Propensity Score Matching and a Difference in Difference Approach to Assess ESG's Influence on Indian Acquirer Performance

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Abstract

This research involves an in-depth analysis of the intricate relationship between Environmental, Social, and Governance scores and the financial and operational performance of Indian acquirers. The research methodology employed herein entails a meticulously crafted design, incorporating a blend of the Propensity Score Matching and Difference-in-Differences model. This strategic amalgamation serves to rigorously assess the impact of ESG factors on the performance outcomes of Indian acquirers involved in M&As. The empirical findings of this study reveal a robust and statistically significant correlation between M&A endeavours and ESG considerations. Notably, the research discerns that M&A activities tend to exert an adverse influence on ESG performance metrics within the Indian corporate landscape. This nuanced insight underscores the multifaceted interplay between strategic corporate actions and the broader sustainability and governance landscape, thereby offering valuable implications for scholars and practitioners in finance and corporate strategy.

JEL: F64, M14, G34, C50, C58, C50, C58 **SDG:** SDG 17, SDG Target 17.J

Keywords: ESG Score, Mergers and acquisitions, Propensity score matching, and Difference-in-differences Method

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1. Introduction and Theoretical Framework

ESG has emerged as a vital framework for evaluating companies' sustainability efforts and their impact on various stakeholders, including investors, employees, communities, and the environment (Lokuwaduge et al., 2020). Environmental considerations highlight a company's efforts to mitigate its ecological footprint, such as reducing greenhouse gas emissions, conserving resources, and promoting sustainable practices. Climate change, pollution, and other environmental challenges have become urgent global concerns, and businesses that prioritise environmental sustainability contribute to a healthier planet and position themselves for long-term success (Cuomo et al., 2011). The social aspect of ESG recognises a company's responsibility towards its employees, customers, and the communities in which it operates (Lokuwaduge et al., 2020). Diversity and inclusion, labour practices, human rights, and community engagement are crucial elements of social sustainability. By fostering a diverse and inclusive workforce, supporting fair labour practices, and actively engaging with the communities they serve, companies can enhance their reputation, build stronger relationships, and attract top talent. The governance component of ESG focuses on the structures and practices that guide corporate decision-making (Aich S. et al., 2021). Transparent and ethical governance mechanisms, such as independent boards, executive compensation aligned with performance, and robust risk management systems, instil stakeholder trust (Demidenko et al., P., 2010).

Effective governance ensures accountability, mitigates the risk of misconduct, and enhances a company's long-term stability and value. In recent years, ESG investing has gained significant traction, with investors increasingly considering sustainability factors alongside financial performance. Numerous studies have shown that companies with strong ESG performance tend to outperform their peers over the long term, proving that sustainable practices and responsible corporate behaviour can generate shareholder value (Fulton et al., C., 2012; Gerard, B., 2019; Feng et al., C. P., 2022). As consumers, investors, and employees become more conscious of the impact of their choices, businesses must embrace ESG principles to remain competitive and relevant (Patil et al., 2021). By integrating ESG considerations into their strategies, companies can unlock new growth opportunities, reduce risk exposure, and contribute positively to society and the environment (Clementino et al.; R., 2021).

Effective management of ESG risks can contribute to improved company performance. By addressing environmental risks, such as climate change or resource scarcity, companies can mitigate potential disruptions to their operations and supply chains (Ghadge et al., S., 2020). Likewise, managing social threats, such as labour issues or community relations, can help prevent costly legal disputes, reputation damage, or operational disruptions. Sound governance practices, including solid board oversight and risk management frameworks, can enhance decision-making, reduce fraud, and improve company performance (Gozman, D., & Willcocks, L., 2019). Embracing sustainable practices leads to increased operational efficiency and cost savings. For example, energy-efficient measures can reduce utility expenses, while waste reduction initiatives can lower disposal costs. Companies prioritising ESG factors are more likely to identify opportunities for resource optimisation, process improvements, and innovation, resulting in enhanced productivity and profitability (Porter et al.; E., 2011).

Companies with strong ESG performance tend to have better brand reputations and customer loyalty. Consumers, particularly younger ones, increasingly prefer companies

that align with their values and demonstrate social and environmental responsibility. Positive brand perception and customer loyalty can increase sales, market share, and long-term profitability. Companies prioritising ESG considerations attract and retain top talent. Employees, particularly millennials and Gen Z, seek purposeful work and want to be associated with organisations that positively impact society and the environment (Giampetro-Meyer, A., 2022). Companies committed to ESG factors are more likely to attract skilled and motivated employees, increasing productivity and employee satisfaction (Narayanan, S., 2022).

ESG performance can influence a company's access to capital. Investors, including institutional investors and asset managers, increasingly incorporate ESG criteria into their investment decisions (Eccles et al.; S. J., 2017). Companies with strong ESG performance are more likely to attract investment and secure favourable financing terms. Companies with poor ESG performance may face difficulty accessing capital or higher borrowing costs. Numerous studies have demonstrated a positive correlation between strong ESG and long-term financial performance. Companies prioritising ESG factors exhibit resilience, adaptability, and a focus on long-term value creation (Edmans, A., 2023; Sritanee et al., R., 2023; Rahman et al., 2023). By managing ESG risks, seizing opportunities, and addressing stakeholder concerns, companies can enhance their competitive advantage and deliver sustainable financial performance over time.

ESG due diligence has become integral to assessing potential risks and liabilities associated with a target company (Dowse, J., 2009). Environmental risks such as pollution, regulatory compliance, or climate change vulnerabilities, social risks like labour practices or human rights issues, and governance risks such as weak board structures or ethical concerns can all impact the valuation and feasibility of an M&A deal. ESG factors can directly impact a company's reputation and brand value. Acquiring a company with a poor ESG track record or a history of controversies may negatively affect the acquiring company's image, leading to reputational risks (Karwowski et al., 2021). Conversely, acquiring a company with strong ESG credentials can enhance the acquirer's reputation and improve its brand value, leading to increased customer loyalty and stakeholder trust (Dai et al., 2021). ESG factors are increasingly subject to regulatory scrutiny. Companies that fail to comply with environmental, social, and governance regulations may face legal consequences, fines, or reputational damage. Acquiring a company with a history of non-compliance or potential regulatory risks can expose the acquiring company to significant legal and financial liabilities. Studies have shown a positive correlation between strong ESG and financial performance. Companies prioritising sustainability, responsible governance, and social impact tend to outperform their peers over the long term (Filbeck et al., 2019; Kulal et al., M. S., 2023; Sandberg et al., 2023). As a result, acquirers may seek targets with robust ESG practices, as it can indicate a more stable and value-generating investment. ESG considerations are increasingly important to stakeholders, including investors, employees, customers, and communities. Investors are more likely to support M&A deals aligning with their ESG investment criteria. Employees may prefer working for companies committed to sustainability and responsible business practices (Chouinard et al., 2011). Customers, particularly those who are environmentally and socially conscious, may favour brands prioritising ESG factors. These stakeholder expectations are necessary to ensure the success of an M&A deal. ESG factors can influence the integration process and potential synergies between the acquiring and target companies. Cultural integration, aligning sustainability goals, and leveraging complementary ESG practices can enhance collaboration and create additional value post-merger.

Integrating ESG principles into mergers and acquisitions represents a critical evolution in the business landscape. The profound influence of ESG on a company's reputation, financial performance, access to capital, and stakeholder relationships cannot be underestimated. As we move forward, it is imperative to recognise that ESG is not just a framework for evaluating sustainability but also a key driver in shaping the future of M&A transactions. Through rigorous testing and analysis, we can gain a deeper understanding of how ESG considerations impact the success and outcomes of mergers and acquisitions, shedding light on the transformative potential of responsible and sustainable business practices in this dynamic and ever-evolving landscape. By examining the concrete effects of ESG on M&A deals, we can pave the way for more informed decision-making and better alignment with the expectations of investors, employees, customers, and communities, ultimately steering businesses toward a future of greater sustainability and value creation.

2. Review of Literature and Hypothesis Development

Recent studies have found that ESG has a significant impact on a firm's performance. A meta-study of literature regarding the impact of ESG on financial performance indicates that 58% of the studies argue that there is a positive impact of ESG performance on the financial performance of the company (Whelan et al., 2021). The ESG has a positive impact on return on investment (Velte, 2017). The performance of high ESG firms has better financial performance than the firms with lower ESG scores (Ahmad et al., 2021). If the firms improve the ESG score well, it will directly impact the corporate accounting performance as well as market value (Dalal & Thaker, 2019). Awaysheh et al. (2020) argue that the higher the ESg score, the higher the operating performance. The financial performance of the company is influenced by the ESG (Huang, 2021).

One of the major aims of M&As is to enhance firm performance (Chen et al., 2020). Studies show ESG is becoming important in this purview since ESG and firm performance are connected. The ESG score of the target has a significant influence on the acquirer's post-merger ESG performance (Hong et al., 2022). On the other hand, Barros et al. (2022) argue there is no such influence. The higher ESG score of the target leads to an increase in the post-merger ESG score of the acquirer (Tampakoudis & Anagnostopoulou, 2020). Since the previous studies mostly focused on the target's pre-merger ESG, this study aims to analyse the acquirer's pre-merger ESG score and how it will affect the post-merger ESG score.

H_1: The higher the pre-merger ESG score, the higher the post-merger ESG

In addition to this, the researchers argue that the pre-merger ESG score and post-merger financial performance are connected significantly. The key question in these studies was whether the huge investment in ESG factors during the process of M&As will improve the financial performance of the acquirer. If the acquirer invests more in ESG while taking over the target, it will lead to higher financial performance (Gillan et al., 2021). The post-merger profitability of the acquirer is influenced by the acquirer's pre-merger ESG score (Kim et al., 2022). On the other hand, Tampakoudis et al. (2021) found that the acquirer ESG performance has a negative impact. Feng (2021) argues that the pre-merger ESG score does not influence the post-merger financial performance of the acquirer. Studies indicate that the acquisition of or merging with a target with a higher ESG score will lead to better financial performance (Salvi et al., 2018). Teti & Spiga (2023) argued that the financial performance of the company is induced by the pre-merger ESG up to an extent

only. The reviews reveal to us that limited studies are occurring in the area of analysing the ESG's impact on financial performance, and the studies that are conducted in the area give mixed opinions. Thus, we try to analyse the impact of pre-merger ESG, along with other control variables, on the financial performance of the acquiring company.

H_2: The higher the pre-merger ESG score, the higher the post-merger financial performance

The financial performance of the company is usually analysed with the help of different ratios. ROA is one of the predominant ratios that help interpret the financial position of a company. Salvi et al. (2018), Tampakoudis and Anagnostopoulou (2020), Feng (2021), Ionescu et al. (2019), etc used the ROA as a proxy while analysing the impact of ESG on financial performance.

The value of the companies was tested in some studies with the help of Tobin's Q. Miralles-Quirós et al. (2019) analysed the impact of the ESG of banks on a firm's value using Tobin's Q. The researchers argue that Tobin's Q value indicates the growth potential of the companies (Kwon et al., 2018). Thus, Tobin's Q is a good measure for analysing the value of the company (Martynova & Renneboog, 2010).

This study finds the gap (explained in the next section) that there are unexplored areas that are yet to be analysed by the scholar using other variables. This study analyses the impact of pre-merger ESG of acquirers on the financial factors such as profitability (ROA) value of the company (Tobin's Q), and financial leverage as well as non-financial factor ESG.

H_3: The higher the pre-merger ESG score, the higher the post-merger market value

Research Gap

Previous studies analysed the impact of ESG on firms' performance using only financial performance or market value as a proxy. But firm performance does not only pertain to financial performance. It's a combination of both financial and non-financial performance. After analysing the previous studies, it is evident that financial performance has been measured only using some profitability ratios. This study aims to bridge that gap by analysing the impact of ESG on firm performance using both financial and non-financial performance. Figure 1 explains the factors examined in this study.

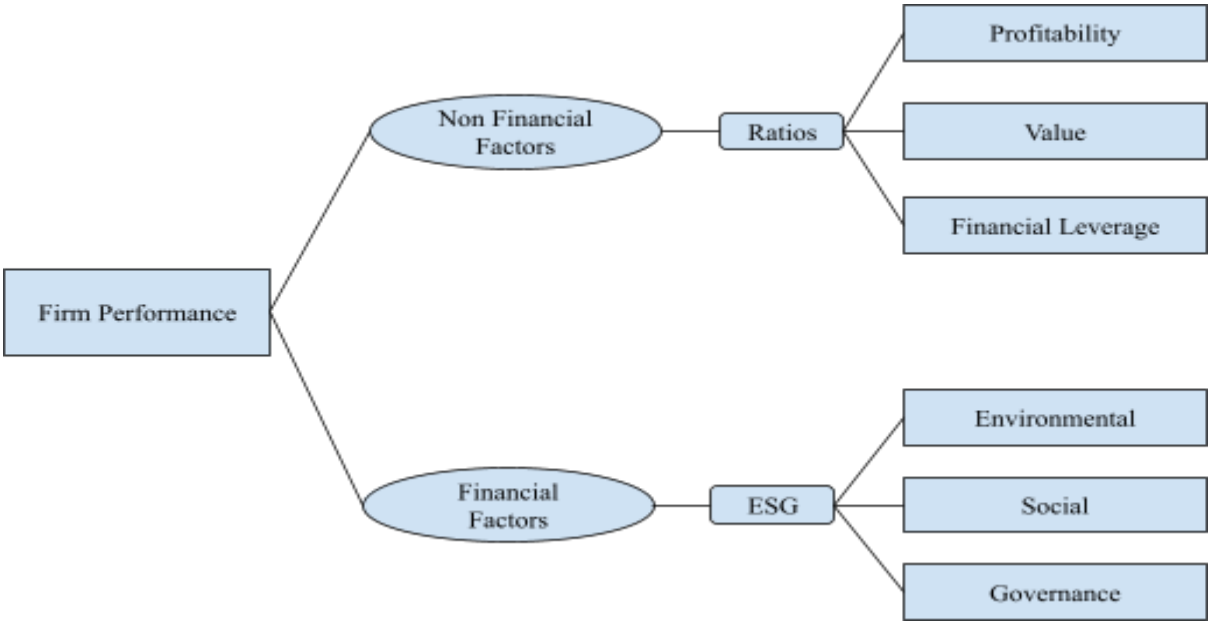

Figure 1. Study Model

3. Methodology

Propensity Score Matching (PSM)

Propensity score matching (PSM) is used in observational studies to balance the distribution of covariates between treatment and control groups when estimating the average treatment effect on a binary outcome variable (Wang et al., 2013). In this study, the dependent variable is denoted as "MERGE," which is a binary variable, and the independent variables include ESG score, market capitalisation (Halid et al., 2023), financial leverage (Alareeni et al., 2020), firm size (Drempetic et al., 2020), Tobin's q ratio (Dalal et al., 2019), and return on asset (Trisnowati et al., 2022).

The logistic regression model estimates the probability of being in the treatment group (A=1) versus the control group (A=0) based on the independent variables (Ives et al., 2010).

$$P(A=1) = 1 / (1 + e^{(-z)}) \quad (1)$$

Where;

P(A=1) is the probability of being in the treatment group. e
is the base of the natural logarithm.
z is the linear combination of the independent variables:

$$z = \beta0 + \beta1 * \text{ESG score} + \beta2 * \text{Market capitalization} + \beta3 * \text{Financial Leverage} + \beta4 * \text{Size of the firm} + \beta5 * \text{Tobin's q ratio} + \beta6 * \text{ROA}$$

Here, β0, β1, β2, β3, β4, β5, and β6 are the coefficients that the logistic regression model

estimates. The coefficients (β0, β1, β2, β3, β4, β5, β6) are estimated using the GLM function. These coefficients in this model quantify each independent variable's influence on the probability of being in the treatment group (Allison et al., 1990).

A logistic regression model was applied to measure each observation's propensity score (P(A=1)). The propensity score gives the probability that each observation belongs to the treatment group based on their values for the independent variables (McCaffrey et al., 2004).

The study used the nearest neighbour matching technique to create a pair of treated and control units with similar propensity scores using the nearest neighbour matching technique (Geldof et al., 2020). This ensures that the groups are balanced concerning the covariates, reducing selection bias. After matching, we assessed the balance of covariates between the treated and control groups to ensure the matching was successful (Staffa et al., 2018).

Finally, the model estimated the average treatment effect (ATE) or other treatment effects of interest on the binary outcome variable "MERGE" while accounting for the balanced covariates.

This study combined PSM and DiD model to investigate the influence of ESG on the performance of Indian acquirers. The study compared the treatment and control group while controlling for the effects of ESG score (ESG), market capitalisation (MKTCAP), Size of the firm (SIZE), Return on Asset (ROA), financial leverage ratio (FINLEV), and Tobin's Q ratio (TQ).

Treatment Effect Estimation

With the matched dataset, we estimated the treatment effect of being a merged firm on the dependent variable (the "Dummy" variable) while controlling for the covariates. The difference-in-differences method is used for the estimation of the treatment effect.

$$\Delta \boldsymbol{Y} = \frac{\mathbf{1}}{\boldsymbol{N_{matched}}} \boldsymbol{\Sigma_{i=1}^{N_{matched}}} (\boldsymbol{Y_{i(merged)}} - \boldsymbol{Y_{i(non-merged)}}) \quad (2)$$

Where:

$N_{matched}$ is the number of matched pairs of merged and non-merged firms.

$Y_{i(merged)}$ is the value of the dependent variable (Dummy) for the merged firm in the i-th matched pair.

$Y_{i(non-merged)}$ is the dependent variable's (Dummy) value for the non-merged firm in the i^{th} matched pair.

The DiD approach is a commonly used quasi-experimental design to estimate causal effects in observational studies (Marinescu et al., K. P. (2018), such as the impact of ESG factors on acquirer performance.

The DiD model estimates the treatment effect by calculating the difference in the average performance outcomes between the two groups before and after the acquisition. The key idea is to measure if there is any difference in performance changes between the merged and non-merged groups on ESG Score, Financial Performance, and Financial Leverage during the post-acquisition period.

Variable Description

The study analyses the impact of pre-merger ESG on the acquirer's financial performance, post-merger value, and post-merger ESG.

Dependent Variable

Financial Performance

Return on Asset (ROA) is the best measure to analyse the financial performance or profitability of a company (Bereskin et al., 2018). This study used the same.

Value of the Firm

Kaldor (1966) introduced Tobin's Q as the measure of market value for the first time. The ESG has a significant impact on Tobin's Q (Miralles-Quirós et al., 2019). Martynova & Renneboog (2010) argue if the target has a better practice of shareholder protection and accounting standards, it will have a positive impact on Tobin's Q. i,e value.

Financial Leverage

The study analyses the impact of pre-merger ESG on post-merger financial leverage.

ESG

The study analyses both the financial and non-financial performance of an acquiring company after the M&As. The ESG is the factor that is used to analyse the non-financial performance. ESG

Independent Variable

All the models used the pre-merger ESG of the acquirer as the independent variable since the study is testing the impact of ESG on post-merger firm performance.

Control Variables

The study used different control variables, such as the size of the firm, market cap, revenue, and capital expenditure.

1. Results and Discussions

The summary statistics have been given in Table 1 and Table 2. Table 1 shows the summary statistics of the non-merged firms, and Table 2 shows the summary statistics of merged firms. Table 3 shows the correlation between the variables tested.

Table 1. Summary statistics for non-merged firms

	ESG	MKT Cap	Lev	Revenue	CAPEX	Tobin's Q	ROA	Size
Mean	33.466	251617.864	3.818	189825.741	-12924.800	2.370	7.531	11.491
Standard Error	0.722	36345.938	0.348	45693.419	3273.378	0.181	0.528	0.147
Median	30.751	92434.774	2.275	53183.709	-2521.221	1.533	5.873	11.212
Standard Deviation	8.195	412810.507	3.950	518977.471	37178.431	2.052	5.994	1.674
Sample Variance	67.153	170412514401.978	15.600	269337615835.465	1382235745.229	4.212	35.931	2.802
Kurtosis	2.677	14.143	5.865	43.374	30.509	14.267	-0.199	-0.076
Skewness	1.563	3.484	2.499	6.189	-5.229	3.278	0.749	0.695
Range	46.142	2664304.268	19.344	4455880.614	284790.006	13.524	27.799	7.198
Minimum	19.762	15292.738	1.081	4898.086	-284796.592	0.730	-2.933	8.603
Maximum	65.905	2679597.006	20.425	4460778.700	-6.586	14.254	24.866	15.801
Sum	4317.065	32458704.507	492.551	24487520.543	-1667299.190	305.694	971.497	1482.319
Count	129	129	129	129	129	129	129	129

Table 2. Summary statistics for merged firms

	ESG	MKT Cap	Lev	Revenue	CAPEX	Tobin's Q	ROA	Size
Mean	36.153	701916.781	4.098	443974.519	-35893.203	2.788	6.873	12.345
Standard Error	1.187	174359.240	0.591	122568.844	15090.993	0.360	0.867	0.298
Median	34.676	240128.416	2.616	90650.720	-6784.886	1.962	5.184	11.719
Standard Deviation	8.135	1195346.729	4.049	840289.657	103458.638	2.471	5.941	2.044
Sample Variance	66.179	1428853802684.000	16.394	706086707093.860	10703689824.424	6.104	35.292	4.179
Kurtosis	-0.133	12.128	4.970	11.882	32.877	3.814	1.730	-0.793
Skewness	0.661	3.222	2.393	3.240	-5.442	1.998	1.369	0.551

Range	35.471	6443240.440	15.766	4429806.887	673891.015	10.993	26.693	7.752
Minimum	20.582	20930.271	1.219	12453.342	-674124.357	0.975	-0.432	9.479
Maximum	56.054	6464170.711	16.985	4442260.229	-233.342	11.969	26.262	17.231
Sum	1699.207	32990088.709	192.590	20866802.392	-1686980.557	131.046	323.039	580.199
Count	47	47	47	47	47	47	47	47

Table 3. Correlation matrix.

	ESG	*MKT Cap*	*Lev*	*Revenue*	*CAPEX*	*Tobin's Q*	*ROA*	*Size*
ESG	1							
MKT Cap	0.44501542	1						
Lev	-0.2095591	0.08953655	1					
Revenue	0.41078328	0.66635251	0.15923422	1				
CAPEX	-0.4061537	-0.704021	0.0342846	-0.808787	1			
Tobin's Q	0.02184644	0.09570879	-0.3024979	-0.1690074	0.1380259	1		
ROA	0.02524381	0.02647501	-0.5340047	-0.1783617	0.1187646	0.73269884	1	
Size	0.34833609	0.53932017	0.60567005	0.57907385	-0.4167102	-0.3826116	-0.4920126	1

Comparisons between full sample, treated firms and controls.

This study aimed to comprehensively assess the impact of mergers on various critical factors within the corporate landscape, including ESG performance, Market Capitalization, Financial Leverage, Company Size, Tobin's Q, and Return on Assets (ROA). To achieve this, we divided our analysis into several distinct time frames, represented in Tables 4a, 4b, 4c, and 4d, focusing on mergers occurring in 2015, 2016, and so forth.

The approach involved comparing treated firms, i.e., those that underwent mergers, with control firms before and after the merger. The key innovation in our study was the implementation of Propensity Score Matching (PSM), a robust statistical technique that identifies the best-matching control companies for the treated firms. These control companies represent potential candidates for merger but did not undergo the process.

A crucial observation from our analysis is that the differences between treated and control firms decreased significantly after applying the PSM methodology. This critical finding suggests that PSM successfully identified control companies that closely resemble the merged entities, allowing us to isolate better and assess the true impact of mergers. This nuanced approach

provides more meaningful insights than merely comparing the same companies before and after a merger, as it accounts for the potential confounding variables inherent in such assessments. This study delved into the impact of mergers on financial leverage using a robust Difference-in-Differences (DID) model. This model allowed us to evaluate changes in financial leverage attributable specifically to the merger, further enhancing our understanding of the merger's overall effects on the financial health of the involved firms. By employing PSM and DID models, we reduce bias and offer a more comprehensive and accurate perspective on how mergers impact a range of critical corporate variables, ultimately providing valuable insights for practitioners and policymakers in corporate finance.

Table 4a. Comparisons between full sample, treated firms and controls- 2015

	Full Sample				PSM Sample				
Variables	**Treated**	**Control**	**Difference**	**Std. Mean Diff.**	**Treated**	**Control**	**Difference**	**Std. Mean Diff.**	**Pair Dist.**
Distance	0.0775	0.0605	0.0170	0.4372	0.0775	0.0792	-0.0017	-0.0432	0.0483
ESG	28.2240	27.6000	0.6240	0.0665	28.2240	32.5445	-4.3205	-0.4606	1.2266
MCAP	4.9788	4.6899	0.2889	0.4532	4.9788	5.1935	-0.2147	-0.3370	0.6418
ROA	9.0103	6.7825	2.2278	0.2083	9.0103	7.8755	1.1348	0.1061	0.8095

Table 4b. Comparisons between full sample, treated firms and controls- 2016

	Full Sample				PSM Sample				
Variables	**Treated**	**Control**	**Difference**	**Std. Mean Diff.**	**Treated**	**Control**	**Difference**	**Std. Mean Diff.**	**Pair Dist.**
Distance	0.1965	0.1054	0.0911	0.6400	0.1965	0.1973	-0.0008	-0.0050	0.0567
ESG	38.0382	31.3853	6.6529	0.5905	38.0382	38.8517	-0.8135	-0.0722	0.7266
MCAP	5.3256	4.8861	0.4395	0.5741	5.3256	5.2734	0.0522	0.0682	0.4747
ROA	4.9477	6.5277	-1.58	-0.3191	4.9477	4.6625	0.2852	0.0576	1.4157

Table 4c. Comparisons between full sample, treated firms and controls- 2017

	Full Sample				PSM Sample				
Variables	**Treated**	**Control**	**Difference**	**Std. Mean Diff.**	**Treated**	**Control**	**Difference**	**Std. Mean Diff.**	**Pair Dist.**
Distance	0.2127	0.0839	0.1288	0.7860	0.2127	0.2106	0.0021	0.0133	0.0428
ESG	36.3669	32.6052	3.7617	0.5535	36.3669	36.5626	-0.1957	-0.0288	1.8311

MCAP	5.4883	4.8707	0.6176	1.2980	5.4883	5.4883	0	-0.0000	0.3757
ROA	7.2012	6.9530	0.2482	0.0270	7.2012	7.3992	-0.198	-0.0216	1.0332

Table 4d. Comparisons between full sample, treated firms and controls- 2018

	Full Sample				**PSM Sample**				
Variables	**Treated**	**Control**	**Difference**	**Std. Mean Diff.**	**Treated**	**Control**	**Difference**	**Std. Mean Diff.**	**Pair Dist.**
Distance	0.1473	0.1188	0.0285	0.4022	0.1473	0.1443	0.003	0.0425	0.0571
ESG	36.6580	35.7869	0.8711	0.0943	36.6580	35.6705	0.9875	0.1069	1.0421
MCAP	5.2403	5.0252	0.2151	0.3690	5.2403	5.1639	0.0764	0.1310	0.7167
ROA	5.9722	7.2654	-1.2932	-0.2062	5.9722	4.8906	1.0816	0.1725	0.9360

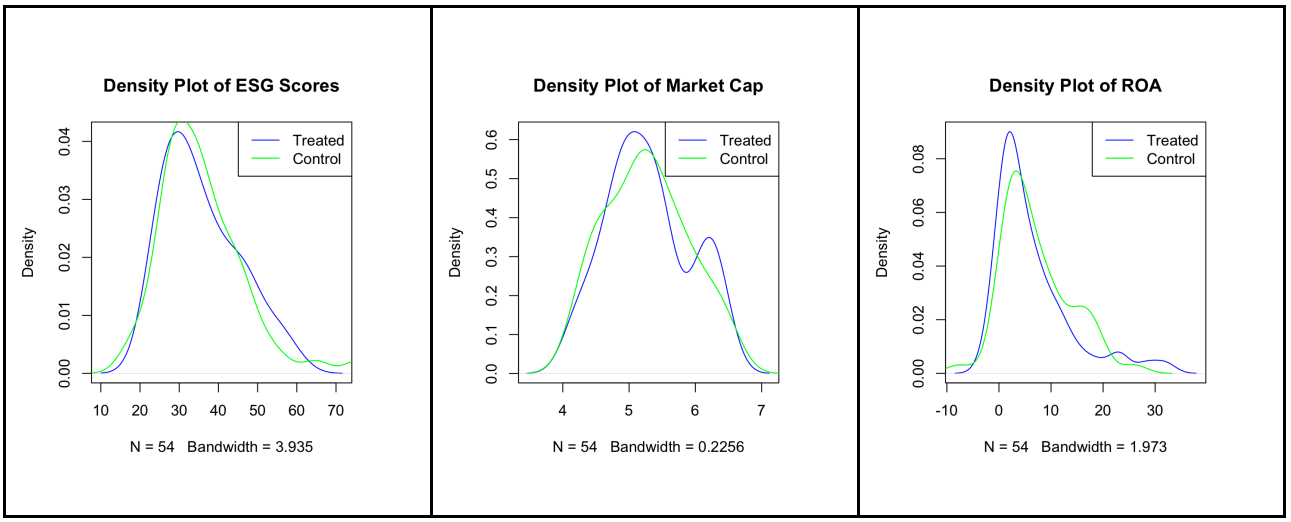

Figure 2. Density Plot

DID Result

Table 5a. Impact of Pre-Merger ESG on Financial Leverage

Table 5a presents the outcomes of our Difference-in-Differences (DID) model, a critical component of our investigation into the repercussions of mergers on financial leverage. In this analysis, our primary objective is to discern the potential influence of Environmental, Social, and Governance (ESG) factors on this outcome.

Our findings reveal a merger's significant and noteworthy impact on a company's financial leverage, indicated by the coefficient "Post." This highlights that mergers have a substantial effect on altering firms' financial leverage in our study. However, what makes our study

particularly illuminating is the insight that ESG factors, alongside Firm Size and Market Capitalization, also wield substantial influence on financial leverage outcomes.

Delving deeper into the role of ESG, we uncover compelling evidence that attests to its significance. ESG considerations, as an integral part of modern corporate governance, are increasingly crucial in shaping a company's financial landscape. Our study underscores how ESG practices, commitments, and performance metrics can impact financial leverage, which has gained prominence in the era of responsible and sustainable investing.

Firm Size and Market Capitalization also have a significant influence on financial metrics. The size and scale of a company, alongside its market valuation, contribute significantly to its financial leverage, further highlighting the complex interplay of factors affecting this critical aspect of corporate finance.

The results reveal the substantial impact of mergers on financial leverage and underscore the pivotal roles played by ESG, Firm Size, and Market Capitalization in shaping financial outcomes. This empirical evidence underscores the growing importance of ESG considerations in the corporate landscape and the necessity for comprehensive assessments that consider these factors when evaluating the consequences of mergers on a company's financial health.

Table 5a. Impact of Merger on Financial Leverage

	Estimate	**Std. Error**	**t-value**
Post	-0.402	0.253	-1.586
MKTCAP	-1.760	0.395	-4.449***
TQ	0.064	0.043	1.469
ROA	0.008	0.016	0.491
Rev	0.104	0.564	0.185
Size	3.910	0.834	4.689***
Capx	0.000	0.000	1.360
ESG	-0.047	0.014	-3.450***
DMerger: Post	0.469	0.275	1.706*
R Squared	0.34783		
Adjusted R Squared	0.26918		
F-Stat	11.7929[a]		

Table 5b offers a comprehensive view of our findings regarding the impact of mergers and acquisitions (M&A) on a company's Return on Assets (ROA). Our analysis aimed to discern whether M&A activities have a discernible effect on this critical performance metric, alongside exploring the roles of firm size, revenue, and market capitalisation in shaping a company's ROA.

M&A activities, as represented by the absence of significance in the "M&A" variable, do not substantially impact a company's ROA. This insight underscores that while M&A activities may be strategic for various reasons, they do not inherently translate into immediate improvements in a company's return on assets.

Firm size, revenue, and market capitalisation are potent determinants of a company's ROA. These variables underscore the idea that achieving a robust financial position relies more heavily on the intrinsic characteristics and performance of the company, as opposed to external M&A activities.

One intriguing observation is the significant negative impact of size on ROA within merged firms compared to control firms. This suggests that larger merged entities may face unique challenges in maintaining or enhancing their return on assets, potentially due to increased complexity or integration hurdles. Table 5b's insights emphasise the nuanced nature of M&A impact on financial performance, with firm-specific attributes like size, revenue, and market capitalisation playing pivotal roles in shaping a company's ROA. These findings encourage a more holistic approach to corporate strategy that recognises the intricate interplay between internal factors and external M&A activities when pursuing enhanced financial performance.

Table 5b. Impact of Pre-Merger ESG on Financial Performance

	Estimate	**Std. Error**	**t-value**
Post	-1.4300	1.1200	-1.2761
MKTCAP	8.3700	1.3600	6.1654***
FL	0.2330	0.3110	0.7492
Rev	4.1600	2.4100	1.7247*
Size	-16.5000	3.4700	-4.7585***
Capx	0.0000	0.0000	-0.4580
ESG	0.1010	0.0618	1.6418
DMerger:Post	-0.2520	1.2200	-0.2065
R Squared	0.23952		
Adjusted R Squared	0.15207		
F-Stat	7.87416[a]		

Tobin's Q, a crucial gauge of a company's financial performance, was a focal point of our investigation. Our rigorous analysis has yielded important insights, particularly concerning the influence of mergers and acquisitions (M&As) on Tobin's Q, while also considering the roles of firm size, revenue, and market capitalisation in shaping this metric.

Our findings underscore an intriguing trend: M&As do not appear to exert a significant impact on Tobin's Q. This aligns with our prior observations and suggests that, from a Tobin's Q perspective, M&A activities may not inherently alter a company's financial performance in the same manner as other factors. This study consistently highlights the significance of other

variables. Firm size, for instance, emerges as a potent determinant of Tobin's Q, exhibiting a significant negative impact. This finding suggests that larger firms may face unique challenges in generating market value relative to their tangible assets, potentially related to efficiency or market perception issues.

We observed that revenue and market capitalisation positively impact Tobin's Q. This signifies that companies with higher revenue and market capitalisation tend to possess greater market value relative to their assets, potentially indicating a stronger market position, brand recognition, or growth potential than their industry peers.

Tobin's Q analysis underscores the nuanced nature of M&A impact on financial performance, with size, revenue, and market capitalisation playing pivotal roles. It emphasises the importance of considering these internal factors alongside external M&A activities when evaluating a company's market value relative to its assets. This holistic perspective provides valuable insights for companies seeking to enhance their financial performance and market positioning.

Table 5c. Impact of Pre-Merger ESG on Value of the Firm

	Estimate	**Std. Error**	**t-value**
Post	0.1730	0.4190	0.4127
MKTCAP	6.1200	0.5070	12.0848***
FL	0.1840	0.1160	1.5785
Rev	3.1200	0.9010	3.4591***
Size	-7.9000	1.2900	-6.1005***
Capx	0.0000	0.0000	0.1882
ESG	0.0254	0.0231	1.1009
DMerger: Post	-0.4110	0.4560	-0.9009
R Squared	0.48709		
Adjusted R Squared	0.42811		
F-Stat	23.7419[a]		

Table 5d constitutes a pivotal segment of our study, focusing on the central theme of our research: the impact of mergers and acquisitions (M&A) on a company's Environmental, Social, and Governance (ESG) performance. Our examination delves into whether the M&A process contributes to improvements in ESG scores, an area of increasing importance in today's market landscape.

Our findings reveal a striking and thought-provoking observation: M&As negatively impact a company's ESG performance. This result suggests that, following the completion of M&A transactions, ESG scores tend to decrease rather than improve—a trend that raises important questions about the implications of such mergers for sustainable and responsible business practices. This finding underscores the need for organisations engaging in M&As to be mindful of potential ESG consequences and to address them proactively.

The study identifies other factors that influence ESG performance. Notably, financial leverage emerges as a negative contributor, indicating that higher financial leverage can hinder a company's ability to maintain or enhance its ESG standards post-merger. On the positive side, firm size and capital expenditure significantly impact ESG scores. This highlights the role of organisational scale and investment in sustainable practices, emphasising their potential to bolster a company's commitment to ESG principles.

Table 5d's insights offer a critical perspective on the ESG implications of M&A activity. The significant negative impact of M&As on ESG scores underscores the importance of integrating ESG considerations into merger strategies. By recognising the potential pitfalls and identifying influential factors such as financial leverage, firm size, and capital expenditure, companies can make more informed decisions and pursue M&A activities that align with their sustainability objectives, contributing positively to financial performance and broader societal well-being.

Table 5d. Impact of Merger on Post-Merger ESG

	Estimate	**Std. Error**	**t-value**
Post	9.1900	1.1000	8.3168***
MKTCAP	-0.0225	2.0800	-0.0108
FL	-1.1900	0.3460	-3.4497***
Rev	-2.9100	2.8300	-1.0274
Size	14.1000	4.3100	3.2808**
Capx	0.0000	0.0000	2.3176*
TQ	0.1820	0.2180	0.8334
ROA	0.1190	0.0811	1.4720
DMerger: Post	-4.0300	1.3600	-2.9577**
R Squared	0.63964		
Adjusted R Squared	0.59618		
F-Stat	39.2477[a]		

Implication

The lack of concern among M&A executives regarding ESG matters during the M&A process is apparent (Lemmen, J). Our study illuminates the fact that ESG factors have a significant influence on a company's performance, and this should be carefully examined during M&As.

2. Conclusion

The study investigates the relationship between ESG scores and the financial and operational success of Indian companies engaged in acquisitions. The results show the intricate relationship between M&A activities and ESG. The study reveals that ESG negatively impacts a company's financial leverage. This suggests that more robust ESG practices tend to have lower financial leverage. M&As are not affecting the financial performance, indicated by less impact of M&As

on Tobin's Q and ROA. Post M&As, ESG scores decline significantly, signalling a challenge in maintaining or enhancing. This comprehensive study delves into the intricate relationship between ESG scores and the financial and operational success of Indian companies engaged in acquisitions. The findings unveiled in our research cast a revealing spotlight on the dynamic interplay between M&A activities and ESG considerations.

One of the notable revelations from our study is the pronounced negative impact of ESG on a company's financial leverage. This intriguing finding suggests that firms with more vital ESG practices tend to operate with lower levels of financial leverage. This insight underscores the potential trade-offs companies face when prioritising sustainable and responsible business practices, as lower financial leverage can provide stability but may also limit growth opportunities.

The results indicate that M&A activities do not substantially influence a company's financial performance, as evidenced by the relatively modest impact of M&As on Tobin's Q and Return on Assets (ROA). This finding suggests that the immediate financial benefits of mergers in the Indian context may be limited, prompting a closer examination of the strategic motivations behind such transactions. One of the most significant takeaways from our study is the post-M & A decline in ESG scores. This decline is critical, highlighting companies' challenges in sustaining or enhancing their ESG practices following mergers. It underscores the need for proactive measures and strategies to ensure that the complexities and demands of the merger process do not overshadow ESG considerations.

This study research sheds light on the intricate relationships between M&As, ESG practices, and financial performance in the Indian corporate landscape. It emphasises the need for a balanced approach integrating ESG principles into strategic decision-making, recognising the potential consequences of financial leverage and the importance of post-merger ESG management. As the global business environment increasingly values sustainability and responsible corporate behaviour, our findings offer insights for Indian companies navigating the complex terrain of mergers and acquisitions.

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