

# Impact of Women Leadership and ESG Ratings and in Organizations: A Time Series Segmentation Study

Dwijendra Nath Dwivedi

Krakov university of Economics, Rakowicka 27, Kraków, 31-510, Poland

E-mail: [dwivedy@gmail.com](mailto:dwivedy@gmail.com)

Gattaiah Tadoori

Osmania University, Hyderabad, Telengana

Saurabh Batra

Department of Business Economics, Delhi University, New Delhi, India

Received: Jan. 10, 2023    Accepted: Feb. 15, 2023    Published: April 1, 2023

doi:10.5296/jmr.v15i1.20538    URL: <https://doi.org/10.5296/jmr.v15i1.20538>

## Abstract

While many ESG measures focus on factors that influence an organization's bottom line, some do not consider the role of women in leadership. First, we want to perform a time series segmentation study to identify the clusters of companies that have improved the ESG scores over the years and also the cluster of companies that has not been able to do so. Second, we want to test the assumption that businesses with more women directors make better decisions than those with more men. The difference in ESG ratings between companies with and without women on their boards isn't particularly substantial, and it is unclear what the exact impact of a woman's inclusion on a board is.

A direct link exists between an organization's ESG rating and the composition of its board of directors. We want to verify empirically that companies with gender-diverse boards perform higher on the ESG index than companies with less diversity. The ESG rating reflects three dimensions of sustainable business development. Listed companies with more women on their boards are expected to perform better across all three GSS categories. The idea is that by including a female board member on your board, organizations will be making a positive impact on the lives of the people who work for the organization.

**Keywords:** ESG Investing, Green finance, ESG rating, Women leadership

## Introduction

A new report by MIT shows that women are influential in driving change. While there has been an increase in women in the boardroom, it is important for more men to be in leadership positions. It is not uncommon for female executives to be viewed positively in a company's ESG score. By promoting gender equality in the workplace, a woman can become a force of change in the organization.

Despite the growing role of women in business, there is still a huge problem with ESG ratings. The fact that ESG ratings are not comparable is problematic because the data from different agencies is not consistent. Many agencies use the same raw data for measuring a company's performance, which causes the data to vary. This can lead to confusion in the ratings. In addition, ESG ratings are not consistently related to corporate performance, which can lead to conflicting results.

Studies have shown that companies with gender-diverse boards outperform their male counterparts when it comes to sustainability and ESG metrics. Additionally, these companies also tend to adopt better practices on sustainability and ESG metrics. However, there are still challenges in determining whether women on the boards make a difference. To understand the impact of women on companies and the importance of gender diversity on boards, let's examine the data behind these results.

Increasing the number of women on boards can help companies improve their performance in ESG. For example, diverse boards are better positioned to spot trends and respond to them, resulting in superior ESG performance. Similarly, a more inclusive board may be more efficient at identifying and responding to trends in the economy. A more diverse board can improve the company's ability to meet the challenges of sustainability. The benefits are many.

Having more females on executive committees can boost performance. Research also shows that women on the board of directors are more successful than their male counterparts. The higher their ESG score, the more profitable the company is. By ensuring that women are represented at all levels, companies can enhance their ESG score. It also contributes to gender diversity. The presence of more females in decision-making. It's not easy to create diversity within the boardroom.

## Literature Study

Ng and Rezaee (2020) looked at whether and how sustainability and disclosure factors affect market price information (SPI). Fiaschi et al. (2020) conducted to measure and exceed ESG Index limits. Rajesh et al. (2021) found in his research, the mean differences in the CSR strategy scores and the ESG scores of firms in select developed economies such as; US, UK, Japan, and Australia, representing different geographical regions globally. Champagne et al. (2021) considered whether non-financial ratings are related to the probability of adverse environmental, social and governance (ESG) events occurring and thus serve as an ESG risk indicator. Bannier et al. (2022) considered the relationship between activities, social responsibility and credit risk.

US and European companies between 2003 and 2018 found that only the environmental aspects are negatively linked to the various credit risk measures for US companies. In the case of European companies, the environmental and social aspects are unfavourably associated with credit risk. Jarjir et al. (2020s) concluded that a risk premium is associated with market-assessed non-financial ratings (i.e., environmental, social and governance (ESG) ratings). Yoo and Managi (2022) investigated whether the information disclosure of Environmental, Social, Governance (ESG) criteria is more crucial than actions for the financial performance of firms by using two different ratings with more than 1,000,000 samples and results showed that disclosure is more important for profits while action is more critical in Tobin's Q and IVA scores. Wong et al. (2021) has demonstrated that ESG certification reduces a company's cost of capital while Tobin Q certification increases significantly. Broadstock et al. (2020) The study identified a non-linear relationship between the adoption of ESG policies and the ability of companies to innovate. Chen and Yang (2020) found that investors overreact to environmental as opposed to social or governance factors. Li et al. (2022) found that higher ESG scores mitigate the risk that businesses will fail. Barros et al. (2022) investigated that whether mergers and acquisitions (M&A) operations impact firms' performances on triple ESG pillars (environment, social, and governance) and provided evidence that M&A deals have a positive impact on the ESG score of firms. Sabbaghi (2022) did empirical research on asymmetric volatility in environmental, social and governance (ESG) investments. Wong and Zhang (2022) found that Empirical results advance signaling theory and resource-based view by providing evidence that corporate reputation is considered a valuable intangible asset by investors and adverse ESG disclosure via media channels have a significant and negative impact on firm valuation. Avramov et al. (2021) Analyzed asset pricing and the portfolio impact of a significant impediment to sustainable investment: uncertainty around the company's ESG profile. Egorova et al. (2022) demonstrated that IT firms are not currently leaders in ESG scores and weaknesses in their ESG components. It demonstrates what leads to the conclusion that IT firms have the capacity to scale up their ESG practice. Huang et al. (2021) The natural issues discussed have an impact on the environmental, social and governance (ESG) information policies of companies located near affected areas. They found that companies with a higher percentage of local institutional ownership are more likely to increase ESG reporting after experiencing nearby disasters. Feng et al. (2021) examined the relationship between environmental, social and corporate governance (ESG) ratings and the risk of stock market price collapse, and found a statistically and economically significant negative relationship for Chinese businesses. Singhania and Saini (2022) found that adopting a system approach using ESG structures would serve RIL as a potential benchmark for the Indian corporate sector and emerging world towards spreading awareness and achievement of sustainable development goals (SDGs). Ng and Rezaee (2020); Becker et al. (2021) examined the impact of the Sustainable Financial Reporting Regulation (SFDR) on mutual funds and individual investors in the EU. The results showed that earmarked funds increase their sustainability rating after a strategic intervention.

## Data and Methodology

ESG Rating Data: NIFTY100 ESG Index is designed to reflect the performance of companies within NIFTY 100 index, based on Environmental, Social and Governance (ESG) scores. The weight of each constituent in the index is tilted based on ESG score assigned to the company i.e. The constituent weight is derived from its free float market capitalization and ESG score. To form part of the NIFTY100 ESG Index, stocks should qualify the following eligibility criteria: Stocks should form part of NIFTY 100 Companies should have an ESG score. And companies engaged in the business of tobacco, alcohol, controversial weapons and gambling operations shall be excluded. Sample: For the purpose of the study, a sample of 90 companies included in National Stock Exchange (NSE) - 100 ESG Index. Of the total companies, GlaxoSmithKline Consumer Healthcare Ltd has been merged with Hindustan Unilever Ltd (HUL) and the data of Cummins India Ltd, Emami Ltd., Oil India Ltd. Steel Authority of India Ltd (SAIL), and Vodafone Idea Ltd was not available from the sources of data collection. Therefore, effectively the sample of the study has come to 84 companies only. The data have been collected for the year 2021. Sources of Data: ESG Disclosure scores have been collected from [www.s&pglobal.com](http://www.s&pglobal.com) and the data pertaining to women's participation on board and in Key executive position has been collected from [www.goodreturn.in](http://www.goodreturn.in)

There are several different methods of time series hierarchical clustering. The most popular is known as the k-means method, which uses the maximum distance between adjacent points. This approach is slow and does not scale to datasets with millions of records. However, this approach can be effective for moderate sized data sets with tens of thousands of series. In addition, the clusters generated by this method may differ from those produced by k-means. There are nuances associated with time series, so it is difficult to determine which algorithm produces "better" clusters. The k-means method is the most common and widely used time series hierarchical clustering method. It combines k-means distance, X- coordinates, and the similarity between two sequences. The same principle can be applied to the t-score problem. To estimate the average distance between two consecutive sequences, the k-means distance should be minimized. The K-means algorithm is the most commonly used time series hierarchical clustering method. The K-means algorithm identifies a set of k clusters. Each example is assigned to a single cluster based on the similarity between two observations. Using this method, we can find out whether two examples are similar by calculating the distance between their centers in the n-dimensional space. The centroids of each cluster are randomly initialized, so all examples are assigned to the closest cluster. Time Series Clustering is an unsupervised data mining technique for organizing data points into groups based on their similarity. The objective is to maximize data similarity within clusters and minimize it across clusters. We applied a time series clustering algorithm to cluster the companies into segments using the ESG time series data. The idea is to segment companies based on their improvement in ESG score, reduction in sag score or

showing random behavior.

After time series clustering, we analyzed the women's leadership and board representations for the three segments of companies.

**Results**

*General Remarks*

In this section, we present the segmentation results of companies based on ESG score growth rates. The results of clustering analysis are presented in three segments: first segment where we have seen consistent improvement of ESG score, second segment that is more random and the third segment of companies that have negative growth rates.

*Companies Clustering based on ESG scores*

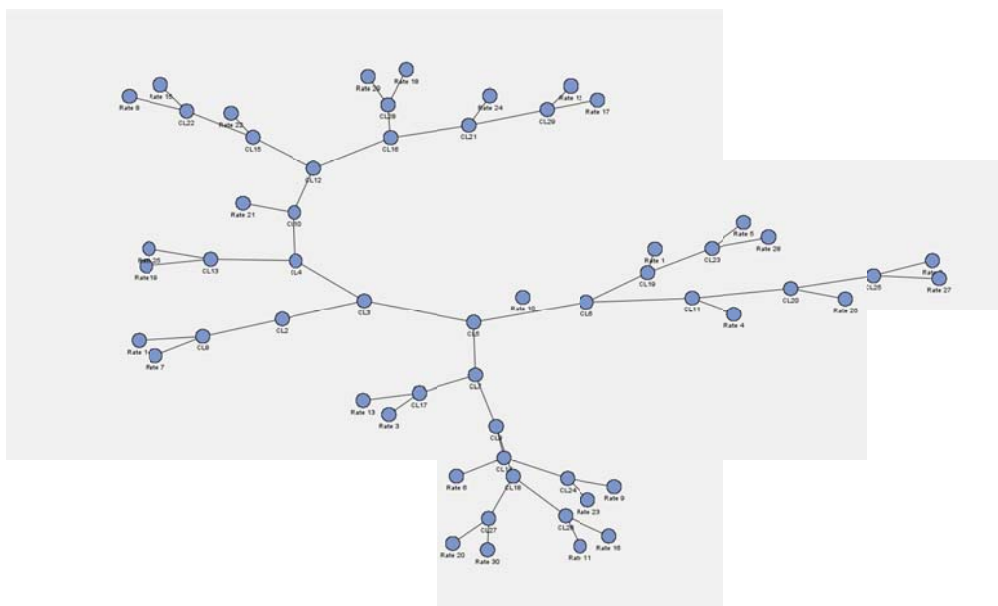


Figure 1. Constellation (source: Author)

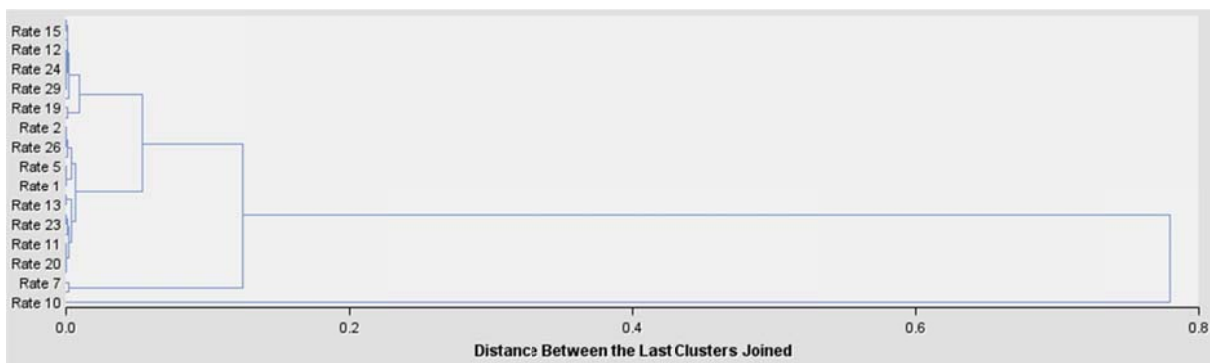


Figure 2. Dendrogram (source Author)

### *Company Profiling*

Companies were segmented into three clusters post which profiling of clusters was carried out. It was observed that the total number of key executives is much higher in Cluster 3 as compared to Cluster 1 and cluster 2. Also, when comparing Cluster 1 to cluster 3, cluster 3 contains a higher number of women directors, has a little more average board strength and number of key woman executive. There is higher percentage of key percentage woman executives and more percentage of woman directors in cluster 3 as compared to cluster 1.

Table 1. Cluster Profiling (source Author)

	<b>Cluster 1</b>	<b>Cluster 2</b>	<b>Cluster 3</b>
<b>Cluster Size</b>	39	36	9
<b>Average of No. Women Directors</b>	1.36	1.83	1.89
<b>Average of Total Board Strength</b>	10.15	10.08	11.11
<b>Average of No. of key Women Executives</b>	0.51	0.67	0.78
<b>Average of Total Key Executives Strength</b>	6.69	9.11	13.00
<b>Average of %Woman directors</b>	0.13	0.18	0.17
<b>Average of %Key women executives</b>	0.07	0.05	0.12

### **Conclusion and Discussion**

As companies strive to be more sustainable, they are increasingly being screened by ESG investors. One reason for this is the fact that a company with low gender diversity is likely to be disadvantaged in competing for workforce talent. The energy industry has lagged behind other sectors when it comes to recruiting and promoting women. Its workforce has less than one-fifth women. The proportion of women in senior positions is less than one-fifth of all senior positions.

Research has shown that a company with a higher percentage of women on its board has better performance. In particular, the authors found that companies with women on their boards are more likely to have high performance ratings. The results of this research are compelling. In addition to a better ESG score, a woman's presence on a company's board improves customer responsiveness and ethical accountability. Moreover, a company with a female board is more likely to perform well than one with no women on its board.

Companies with gender-diverse boards have been found to receive higher scores than



those with less diversity. Those with more diverse boards have been found to have a lower risk of financial disasters and higher profit margins. While pursuing profitability is the primary goal of any company, there are a number of companies that also aim to create social impact. These companies are likely to outperform the companies with lower gender diversity.

Companies with higher strength of executives and directors tend to have a decreasing ESG score with time. With a greater number of members on board the company looks to concentrate more on profitability than ESG responsibility over time.

## References

Avramov, D., Cheng, S., Lioui, A., and Tarelli, A. (2021). Sustainable investing with ESG rating uncertainty. *Journal of Financial Economics*, (xxxx). <https://doi.org/10.1016/j.jfineco.2021.09.009>

Bannier, C. E., Bofinger, Y., and Rock, B. (2022). Corporate social responsibility and credit risk. *Finance Research Letters*, 44(November 2020). <https://doi.org/10.1016/j.frl.2021.102052>

Barros, V., Matos, P. V., Sarmiento, J. M., and Vieira, P. R. (2022). M&A activity as a driver for better ESG performance. *Technological Forecasting and Social Change*, 175(November 2021):121338. <https://doi.org/10.1016/j.techfore.2021.121338>

Becker, M. G., Martin, F., and Walter, A. (2021). Fostering the Power of ESG Transparency: The Effect of Sustainability Labels on Mutual Funds and Individual Investors. *SSRN Electronic Journal*, (November 2021), 1-6. <https://doi.org/10.2139/ssrn.3970861>

Broadstock, D. C., Matousek, R., Meyer, M., and Tzeremes, N. G. (2020). Does corporate social responsibility impact firms' innovation capacity? The indirect link between environmental & social governance implementation and innovation performance. *Journal of Business Research*, 119(July 2019), 99-110. <https://doi.org/10.1016/j.jbusres.2019.07.014>

Champagne, C., Coggins, F., and Sadjahin, A. (2021). Can extra-financial ratings serve as an indicator of ESG risk? *Global Finance Journal*, (March):100638. <https://doi.org/10.1016/j.gfj.2021.100638>

Chen, H. Y. and Yang, S. S. (2020). Do Investors exaggerate corporate ESG information? Evidence of the ESG momentum effect in the Taiwanese market. *Pacific Basin Finance Journal*, 63(October 2019):101407. <https://doi.org/10.1016/j.pacfin.2020.101407>

Egorova, A. A., Grishunin, S. V., and Karminsky, A. M. (2022). The Impact of ESG factors on the performance of Information Technology Companies. *Procedia Computer Science*, 199, 339-345. <https://doi.org/10.1016/j.procs.2022.01.041>

Feng, J., Goodell, J. W., and Shen, D. (2021). ESG rating and stock price crash risk: Evidence from China. *Finance Research Letters*, (September):102476.

<https://doi.org/10.1016/j.frl.2021.102476>

Fiaschi, D., Giuliani, E., Nieri, F., and Salvati, N. (2020). How bad is your company? Measuring corporate wrongdoing beyond the magic of ESG metrics. *Business Horizons*, 63(3), 287-299. <https://doi.org/10.1016/j.bushor.2019.09.004>

Huang, Q., Li, Y., Lin, M., and McBrayer, G. A. (2022). Natural disasters, risk salience, and corporate ESG disclosure. *Journal of Corporate Finance*, 72(December 2021):102152. <https://doi.org/10.1016/j.jcorpfin.2021.102152>

Jarjir, S. L., Nasreddine, A., and Desban, M. (2020). Corporate social responsibility as a common risk factor. *Global Finance Journal*, (December 2019):100577.

Li, H., Zhang, X., and Zhao, Y. (2022). ESG and Firm's Default Risk. *Finance Research Letters*, (Jan- uary):102713. <https://doi.org/10.1016/j.frl.2022.102713>

Ng, A. C. and Rezaee, Z. (2020). Business sustainability factors and stock price informativeness. *Journal of Corporate Finance*, 64(November 2019),101688. <https://doi.org/10.1016/j.jcorpfin.2020.101688>

Rajesh, R., Rajeev, A., and Rajendran, C. (2021). Corporate social performances of firms in select developed economies: A comparative study. *Socio-Economic Planning Sciences*, (November):101194. <https://doi.org/10.1016/j.seps.2021.101194>

Sabbaghi, O. (2022). The impact of news on the volatility of ESG firms. *Global Finance Journal*, 51(De-cember 2019):100570. <https://doi.org/10.1016/j.gfj.2020.100570>

Singhania, D. M. and Saini, D. N. (2022). Systems approach to environment, social and governance (ESG): Case of Reliance industries. *Sustainable Operations and Computers*, 3(November 2021):103-117. <https://doi.org/10.1016/j.susoc.2021.11.003>

Wong, J. B. and Zhang, Q. (2022). Stock market reactions to adverse ESG disclosure via media channels. *British Accounting Review*, 54(1), 101045. <https://doi.org/10.1016/j.bar.2021.101045>

Wong, W. C., Batten, J. A., Ahmad, A. H., Mohamed-Arshad, S. B., Nordin, S., and Adzis, A. A. (2021). Does ESG certification add firm value? *Finance Research Letters*, 39(November 2019):101593. <https://doi.org/10.1016/j.frl.2020.101593>

Yoo, S. and Managi, S. (2022). Disclosure or action: Evaluating ESG behavior towards financial performance. *Finance Research Letters*, 44(November 2020):102108. <https://doi.org/10.1016/j.frl.2021.102108>