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Do Firms ESG Commitments Affect Investment in-Efficiency in Global Context

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Abstract

This paper has examined the relationship between (ESG) environmental, social, & governance performance and firm's investment in-efficiency in the context of global economies. The empirical result of this paper has been estimated by using fixed-effect with robust standard error and GMM. These results are consistent with our study hypothesis as well prior literature and have suggested that ESG practices reduces firm's investment in-efficiency by mitigating issues which are information asymmetries and agency conflicts. Moreover, we have also determent the negative relationship between firm's ESG performance and firms' investment in-efficiency.

Keywords: Investment in-efficiency, ESG, Environment, Social, Governance, Agency Conflict.

INTRODUCTION

The companies that adopt sustainability tactics and reveal environment, social, and governance (ESG) info continues to change business models. Currently, a significant growth in the importance of environmental, social, and governance (ESG) practices have been witnessed within the realm of academics and business management. These practices have been extensively embraced by firms on a global scale, as they strive to fulfill the demands for sustainable development put forth by investors and society (Matos, 2020) ; Lin et al., 2023). They indicate that advantages and disadvantages of ESG practices have been explained with mix trend. The following studies, (Borghesi et al., 2014 ; Lin et al., 2023) have suggested that environment , social, and governance (ESG) policies incurs additional cost and utilizes resources that could otherwise be used towards enhancing the value of a corporation. In contrast, (Duque-Grisales & Aguilera-Caracuel, 2021) proposes a significant inverse association between the environmental, social, and governance (ESG) score and the economic performance of companies operating in Latin America. On the other hand, the phenomenon of adoption has a significant surge in recent years due to the recognition by investors of the significant importance of three non-financial variables, namely environmental, social, and governance (ESG) considerations to evaluate the perils and investment opportunities (Naeem et al., 2023). In addition, it is worth noting that the term "socially responsible investing" is too employed as a broad characterization of any asset approach that incorporates a communal component or objective (Dmuchowski et al., 2023). Moreover, (Matos, 2020 ; Lin et al., 2023) has argued that environment social, and governance (ESG) policies may be viewed as an asset for an organization's forthcoming. These such activities have the potential to provide the beneficial effects on the long-term firm value and investment performance of organization. In addition, orthodox stakeholder-oriented

administration (Friedman, 1970) only intents to build benefits of shareholders and financial performance of the firms. But, ESG related activities play the role to maximize the benefits of shareholders as well stakeholders. It has indicated that sustainable business strategies encourage all stockholder- oriented administration (Freeman & McVea, 2001), that includes all the investors, owners, clients, customers, societies, depositors, and additional associated sets. Therefore, they demand the companies to disclose all (ESG) relevant information which encourages the confidence level of all stakeholders (Ellili & Nobanee, 2022).

ESG practices importance is increasing day by day in the corporate sector, as per Bloomberg report, between the years 2016 and 2018, there was a notable increase in the value of ESG assets, which rose from $22.8 to $30.6 trillion. Likewise, companies in the U.S. having large size in-term of assets are publishing sustainability reports at the defined period and are also disclosing all economic performance of the companies. Further, it is very considerable aspect that reporting of Governance and Accountability Institute (G&A, 2021), has announced that 92% of S&P 500 and 70% of Russell firms have issued relevant information related to ESG risks. These risks can affect the investment efficiency and their (ESG) descriptions which is 20% in 2011. Furthermore, PwC Australian's 2023 report, ESG experts have found that investors (buyers) are making purchasing decisions based on their personal values and behavior. Currently a significant proportion, over 60% of entities, are deciding their investment conclusions grounded on sustainability and moral deliberations. Moreover, this trend is observed to be increasing at an annual rate of 10%.

Despite of all, the existing body of study has given little consideration and examined the effect of ESG practices on value creation or destruction. However, there is still a lack of clarity on the influence of these performs on investment in-efficiency at a business level. Therefore, this paper has been organized to address this gap by using the global sample. The act of making optimal investment decisions holds significant importance in the realm of business management, as these decisions have a dramatic influence on the upcoming profitability of the company (Goodman et al., 2014). There have been two divergent theories put up by researchers regarding the influence of environmental, social, and governance (ESG) performs on investment effectiveness. One perspective, known as the resource-consuming approach, draws upon the slack resources theory and absorptive capacity theory to assert that ESG practices impose costs on enterprises in terms of valuable resources and divert managerial attention, hence diminishing investment efficiency (Jensen, 2002). In contrast, the obstacle-mitigating perspective, which draws upon the voluntary disclosure and stakeholders , has suggested that ESG practices lessens data irregularities and agency cost, resultantly, improve the company's performance and overcome firm's investment in-efficiency (Fintelman-Rodrigues et al., 2020).

This study empirically has examined the relationship among ESG (environment, social and governance) and investment in-efficiency. This study sample has been drawn from two main databases: Thomson Reuter Eikon, which has provided ESG as well environment, social and governance data, and DataStream, which has helped to obtain firm's financial and accounting data. This paper has merged the DataStream financial data with Thomson Reuter Eikon ESG data. Finally, the sample of this paper has retained the 51,480 observations representing the 3,960 firms (see in Appendix – A). The empirical result of this paper has been estimated by using fixed-effect robust standard error and GMM. Our hypothesis result is consistent with prior literature (Jensen, 2002; Fintelman-Rodrigues et al., 2020) and have suggested that ESG

performs reduces company's investment in-efficacy through controlling obstacles which are data irregularities and agency clashes. We too presented the negative connection amid firm's ESG performance and organizations' investment in-effectiveness. The rest of the paper as follow, section-2 presents the literature review on potential variables. Section-3 discusses the empirical model and variable calculation, section-4 is compress of research methodology and data collection, section-5 presents the empirical results, lastly, conclusion of this paper.

LITERATURE REVIEW

Determent Factor of Investment in-Efficiency (Under-investment/Over-investment Problem)

The investment in the growth of a corporation is influenced by the presence of frictions in the capital market, which in turn impact the decision-making process about corporate investments (Biddle et al., 2009) ; (Quader & Taylor, 2018). Moreover, these studies have explained that the presence of adverse selection and moral hazard serves as the foundation for organizations' suboptimal investment decisions. These moral hazard issues give rise to post-investment over-investment, manifesting in outcomes such as the corporation expanding above its optimal size or making decisions aimed at empire building (Jensen, 1986) ; (Goodman et al., 2014) and (Y. Lin et al., 2023). Moreover, when firms adopt the same behavior ex-ante, resultantly, firms are unable to get lending because of high capital cost, that's why, at this situation firms have to face underinvestment problem (Biddle et al., 2009 ; Chen et al., 2017). In other words, adverse selection of investment opportunity might cause under-overinvestment problem.

Under/over-investment problem is basically the issue faced by firms who are doing their business in real markets where managers, shareholders and lenders are combatant for their benefits as firm's financing and investment policy can affect their expectations (Myers, 1977).; (Smith Jr & Watts, 1992) and (Biddle et al., 2009). Underinvestment problem had been addressed earlier and had been contributed by (Myers 1977) about this issue in literature. He concluded that debt plays disciplinary role to address the underinvestment problem. It is challenging task for firm's management to take decisions on firm's financing and investment policy because major objectives of comprehensive policy are to achieve firm's value at optimal level and also to avoid certain risks (agency problem and asymmetric information).

In seminal work, (Modigliani & Miller, 1958) have explained that firm's investment decisions have no correlation with any other factor which is picture of (independent) perfect (efficient) market. Another aspect of his study has explained that there is no agency problem among firm's shareholders, lenders and managers. Furthermore, Efficient Market Hypothesis (EMH) has pointed out that the two concrete factors which are determined and have defined the standard of efficient markets, which is difficult to achieve in reality i.e., shareholders receive timely and unbiased new information about company stocks (M. Jensen, 1978; Malkiel, 2003 and Malkiel, 2005). Further, literature illuminates attentively the characteristics of efficient markets with different logics. One of major features is that no investor can get more returns from above the range of expected rates of return. Under-overinvestment problem arises when benefit fight start among shareholders and lenders because manager takes decision on investment opportunity, who has selected one of the investment opportunities which lead to more returns (Arafat, Warokka, & Suryasaputra, 2014). Myers, (1984) concludes that if firm has growth opportunities, then managers can take decision on investment

in favor of shareholders. They may refuse the positive NPV projects as debt has partially occurred. At this saturation, underinvestment problem may be faced by firms. Manager always adopt such strategies and invest in such projects which generate more returns since their reward is associated with the profitability of organization (Arafat et al., 2014). Moreover, underinvestment and overinvestment problems are faced by firms when managers take decision on investment opportunity under reflection of financial policy of the firms. Literature has explained that optimal level of investment exists (Morgado & Pindado, 2003). He concludes that when firms adopt the level of investment which is less than optimal level then firms face underinvestment problems, and when firms invest in such opportunities which are more than optimal level it leads to notice the overinvestment problem so it all depends on investment priority. Such argument is supported by (D'Mello & Miranda, 2010) : (D'Mello & Miranda, 2010). Investment priority is dependent on manager's rewards (Inderst & Klein, 2007), and they also studied tension related to reward and new investment opportunity selection dilemma. Overinvestment can be defined as investment on real asset (D'Mello & Miranda, 2010) the investment beyond the asset maintenance expenditure (Richardson, 2006).

Further, he documented that company's free cash has constructive relation with overinvestment. Organization's free cash flow, investment opportunity and manager incentive are their relation that cause the overinvestment problem. Managers focus on expanding and investing the free cash flow in the extravagant projects which result in the overinvestment problem (McConnell & Servaes, 1995; Richardson, 2006b). Firm's free cash flow can play role to curtail the overinvestment problem, - the way adopted by firms to payout its obligation (debt services), as a result, firms pay more focus on its obligation which becomes the cause to overcome overinvestment problem as the firm's free cash flow has utilized its liabilities, and debt plays disciplinary role (D'Mello & Miranda, 2010; Inderst & Klein, 2007). Under plausible assumptions, leverage has supported overinvestment (De Meza & Webb, 1987 ; Richardson, 2006c). In literature, investment efficiency has inspected the relationship among different strategic variables such as competition, new investment opportunity, innovation, technological advantage to capture the new growth opportunities, maximization of reward scheme, dividend policy, free cash flow, accounting standard, management forecast ability, CSR, firm life cycle and most important ESG, (Richardson, 2006; Inderst & Klein, 2007; Amidu, 2007;Biddle et al., 2009; Ritter, 2012; Goodman et al., 2014;Ahmed et al., 2020; Y.-E. Lin et al., 2021).

Environment, Social and Governance (ESG)

ESG term has emerged in 2004, in the meeting of UNO and has been developed by 20 financial institutions. ESG can be explained as, the firms are more responsible towards social responsibility of society. The terms ESG and CSR have significant importance in the eye of corporates and as well investors (Allman, 2021). Literature has explained that ESG and CSR have only one difference that is ESG incorporates the governance issues explicitly and CSR only discusses some issues of governance (Graciosa, Gracia, & Juliana, 2020). Further, ESG terminology is more expansive rather than CSR. The significance of ESG practices has increased for investors in discerning matters pertaining to company ethics, corporate social responsibility, and corporate governance. The past scholars have put forth two contrasting views about the potential impact of environmental, social, and governance (ESG) practices at enterprises' investment conclusions. The name of these theories are commonly referred to as the resource-consuming theory and the obstacle-mitigating theory.

According to the resource-consuming view, it is posited that the adoption of environmental, social, and governance (ESG) practices leads to appropriation of resources from enterprises and diverts the attention of managers. Consequently, this is believed to result in a decrease in the efficiency of firm investments, as explained by the slack resources hypothesis (Preston & O'Bannon, 1997) and absorptive capacity theory (Cohen & Levinthal, 1990). Initially, it should be noted that the implementation of ecological, societal, and governance (ESG) policies might result in the allocation of capital and other limited resources by enterprises. Consequently, firms may be compelled to forego specific investment prospects in order to fulfill their (ESG) objectives. (Preston & O'Bannon, 1997). This phenomenon may lead to a decrease in investment efficiency, since the allocation of resources towards non-profitable projects could impede the identification and funding of potential investment opportunity (Matos, 2020b); (Y. Lin et al., 2023).

For instance, companies that prioritize philanthropic endeavors and environmental policies may opt to abstain from pursuing lucrative projects associated with nuclear energy or military technologies (Bhandari & Javakhadze, 2017). Additionally, the execution of ESG performs have the capability to divert the focus and introduce cognitive intricacy for company management. Administrators may face challenges to absorb diverse and many skills and knowledge associated with environmental, social, and governance (ESG) activities, as these competencies cannot be instantaneously acquired (Tang et al., 2012). As a result, the execution of time-intensive environmental, social, and governance (ESG) practices may lead to a diversion of managerial attention from their core management duties (Jensen, 2002), potentially resulting in a neglect of opportunities for profitable investment opportunities. Moreover, managers may encounter challenges in effectively allocating resources to environmental, social, and governance (ESG) activities while fulfilling their primary management objectives which are crucial for ensuring organizational success and long-term survival (Jensen, 2002;Y.-E. Lin et al., 2021). The aforementioned challenges pose a significant hindrance to the firm's ability to achieve profitability, hence diminishing the effectiveness of its investment endeavors.

In contrast to the perspective-theory that emphasizes the consumption of resources, the obstacle-mitigating view, as proposed by voluntary disclosure theory (Verrecchia, 2001) and stakeholder theory (Freeman, 1999; Freeman et al., 2010), suggests that environmental, social, and governance (ESG) considerations enhance enterprises' investment efficiency through the reduction of information asymmetries and agency conflicts. Eliwa et al., (2021) has demonstrated a positive correlation between organizations exhibiting robust environmental, social, and governance (ESG) performance and their propensity to reveal a greater amount of ESG-related information, which has supported the argument of (Verrecchia, 2001) 'voluntary disclosure hypothesis posits the inclusion of ESG disclosure.

***(H1):* The companies doing ESG activities tend to overcome investment in-efficiency.**

EMPIRICAL MODEL

The regression model of this study is that ESG (Environmental, Social, and Governance) has explained the investment inefficiency INV.IEF of globally non – financial listed firms

$$INV.IEF_{i,t} = \delta_0 + \delta_1 ESG_{i,t-1} + \delta_2 X^{INV.EF}{}_{i,t-1} + \mu_{i,t} \quad \text{Eq (1)}$$

In above models, where INV.IEF represent the dependent variable of investment in-efficiency which has estimated the residuals by using (Richardson's, 2006) investment

in-efficiency model, (see section-3.2) and ESG is independent variable and abbreviated as environment, social and governance. Further, firm's ESG activities, (-1) means that last year activity of the firm and i represent the i^{th} firm. Moreover, measure of ESG is indicator firm's ESG performance. Moreover, $X^{INV.EF}$ vector consist of control variables which has been abstracted from the literature. Definitions of all these variables are in Table 01

Estimating Independent Variable ESG (Environmental, Social and Governance)

The independent variable for this research is the lagged ESG score that has explained the company's performance related to ESG disclosures and this score also reflects how much information has been disclosed by firms with reference to ESG activities. This ESG score is released once a year and this score has been used to explain the firm's investment efficiency.

ESG data has significant importance and investors incorporate it when they are going for investment decision. Moreover, in 2016, 100 rating agencies have considered the firm's ESG activities. Due to its rapid growth and importance, large data providers Thomson Reuters and Margan Stanley Capital International (MSCI) have incorporated it in their databases (Amel-Zadeh & Serafeim, 2018; Jang, Kang, Lee, & Bae, 2020).

Richardson's Model for Estimating Dependent Variable INV-EF (Investment Efficiency)

This section has described the measurement procedure to construct investment in-efficiency followed by Richardson. He has defined total investment, I_{TOT}, as the sum of all expenditures on principal expenditure, acquisitions, and research & development, minus receipts from the sale of property, plant, and equipment.

$$I_{TOT\ (I,t)} = CAPEXt_{(I,t)} + Acquisitions_{(I,t)} + R\&D_{(I,t)} - SalePPE_{(I,t)} \text{ ---------- EQ (1)}$$

Moreover, according to Richardson total investment expenditure has been split into two categories: first category is investment expenditure on new projects (I_{New}) and second category required investment expenditure to maintain existing long-term assets (($_{Maint}$). Its representation for ($_{Maint}$ is amortization and depreciation. Total investment expenditure share's follows the estimation of amortization and depreciation that is essential to sustain equipment, plant and other functional resources.

Following phase is to define the I_{NEW} and also consist of two components. First, projected investment outflow in new positive NPV schemes, second, is I_{NEW}^{*} and irregular (or unpredicted) investment I_{NEW}. The division is displayed underneath in Figure 1: Moreover, depreciation and amortization is probably a rational evaluation to maintain investment (of the long term expenditure diversity) for companies whose depreciation plan closely corresponds with the asset's I_{NEW}. Though, this is not the circumstance for all companies. Similarly, depreciation and amortization are unlikely to an accurate estimate of R&D preservation expenditures. Diagnosing the constraints, the investment projected model established in above equation (1). Richardson's anomalous investment component may be either (-) or (+). Negative (positive) observations indicate inadequate (excessive) investment.

Total investment of new project = Investment to Maintain Existing Assets in Place + Expected

Investment on New Projects + Under/Over-investment in New Projects------- Eq(2)

Figure 1.

$$I_{TOTAL}(I, t) = I_{Main(I, t)} + I_{New(I, t)}$$

$$I_{TOTAL}(I, t) - I_{Main(I, t)} = I_{New(I,t)} + I_{New(I,t)}^{*} = VP_{(I, t)} + X_{(I,t)} + I_{New(I,t)}^{*}$$

Where V/P is the estimate of growth opportunities. This measure can be determined as a proportion of the book worth of the organization to the market worth and $I_{New(I,t)}^{*}$ under/over-investment of regressor.

METHODS OF ANALYSIS

The empirical models have been developed in section-3, in which (Environment, Social and Governance) ESG behaved as independent variable and investment inefficiency as dependent variables. This study has collected data of 3,960 non – financial listed firms of 61 countries and post analyzed event of financial crisis 2007 - 08. Primarily, data of the study has used panel data (Levin, Lin, & Chu, 2002), according to this study, assumption behind that data should be finite and collected on the basis of period. This study has implied the Housman test (Hausman, 1978) which has decided whether fixed effect or random effect should have be applied. This test has suggested fixed effect to be applied in order to evaluate the outcomes of empirical model equation - 1.

The concluded outcomes of each model may show the results biased, unpredictable and the availability of autocorrelation due to panel distribution (Dang, 2011). The model is most suitable for dynamic relatively to static board proposed by (Antoniou, Guney, & Paudyal, 2006). The estimation of the dynamic equation has been biased and inconsistent because of panel data. To improve the efficiency of OLS and fixed effect. This study has run the two techniques fixed effect robust standard error and two-step GMM general method of movement to improve the effectiveness of IV estimation. We can say that two-step GMM is most generalized scheme of IV method. Fixed effect robust standard error and GMM, assumption of no sequential relationship between the variables have been considered by both the estimating techniques. Two- stage GMM is more linear than the estimation of dynamic equation (Arellano & Bond, 1991) and solves the problems of heteroscedasticity, simultaneousness, normality and measurement error (Antoniou et al., 2006).

Sample and Data Collection

This study empirically has examined the relationship among ESG (Environment, Social and Governance) and investment in-efficiency. This study sample has been drawn from two main databases: Thomson Reuter Eikon provides ESG as well environment, social and governance data, and DataStream, helps to obtain firm's financial data mean all financial variables. In order to create sample, this study has been started by taking into account all companies from DataStream without missing financial data having observation of 91,091 representing the 7,007 firms for the years of 2009 to 2021. To establish the dependent variable (investment in-efficiency) residuals estimated by using Richardson and control variables, this study keeps observations with enough data accessible. Following prior research, this study excludes financial sector (Standard Industrial Classification (SIC) codes between 6000 and 6999) from model data having observations 5,473 depict the firm's 421 i.e. the assurance corporations, banks, joint funds, savings companies, and trust foundations, as the firms of this segment are subject to diverse monitoring, supervisory and furthermost accountancy practices. In next proceeding, this study matches the DataStream financial data with

Thomson Reuter Eikon ESG data. Finally, the sample of this paper has retained the 51,480 observations representing the 3,960 firms (see in Appendix – A). It shows the yearly data distribution on the basis of industry, sectoral, and regional level. Further, we also set standard that winsorised all the variables at 1st and 99th percentile as well their ratio to remove the outliers and getting normalize data. The definition

Table 1.
Variable Description

Dependent Variable	Abbreviation	Method of Determination	References
Investment in-Efficiency	INV.EF	EQ # 1 in Section-3	{Richardson's, 2006)
Independent Variable			{
Environmental, Social and Governance	ESG	Data from Thomson Reuters and MSCI	(Amel-Zadeh & Serafeim, 2018; Jang et al., 2020)
Control Variables	Abbreviation	Method of Determination	References
Leverage		Log of (Total Assets)	(Lin et al., 2021)
Size			
Age		Year of registration to date	(Lin et al., 2021)

Descriptive Statistics and Correlation

Table 2 portraits the summary figures of the dependent, independent & control variables. The mean (median) value residual (investment in-efficiency) is 0.062 and its standard deviation is 16.6% and the mean value of ESG combine is 43.36. These descriptive statistics are closely similar to prior literature which has revealed the dimensions of investment in-efficiency and ESG performance in global context. Moreover, the standard deviation of ESG for our global model is 19.96, which has disclosed the significant variance in the ESG scores across the global model non – financial registered companies.

Table 2.
Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Richardson's (Investment in -efficiency)	33,950	.062	.166	0	4.504
ESG	62,009	43.36	19.673	.402	94.956
Size	67,276	14.838	1.837	9.899	19.989
Leverage	67,187	.251	.199	0	.873
Age	81,304	2.713	.881	0	4.796

The above table 02 reports the descriptive statistics for overall model. Our sample covers the time span from 2009–2021. In below table, reports the correlation among the key variable of the empirical model.

Table 3 present the Pearson correlation matrix among key variables in our empirical study. Since we have perceived the ESG score as negatively connected with investment in-efficacy, this result proves to be consistent with our study hypothesis, the value of correlation coefficient is 0.045.

Table 3.

Matrix of Pearson correlations

Variables	(1)	(2)	(3)	(4)	(5)
(1) Richardson's Residuals	1.000				
(2) ESG	-0.045	1.000			
(3) Size	-0.267	0.221	1.000		
(4) Leverage	-0.077	0.032	0.231	1.000	
(5) Age	-0.059	0.188	0.140	-0.007	1.000

Investment in-efficiency (INV.IFF) also negatively linked with other descriptive variables i.e. magnitude, leverage and phase. Moreover, the correlation among investment in-efficiency and size is high which is -0.267. Furthermore, we have also examined none of the correlation coefficients between all the independent variable quantities are higher than 0.6, which has recommended the empirical analyses as less likely to be affected from some multicollinearity issue (Fleming et al., 2005).

Likewise, in table 4, we have presented the variance inflation factors (VIF) that are underneath in the threshold stages of 10 of all explanatory variables, which supports that our empirical model is unlikely to be multicollinearity problem (Jung et al., 2018). In below table 4 portraits the VIF value of all explanatory variables in our model.

Table 4.
Variance inflation factor

	VIF	1/VIF
Size	1.123	.89
ESG	1.08	.926
Leverage	1.058	.945
Age	1.049	.953
Mean VIF	1.078	.

EMPIRICAL RESULTS

Table 5 column (1) and (2) report results of ordinary least squares (OLS) regressions. These outcomes are based on our study empirical model Eq(1) in section-3, where the main explanatory variable quantity is environment, social and governance (ESG) score and dependent variable is investment in-efficiency. The coefficient for ESG is -0.000157 with a *t*-statistic of -7.548 and also ESG is highly significant with negative coefficient. These results suggest that one-point rise in ESG score is linked with a decrease in the investment in-efficiency with 0000157. This value is large when we compare the mean and standard deviation of investment in-efficiency. These results support hypothesis H1 and also regression coefficient and its sign is consistent with prior literature (Fintelman-Rodrigues et al., 2020). It has suggested that ESG performance overcome the obstacles which are agency conflicts and asymmetric information. As a result, it increases the efficiency of investment projects or reduces the investment in-efficiency, which support to attract sufficient capital from the investors. We can conclude that information disclosure is essential to overcome the investment in-efficiency.

Though the OLS model has not addressed the regression issues and fixed effects with standard error model may partly resolve the concerns of endogeneity and selection bias. Resultantly, these are still problems between relationship ESG practices and investment in-efficiency.

Table 5.
Results of OLS, Fixed Effect and GMM

Dependent Variable	**Ordinary Least Square**		**Fixed Effects**		**Generalized Method of Moment**	
Investment In-efficiency INV.IEF (Richardsons)	(1) OLS	(2) OLS	(3) FE	(4) FE	(5) GMM	(6) GMM
ESG	-.0003731***	.0001571** *	-.0001426	.000043	-.0003315***	-.000291**
	(-7.548)	(3.172)	(-1.588)	(0.401)	(-2.628)	(-2.109)
Size		-0.026***		-0.020***		0.003
		(-43.512)		(-2.945)		(0.608)
Leverage		-0.014***		-0.015		-0.023
		(-2.808)		(-0.602)		(-1.554)
Age		-0.006***		0.002		0.002
		(-4.449)		(0.271)		(0.235)
					0.033***	0.032***
					(3.963)	(3.924)
_cons	0.077***	0.463***	0.067***	0.364***	0.072***	0.030
	(31.957)	(52.444)	(16.688)	(4.021)	(12.285)	(0.489)
Observations	28449	28447	28449	28447	20913	20911
R^2 (R squared)	0.0020	0.0722	0.0020	0.0707	-	-
No of Groups	-	-	4,234	4,234	3,896	3,896
Number of Instruments	-	-	-	-	47	50
F-Stats/Wald Chi^2	56.97***	553.46***	2.52	4.24**	25.57***	24.31***

t-values are in parentheses *** p<.01, ** p<.05, * p<.1

For example, organizations have improved financial performance and have enough cash flows to grow their ESG performance. In this connection, the table-5 column (5) and (6) has reported the two step - GMM estimation results to resolve the credible endogeneity issue in the relationship between ESG score and firm's investment in-efficiency. Moreover, these results are also consistent with our study hypothesis (H1) and prior literature (Y. Lin et al., 2023).

CONCLUSION

This paper has examined the relation between ESG practices and corporate investment in-efficiency for Global-registered non-financial firms since 2009 to 2021. We have emphasized that companies with advanced ESG practices display overcome the investment in-efficiency, that is consistent with our study hypothesis (H1) and obstacle-mitigating view. Our main results of this paper are robust to alternative with estimating technique (two-step GMM) and address endogeneity problem. This paper has provided few important policy recommendations for administrators, supervisors, researchers, and academic implications. For administrators concern, it is significantly important to improve their ESG activities, resultantly, firms will disclose more related information which ultimately lessens data irregularities and agency conflicts. This action will lead to help the firms to overcome the investment in-efficiency problem.

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Appendix - A

Countries Name	Freq.	Percent	Cum.
Argentina	91	0.16	0.16
Australia	3029	5.32	5.48
Austria	299	0.52	6.00
Belgium	338	0.59	6.60
Brazil	624	1.10	7.69
Canada	2067	3.63	11.32
Chile	338	0.59	11.92
China	2327	4.09	16.00
Colombia	130	0.23	16.23
Cyprus	13	0.02	16.25
Czech Republic	26	0.05	16.30
Denmark	299	0.52	16.82
Egypt	52	0.09	16.91
Finland	234	0.41	17.32
France	1274	2.24	19.56
Germany	1534	2.69	22.26
Greece	260	0.46	22.71
Hong Kong	2301	4.04	26.75
Hungary	39	0.07	26.82
India	962	1.69	28.51
Indonesia	390	0.68	29.19
Ireland; Republic of	130	0.23	29.42
Israel	117	0.21	29.63
Italy	689	1.21	30.84
Japan	4901	8.61	39.44
Jordan	13	0.02	39.47

Kenya	13	0.02	39.49
Korea; Republic (S. Korea)	884	1.55	41.04
Kuwait	65	0.11	41.15
Luxembourg	26	0.05	41.20
Malaysia	572	1.00	42.20
Mexico	403	0.71	42.91
Morocco	39	0.07	42.98
Netherlands	403	0.71	43.69
New Zealand	429	0.75	44.44
Nigeria	13	0.02	44.46
Norway	481	0.84	45.31
Oman	104	0.18	45.49
Pakistan	52	0.09	45.58
Peru	208	0.37	45.95
Philippines	273	0.48	46.43
Poland	403	0.71	47.14
Portugal	169	0.30	47.43
Qatar	117	0.21	47.64
Romania	26	0.05	47.68
Russia	390	0.68	48.37
Saudi Arabia	364	0.64	49.01
Singapore	338	0.59	49.60
Slovenia	13	0.02	49.62
South Africa	832	1.46	51.08
Spain	559	0.98	52.07
Sweden	806	1.42	53.48
Switzerland	936	1.64	55.12
Taiwan	1586	2.78	57.91
Thailand	416	0.73	58.64
Turkey	390	0.68	59.32
Uganda	13	0.02	59.35
United Arab Emirates	182	0.32	59.67
United Kingdom	3250	5.71	65.37
United States of America	19708	34.60	99.98
Zimbabwe	13	0.02	100.00
Total	56953	100.00	

Regions

Region_Name	Freq.	Percent	Cum.
East Asia & Pacific	17446	30.63	30.63
Europe & Central Asia	12987	22.80	53.44
Latin America & Caribbean	1794	3.15	56.59
Middle East & North Africa	1053	1.85	58.43
North America	21775	38.23	96.67
South Asia	1014	1.78	98.45
Sub-Saharan Africa	884	1.55	100.00
Total	56953	100.00	

Sectors

Sector	Freq.	Percent	Cum.
Basic Materials	4797	8.42	8.42
Consumer Discretion	9334	16.39	24.81
Consumer Staples	3952	6.94	31.75
Energy	3159	5.55	37.30
Financials	5473	9.61	46.91
Health Care	6305	11.07	57.98
Industrials	10361	18.19	76.17
Real Estate	4628	8.13	84.30
Technology	5044	8.86	93.15
Telecommunications	1703	2.99	96.14
Utilities	2197	3.86	100.00
Total	56953	100.00	

Industries

Industries	Freq.	Percent	Cum.
Automobiles & Parts	1339	2.35	2.35
Banks	104	0.18	2.53
Basic Resources	3172	5.57	8.10
Chemicals	1625	2.85	10.96
Construction & Mats	2171	3.81	14.77
Consumer Prod & Svs	3107	5.46	20.22
Drug & Grocery Stores	1183	2.08	22.30
Energy	3159	5.55	27.85
Financial Services	3588	6.30	34.15
Food, Bev. and Tobacc	2769	4.86	39.01
Health Care	6305	11.07	50.08
Ind. Goods & Services	8190	14.38	64.46
Insurance	1781	3.13	67.59
Media	923	1.62	69.21
Real Estate	4628	8.13	77.33
Retailers	1963	3.45	80.78
Technology	5044	8.86	89.64
Telecommunications	1703	2.99	92.63
Travel & Leisure	2002	3.52	96.14
Utilities	2197	3.86	100.00
Total	56953	100.00	