemic, exhibited notable disparities between the two groups. The second group exhibited notably higher ESG scores. However, these differences are not uniform. The average scores for E and S are approximately double those of the first group. Conversely, the averages of the G scores are found to be closely aligned. Furthermore, the distribution of G scores is characterized by a significant variation in both high and low values, resulting in an average that is moderately dispersed.

In their 2021 paper, Kaminskyi and Nehrey (2021) presented the dependency between SD and RR for Polish stock market companies in the post-COVID-19 era. The dependency formula demonstrates a larger value of the “angular coefficient” (R-squared = 0.61):

$$\text{Recovery Rate} = 1.43SD + 1.29. \tag{5}$$

In a 2022 paper, Kaminskyi et al. (2022) indicated differences in shock passing for a sample of ETFs. The first difference expresses a more compact placement of high-ESG-scored ETFs, while the second difference in the dependency form between the RR and SD is evident. This tendency appears to be linear in the case of the group $ESG < 2.5$. The linear regressions have demonstrated this: specifically, the regression coefficient (RR) is estimated to be $1.87SD$ (R-squared = 0.74) for $ESG < 2.5$, and $1.68SD$ (R-squared = 0.58) for $ESG > 7.5$.

A detailed investigation into the recovery process was conducted. This analysis entailed the identification of a time interval (expressed in weeks) when the stock price of the companies returned to the level experienced prior to the pandemic. The initial value corresponded to the mean price of the initial interval. The weeks were counted from the end of the second interval. The attainment of the initial level was defined as the price surpassing it for three consecutive weeks. This condition ensured the exclusion of random price fluctuations. The aggregate recovery profile is illustrated in Figure 4.

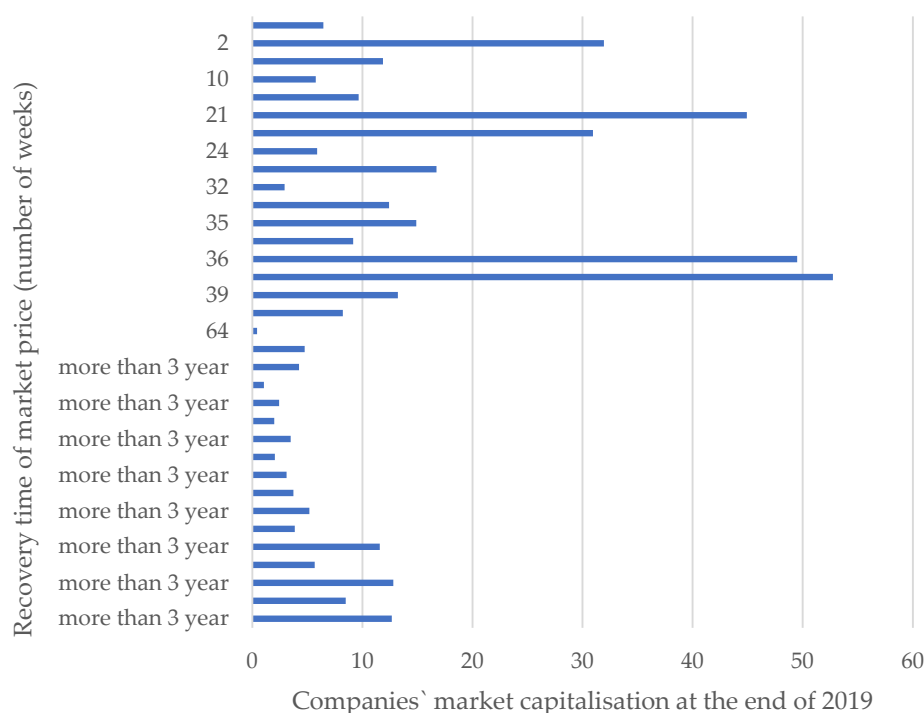


Figure 4. Time (weeks) to stock price recovery to the “before COVID-19” level.

The companies have been arranged on a vertical axis from the top to the bottom, with the recovery time increasing. It is noteworthy that some companies did not demonstrate a recovery to the level experienced prior to the pandemic. In instances where such a recovery was not achieved, a category of “more than 3 years” has been designated. The graph confirms that capitalization played an important role in the recovery processes. It is evident that companies with higher capitalization exhibited a more rapid return to pre-pandemic levels.

The distribution of the companies by time of recovery is presented in Figure 5.

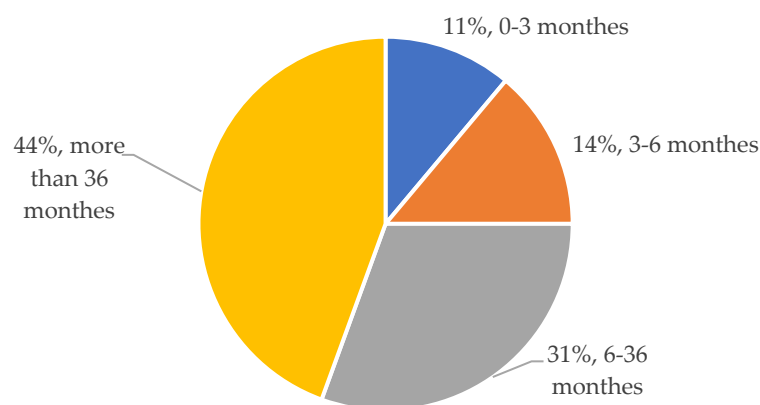


Figure 5. Distribution of companies by time of recovery.

The correlation ratios between the SD, RR, and market capitalization of the companies also demonstrate a moderate dependency with correlation (Table 3).

Table 3. Correlation ratio for whole sample.

| Correlation Ratio for Whole Sample | SD | RR |
|--|------|------|
| Companies’ market capitalization, end 2019 | 0.33 | 0.38 |
| Companies’ market capitalization, end 2020 | 0.43 | 0.50 |

5.2. Determinants in Relationship Analysis

In the context of the research framework, a series of hypotheses were formulated and subsequently verified. Initially, it was hypothesized that the values of ESG scores, both collectively and in component form, could serve as a pre-definition of SD-RR correspondence. To this end, regression analysis was employed to examine the relationship between the SD and RR, considering both absolute and relative values of ESG scores, as well as their constituent elements. This study utilized ESG scores from 2019 in their absolute value and their increments from 2018 to 2019. The economic underpinnings of this hypothesis stem from the assumption that companies that proactively integrate ESG criteria are more resilient in crisis situations, such as the pandemic. However, the regression analyses conducted did not yield significant results, thereby leading to the rejection of the hypothesis. To explore potential interdependence, correlation analysis was employed. The correlation coefficients are presented in Table 4. As can be seen, the correlation is negligible. However, in the case of the E score, a weak correlation with the SD is demonstrated, and the RR can be identified. Consequently, the findings indicate that the companies’ commitment to environmental, social, and governance initiatives in 2019 did not exert a discernible influence on the pandemic’s progression.

Table 4. Correlation analysis.

| Correlation Analysis with ESG Scores | | | | |
|--|--|------------------|-------|-------|
| ESG | $\Delta(\text{ESG}) = \text{ESG (2019) score} - \text{ESG (2018) score}$ | ESG (2019) score | SD | RR |
| $\Delta(\text{ESG}) = \text{ESG (2019) score} - \text{ESG (2018) score}$ | 1.00 | 0.14 | −0.19 | −0.18 |
| ESG (2019) score | 0.14 | 1.00 | 0.02 | −0.25 |
| SD | −0.19 | 0.02 | 1.00 | 0.77 |
| RR | −0.18 | −0.25 | 0.77 | 1.00 |
| Correlation analysis with E scores | | | | |
| E | $\Delta(\text{E}) = \text{E (2019) score} - \text{E (2018) score}$ | E (2019) score | SD | RR |
| $\Delta(\text{E}) = \text{E (2019) score} - \text{E (2018) score}$ | 1.00 | −0.05 | −0.36 | −0.29 |
| E (2019) score | −0.05 | 1.00 | 0.02 | −0.30 |
| SD | −0.36 | 0.02 | 1.00 | 0.77 |
| RR | −0.29 | −0.30 | 0.77 | 1.00 |
| Correlation analysis with S scores | | | | |
| S | $\Delta(\text{S}) = \text{S (2019) score} - \text{S (2018) score}$ | S (2019) score | SD | RR |
| $\Delta(\text{S}) = \text{S (2019) score} - \text{S (2018) score}$ | 1.00 | 0.13 | −0.07 | 0.06 |
| S (2019) score | 0.13 | 1.00 | −0.09 | −0.28 |
| SD | −0.07 | −0.09 | 1.00 | 0.77 |
| RR | 0.06 | −0.28 | 0.77 | 1.00 |
| Correlation analysis with G scores | | | | |
| G | $\Delta(\text{G}) = \text{G (2019) score} - \text{G (2018) score}$ | G (2019) score | SD | RR |
| $\Delta(\text{G}) = \text{G (2019) score} - \text{G (2018) score}$ | 1.00 | 0.39 | 0.00 | −0.11 |
| G (2019) score | 0.39 | 1.00 | 0.14 | 0.06 |
| SD | 0.00 | 0.14 | 1.00 | 0.77 |
| RR | −0.11 | 0.06 | 0.77 | 1.00 |

The present study hypothesizes that the pandemic had an impact on the change in ESG scorings, a hypothesis which was tested by modeling dynamic scores throughout the years 2018–2021. Mathematically, the median and interquartile range were applied to four scores (ESG, E, S, G). The medians were chosen in order to eliminate the impact of large outliers from several companies. The results of the analysis are presented in Figure 6. The formulas correspond to the trend lines for the medians.

The findings indicate an increase in the median (though not invariably uniformly) for the period 2018–2021. The highest growth rate was observed for scoring points of criterion E, while the lowest growth rate was recorded for S. The dynamics of the median scoring points according to criterion G exhibited an average increase; however, a relatively substantial decline in the lower (25%) interquartile was observed after 2019. This finding suggests that the pandemic had a substantial impact on the components of the G criterion. Consequently, a considerable proportion of companies demonstrated a decline in performance with respect to this criterion.

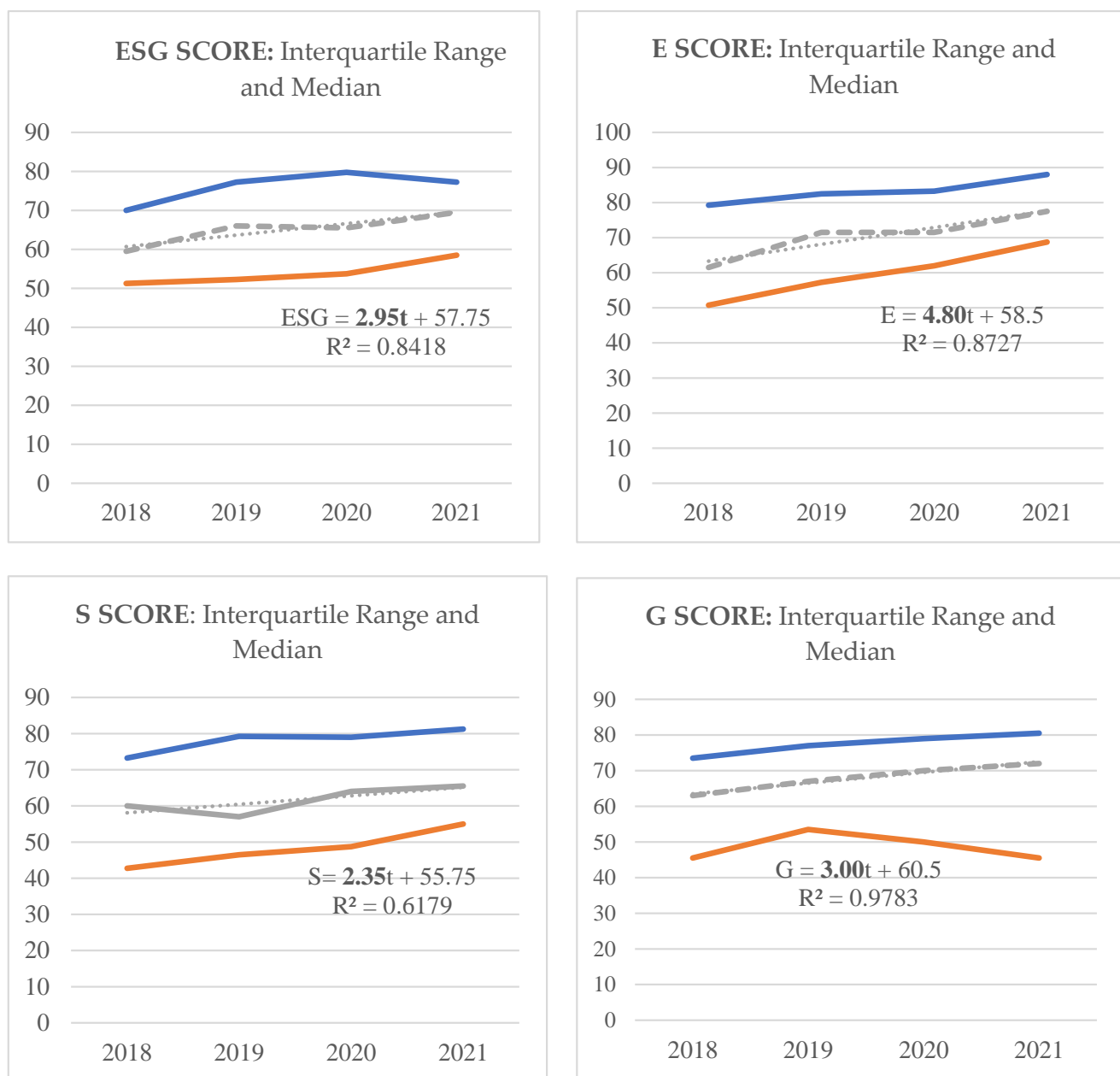


Figure 6. Dynamics of ESG scores during the period 2018–2021.

Focusing in more detail on the changes from 2019 to 2020, certain patterns were identified in the companies under study, as illustrated in Figure 7.

During the transition from 2019 to 2020, only the average S points increased significantly. The interquartile range for S also remained the largest. Conversely, for E, the interquartile range underwent a significant decrease, indicating a more uniform distribution of values. Concurrently, the interquartile range for G increased substantially.

The distribution of ESG scores in the context of countries where companies are registered is a subject worthy of further investigation (Table 5). The ensuing comparison is provided below. European companies have been found to demonstrate the highest average scores, while those in the US have been found to demonstrate the lowest.

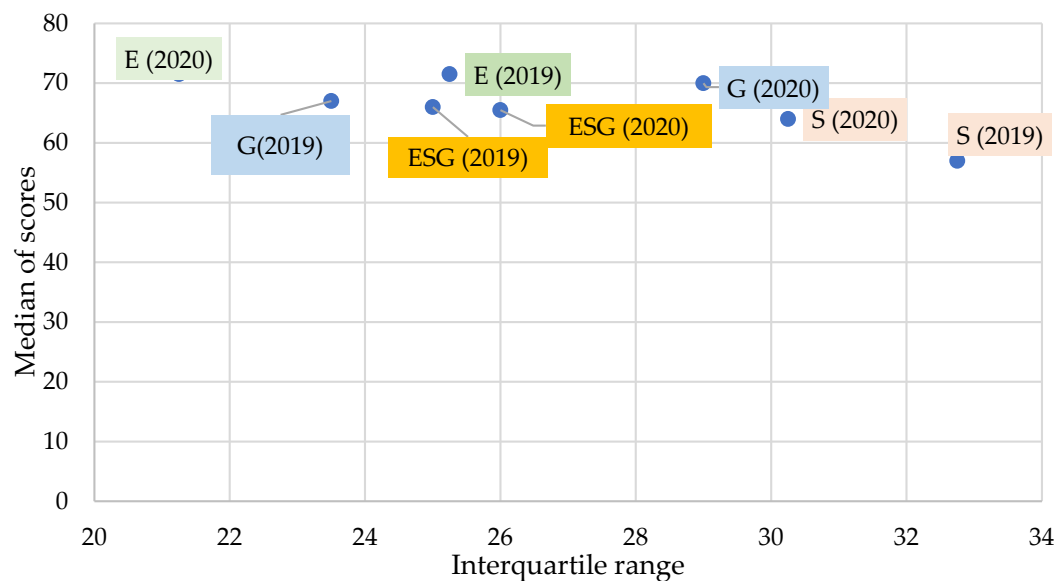


Figure 7. Shifts in scores from 2019 to 2020.

Table 5. ESG score by region.

| | ESG Score | E | S | G |
|--------|-----------|------|------|------|
| Total | 66.9 | 73.4 | 67.7 | 58.7 |
| USA | 61.8 | 66.9 | 61.1 | 56.6 |
| Europe | 77.3 | 82.4 | 77.0 | 70.7 |
| Other | 67.6 | 76.4 | 70.8 | 54.8 |

5.3. Financial Performance K-Ratio Analysis

The primary stage of our study pertained to the implementation of the RR indicator, which was utilized to evaluate financial performance during the initial phase of the pandemic. As previously mentioned, the recovery time interval was designated as 1 June 2020 to 30 November 2020. In this section, we intend to present financial performance in the long-term recovery period (2021–2022). To this end, we applied the analysis in light of the value-added weekly index (VAWI). Our analysis involved the assessment of the VAWI based on 104 weeks from the aforementioned years, and the estimation of the K-ratio (we used the K-ratio type from 2003). This K-ratio has also been accepted as an indicator of financial performance in that period. The rationale underpinning the utilization of the VAWI and K-ratio stems from the necessity to estimate long-term recovery in the aftermath of a market downturn precipitated by a pandemic. From our perspective, long-term recovery is predicated on sustainability logic. The VAWI and K-ratio embody such a logic in the sense of deviations from the linear trend inherent in the K-ratio definition. Lower deviations are concomitant with stability, according to our approach.

The subsequent analysis involved the segmentation of the companies into two distinct groups, categorized based on the K value. The initial group encompasses companies with $K > 0$, while the subsequent group comprises companies with $K < 0$. The characteristics that define these two groups are delineated in Table 6.

Table 6. Comparison of ESG scores and K-ratios for companies with positive ($K > 0$) and negative ($K < 0$) K-ratios.

| K-Ratio | Percentage | Average K-Ratio | Average ESG Score | Average E | Average S | Average G |
|---------------------------------|------------|-----------------|-------------------|-----------|-----------|-----------|
| $K > 0$ | 31% | 0.040 | 60.9 | 65.5 | 65.4 | 49.2 |
| $K > 0$, without two companies | | | 69.3 | 77.9 | 72.8 | 55.6 |
| $K < 0$ | 69% | -0.102 | 69.6 | 76.8 | 68.7 | 62.8 |

It is important to note that the initial group with $K > 0$ comprises two companies, which exhibited substantial deviations in scores across all ESG-related indicators (using the 2022 data). These companies are Hilton Grand Vacations (USA) and Bluegreen Vacations (USA). The ESG-related values for the first company are as follows: $ESG = 33$, $E = 17$, $S = 47$, $G = 26$. The values for the second company are as follows: $ESG = 13$, $E = 3$, $S = 17$, $G = 15$. The analysis was conducted on samples including and excluding these two companies. Consequently, the initial horizontal line in Table 4 presents the mean values for all values for companies with $K > 0$. The second horizontal line in Table 6 presents the mean values for all values for companies with $K > 0$, with the exclusion of these two companies. It is noteworthy that, in general, a sample with $K > 0$ exhibits a lower mean value than the average for companies with $K < 0$. The exclusion of these two companies results in G and S deviations.

The subsequent analysis, undertaken within the context of the international scenario, yielded the following estimation of the mean values of the K-ratios. The total sample of companies generates ~ -0.057 ; USA-based companies generate ~ -0.019 ; Europe-based companies generate ~ -0.078 ; and companies which are not based in the USA or Europe generate ~ -0.09 . Consequently, a salient finding of our research is that, while US companies demonstrate superior K-ratios, their average ESG-related scores are comparatively lower.

To illustrate the behavior of the VAWI curve, a visualization of this curve for naive diversified portfolios was employed. One such naive diversified portfolio was constructed on the basis of companies with $K > 0$, while a second naive diversified portfolio was constructed which corresponds to companies with $K < 0$. The dynamics of the VAWI curves are illustrated in Figure 8.

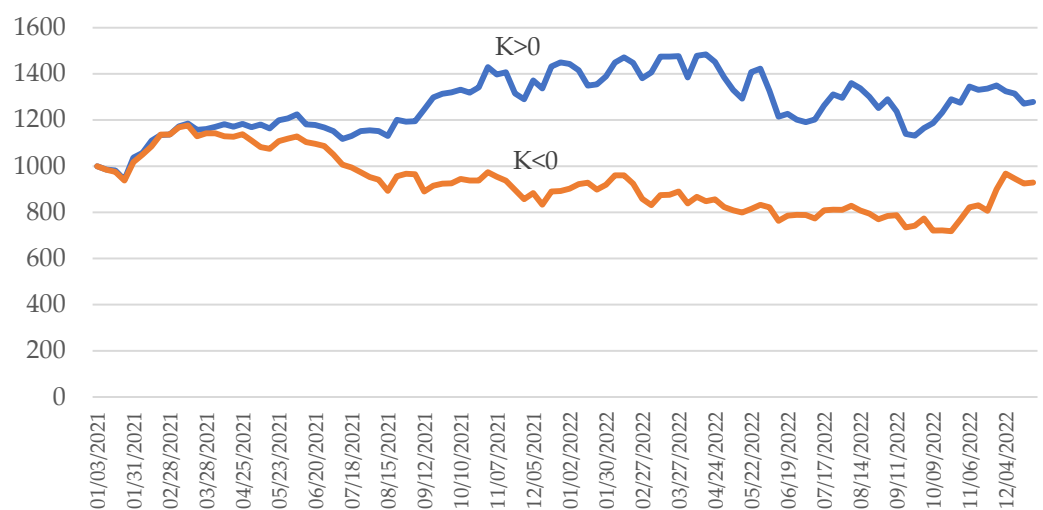


Figure 8. VAWI dynamics for naive diversified portfolios based on companies with $K > 0$ (up line) and $K < 0$ (down line).

This visualization demonstrates the dynamics of financial performance. In early 2021, the majority of the companies demonstrated positive profitability. However, from May 2021, there was a decline in returns, continuing until August of the same year. Subsequent to this, a bifurcation of the companies into two distinct groups became evident. The first group demonstrated growth, while the second exhibited a decline. Thereafter, the VAWI in the first group exhibited a horizontal trend, while in the second group, the VAWI demonstrated a monotonic decline. In the final two months of 2022, both groups exhibited a modest uptick. The comprehensive analysis of this period reveals elevated volatility and an absence of sustained growth. This analysis suggests that the long-term implications are influenced by the lingering effects of the pandemic.

6. Discussion

Prior to the emergence of the global pandemic, the largest international hotels exhibited relatively high capitalization in 2019. The capitalization of the 36 largest companies in 2019 exceeded USD 400 billion. However, the COVID-19 pandemic has had a significant impact on the development of the hotel industry. Concurrently, several discussion units have emerged. The first of these relates to the development of ESG reporting in this segment over the 2018–2021 period and beyond. The question therefore arises as to the extent to which ESG implementation was relevant in this period. The discussion also encompasses the introduction of ESG practices during a period of declining tourism demand, characterized by the unique challenges posed by a pandemic. The implementation of ESG in such circumstances poses a significant challenge to the development of businesses operating within a pandemic environment. The ability to attract investors in such circumstances is a matter of debate.

The capitalization of the 36 largest hotel companies in 2019 was high (see “Largest hotel companies by market cap”). However, the COVID-19 pandemic has had a significant impact on the development of the hotel industry. There have been several controversial discussions, the first of which concerns the development of ESG reporting in this segment during the 2018–2021 period and further in 2019–2022. The question arises as to the relevance of ESG implementation during this period, which was characterized by a significant increase in tourism services demand. The introduction of ESG in such conditions has been identified as a salient feature, though it has also been argued that it hinders business development during pandemics. A further point of debate is the ability to attract investors in such circumstances.

The second discussion unit concerns the decline in the scores of the G component in the ESG methodology during crises, and it is in this unit that a number of companies were compelled to make business development decisions that lowered the rating of the G component in the context of the pandemic. The effectiveness of solutions in such conditions is not yet fully understood.

The third element of the discussion pertains to the negative K coefficient, which was observed in 69% of the companies studied during the period 2019–2022. Furthermore, the calculations reveal that European hotel companies exhibited higher ESG values but negative K values, while companies with $K > 0$ values are predominantly American, along with one Thai and one Japanese company. This prompts the question of whether efforts towards ESG development and business development in a crisis (or post-crisis) environment should be combined.

The active development of ESG reporting in 2019–2022 was based on the problem of a sharp decline in hotel industry business due to the pandemic, and the effectiveness of ESG solutions in crisis situations was highlighted by a discussion framework. The discussion framework underscored the potential of proactive ESG implementation to

impede business optimization during crises, thereby highlighting the absence of a definitive business development strategy in this regard.

7. Limitations and Further Research

Despite its contributions, this study has several limitations that should be acknowledged. Firstly, the sample size was limited to 35 of the world's largest hotel companies. While these companies are representative, they may not fully capture the diversity of the global hotel industry, particularly with regard to smaller firms and regional market differences. It may be beneficial for future studies to consider expanding the dataset to include mid-sized and small hotel chains, with a view to assessing whether there are any differences in ESG–financial performance dynamics across company sizes.

Secondly, this study relied primarily on ESG scores from established rating agencies, which, despite their robustness, may not fully reflect nuanced firm-specific ESG practices or qualitative aspects such as corporate culture and stakeholder engagement. A more comprehensive analysis integrating qualitative ESG disclosures or alternative ESG metrics could provide deeper insights into the financial resilience of hospitality firms.

Thirdly, while this study examined ESG performance through aggregated ESG scores, it did not incorporate detailed environmental variables that could further strengthen the financial analysis. In the future, it may be beneficial to consider incorporating additional environmental factors, such as carbon emissions, waste management practices, carbon tax policies, and emissions trading systems implemented by hotels, into the research. This could enhance financial assessment by allowing for a more precise evaluation of the impact of sustainability efforts on corporate performance and resilience.

Fourthly, this study evaluated financial resilience through the shock depth and recovery rate for short-term performance and the K-ratio for long-term sustainability. While it is acknowledged that these metrics effectively measure market-based resilience, it is also recognized that they do not capture operational or strategic factors, such as government interventions, management responses, or customer behavior shifts. It is proposed that subsequent research endeavors might encompass qualitative case studies or sentiment analysis to investigate the impact of managerial decisions on ESG–financial performance relationships. By addressing these limitations, future research could further refine our understanding of the interplay between ESG performance and financial resilience, thereby assisting investors, policymakers, and hospitality firms in making more informed decisions in an increasingly uncertain global environment.

8. Conclusions

The global economic impact of the COVID-19 pandemic has been detrimental to all sectors. The hotel industry was particularly impacted. There was a considerable decline in the domains of traveling, voyages, and entertainment. From the perspective of investment risk management, the emergence of the novel strain of virus represented a systemic risk, a phenomenon often termed a “Black Swan” event, as coined by the economist and philosopher Nassim Nicholas Taleb. In light of these developments, contemporary risk analysis methodologies have evolved to encompass a range of approaches and techniques. The present study aimed to investigate the relationship between ESG performance and financial performance during the pandemic. The focus was on the interrelation of these two performances and their influence on each other.

The conceptual framework underpinning this study posits a two-dimensional assessment of financial performance, distinguishing between short-term and long-term dimensions. The analysis of short-term performance was accomplished using the framework of SD-RR correspondence. The observed pattern indicated that “more fall is accompanied

by less recovery". However, it was observed that there were deviations from this pattern. Companies' capitalization was identified as a determining factor in these deviations. Large capitalization was found to be a significant factor in the likelihood of returning to pre-pandemic levels.

This study utilized the VAWI and K-ratio to analyze the long-term financial performance of the companies. The findings revealed that the VAWI exhibited volatility over time, with a negative K-ratio in 69% of the cases. A notable observation from this study was the disparity in K-ratio values between US and European companies. The former exhibited superior performance, with European companies following closely behind. Conversely, companies outside these two groups demonstrated the lowest K values.

The findings of the ESG performance analysis for the period 2019–2022 demonstrated median growth across all four indicators (ESG, E, S, G). However, growth in E exhibited greater homogeneity, while S demonstrated significant variation in estimates. Noly, the variation in the estimates of G increased during the period of the pandemic. The values of ESG, E, S, and G in the pre-pandemic period did not demonstrate an impact on SD-RR values. Conversely, long-term recovery analysis revealed a correlation between the K-ratio and G score, indicating that companies with positive K-ratios exhibited lower G scores. This suggests that enhanced financial performance may be achieved by reducing governance standards. It is noteworthy that the comprehensive management strategies employed in our study were not addressed in the present analysis, which may pose a challenge for further research.

Author Contributions: Conceptualization, A.K. and M.N.; methodology, A.K. and M.N.; software, A.K.; validation, A.K., V.O. and N.A.; formal analysis, A.K. and M.N.; investigation, M.N. and A.K.; resources, N.A.; data curation, M.N. and A.K.; writing—original draft preparation, A.K. and M.N.; writing—review and editing, A.K., V.O. and N.A.; visualization, M.N. and A.K.; supervision, A.K. and N.A.; project administration, M.N.; funding acquisition, N.A. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Institutional Review Board Statement: Not applicable.

Informed Consent Statement: Not applicable.

Data Availability Statement: The data supporting the reported results in this study are derived from publicly available sources and proprietary datasets. Where applicable, publicly archived datasets analyzed or referenced in this study can be accessed at: CompaniesMarketCap. (2024). Largest hotel companies by market cap. Available online: <https://companiesmarketcap.com/hotels/largest-hotel-companies-by-market-cap/> (accessed on 5 December 2024). ESG Voices. (2024). ESG score rating agencies: Key organizations and their impact. Available online: <https://esgvoices.com>. Investing.com. (2024). Financial market data and stock analysis. Available online: <https://www.investing.com>. London Stock Exchange Group (LSEG). (2024). Market insights, stock exchange data, and financial reports. Available online: <https://www.lseg.com>.

Conflicts of Interest: The authors declare no conflicts of interest.

Note

- ¹ <https://corporate.hgv.com/news/news-details/2024/Hilton-Grand-Vacations-Completes-Acquisition-of-Bluegreen-Vacations/default.aspx> (accessed on 10 December 2024).

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