Unlocking Trade Credit Opportunities and Working Capital Efficiency through ESG Disclosure

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Abstract

This paper explores the impact of firms' ESG performance on their trade credit financing and working capital efficiency, utilizing a sample of 586 Indian firms listed on the National Stock Exchange (NSE) from 2015 to 2022. The study offers robust evidence supporting the positive connection between superior ESG disclosure and trade credit, as well as the negative link between ESG disclosure and the cash conversion cycle. These findings underscore the role of ESG disclosure in increasing suppliers' willingness to extend trade credit and facilitating efficient working capital management practices. The result shows that improved ESG disclosure practices increase payable turnover days and reduce both inventory turnover and receivable turnover days, reflecting the enhanced operational efficiency and market power of the firm.

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Keywords: ESG disclosure, Trade credit, Working capital efficiency, Market power

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1. Introduction

Trade credit represents a financial tool extended by a supplier to its customers in the business domain and functions as a pivotal financing mechanism. Trade credit assumes a significant role in the management of corporate capital. According to Baker et al. (2022), trade credit is a vital aspect of profitability among Indian firms. Concurrently, external determinants of trade credit encompass economic circumstances, the financial landscape, and monetary policies, all of which influence firms' trade credit decisions (Benmelech et al., 2017; Casey and O'Toole, 2014). Vaidya (2011) underlines the importance of trade credit, equating it with bank credit within the Indian manufacturing sector. Management of working capital is essential for the success of firms, and trade credit is vital for meeting working capital requirements and increasing revenue. In the context of this study, working capital efficiency (WCE) denotes the efficiency of the cash conversion cycle, accounts payable turnover days, accounts receivable turnover days, and inventory turnover days. Factors within a firm that impact trade credit encompass firm-specific attributes, internal control mechanisms, and management traits (Kong et al., 2019).

The ESG activities of firms are evidenced through their conscientious involvement in environmental preservation in their manufacturing processes (environmental aspect), proactive engagement in fulfilling social responsibilities and nurturing constructive relationships with stakeholders (social aspect), and improving corporate governance involves strengthening corporate regulations, organizational structures, and various other dimensions (governance aspect). Over the past decade, the discussion around ESG activities within companies and their influence on a range of firm-level factors has garnered substantial attention from both regulators and industry experts worldwide. Prior literature posits that efficient ESG disclosure helps firms decrease their cost of equity (El Ghoul et al., 2011), reduces the cost of debt or bank loans (Eliwa et al., 2021) and improves credit ratings of the firms (Attig et al., 2013). Cheng et al. (2014) substantiated that firms exhibiting stronger CSR performance tend to have enhanced access to financial resources. However, scant attention has been given to the effect of ESG disclosure on the trade credit finance and WCE of firms. Long-term debt is considered more in debt financing literature, even though firms usually consider trade credit for their short-term financial needs.

Wu et al. (2014) argued that a good relationship with suppliers helps the buyer avail of trade credit, fostering mutual trust between buyer and supplier. Researchers assert that improved ESG activities enhance a firm's reputation and foster better relationships with stakeholders. This further leads to attaining market power over the suppliers and customers, which increases the working capital efficiency and availability of supplier finance. ESG data, combined with financial statements, potentially decreases agency costs (Bernanke and Gertler, 1989), mitigates information asymmetry (Cormier et al., 2011), and minimizes reputation risks (Diamond, 1989). This, in turn, can lower financing expenses. The growing focus on ESG initiatives communicates affirmative messages to suppliers and enhances trade credit opportunities (Luo et al., 2023). The existing literature suggests that improved ESG disclosure practices have been linked to enhanced supplier finance opportunities (Luo et al., 2023), increased accounts payable turnover (El Ghoul et al., 2017), and improved working capital efficiency (Barros et al., 2022).

However, in the Indian context, there are no such studies that analyze the effect of ESG disclosure on trade credit and WCE, specifically after the amendment of the Indian Companies Act 2013. Research conclusions on the effect of corporate ESG disclosure on trade credit opportunities are divergent, probably because different countries have different institutional backgrounds and social environments, and the evaluation of ESG is also different. The argument that a country-specific study can provide richer knowledge favours the effectiveness of corporate governance practices, particularly for a country like India, with a large economy and unique legal institutional mechanisms.

This is especially relevant after the Securities Exchange Board of India introduced new regulations on corporate governance in 2015.

As a contribution to fill the gap in the literature, this study examines the effect of ESG disclosure on the trade credit finance and WCE of the firm. The study reveals that superior ESG disclosure increases trade credit opportunities and WCE. Further, the study examined the non-linear effect of ESG disclosure on trade credit and WCE and observed a non-linear relationship. Moreover, this study explores how individual disclosure scores impact trade credit and WCE. The study's findings reveal that the positive relationship between ESG disclosure and credit and ESG disclosure and WCE is channelled through environmental and social components, where the governance disclosure was found to be insignificant. The result leads to a new theoretical perspective in ESG disclosure: Market Power theory demonstrates that ESG disclosure practices enhance firms' market power over both their suppliers and customers.

The remainder of the paper is structured as follows: Section 2 reviews previous literature and formulates the research hypotheses. Section 3 outlines the sample selection procedure and research methodology. Section 4 explains the empirical findings, section 5 discusses the findings, and lastly, Section 6 offers the paper's conclusion.

2. Literature Review and Hypothesis

2.1 ESG disclosure and Trade credit

Existing literature argues that a variety of factors, including mutual trust, information asymmetry, stakeholder engagement, and transaction cost, may explain the connection between ESG disclosure and trade credit (El Ghoul et al., 2017; Shou et al., 2020; Zhang et al., 2020). A company's ESG performance has the potential to augment its access to trade credit. To begin with, commendable ESG performance facilitates improved communication between enterprises and pertinent external stakeholders, thereby diminishing information disparities and cultivating greater trust in the company among stakeholders (Wu et al., 2014).

Stakeholder theory posits that the success of an organization depends on whether the organization can maintain mutual respect and trust with its stakeholders, including employees, investors, suppliers, and the government (Freeman, 1994). Environmental and social activities help the firm improve its reputation and build better relationships with suppliers and other stakeholders (Gardberg and Fombrun, 2006). Trade credit is directly related to the suppliers' trust and attitude towards their buyers. Suppliers analyze the buyer firm's financial and non-financial disclosure to make a suitable decision regarding trade arrangements, i.e., trade credit and credit period. Literature evidence suggests that improved CSR involvement could generate positive moral capital in terms of credibility and trust among stakeholders and reduce operational risks by protecting against adverse events. Cooperation and mutual trust with stakeholders are the essential elements of stakeholder theory because they help to mitigate transaction costs and production costs. Later this superior engagement of stakeholders will lead to greater revenue and profits (Choi and Wang, 2009). Cuñat (2007) claims that improved relationships between customers and suppliers raise the probability of providing trade credit. Bad debt losses are one factor that suppliers consider in deciding credit terms. Reduced risk due to better ESG can better trade credit terms. According to Wu et al. (2014), trust plays a significant role in the trade credit process: firms operating in highly trusted regions tend to receive more credit from suppliers and extend more credit to consumers.

Signalling theory is relevant when information transmission is constrained by one party having unobservable characteristics and some information asymmetry (Spence, 1974). Non-financial disclosure plays a signal to the supplier firms and other stakeholders. Yang et al. (2019) studied the

relationship between corporate philanthropy and access to trade credit for all private firms listed in China's Shanghai and Shenzhen stock exchanges and found a positive relationship. They considered corporate philanthropy a necessary form of CSR and stated that the firms donating more could avail of more trade credit from their suppliers. Similarly, Zhang et al. (2014) observed that the CSR activities of firms in the form of charitable donations positively impact the supplier's decision on the trade credit, even though the impact is significant only in non-state-owned firms. Luo et al. (2023) recently examined how ESG performance affects trade credit financing in China. Stakeholders examine CSR disclosure primarily to gauge the company's capability to address social and environmental issues. Improving the signalling process can reduce information asymmetry.

Drawing upon signalling theory, prior studies posit that ESG/CSR disclosure has a significant role in availing or offering trade credit (Cheung and Pok, 2019; Shou et al., 2020). A recent study conducted using a U.S. sample by Zhang et al. (2020) analyzed the association between CSR performance and a firm's access to trade credit and found a significant positive relationship. Their result shows that better engagement in CSR activities signals the suppliers' creditworthiness, and socially responsible firms extend the trade credit. Along similar lines, Saeed and Zureigat (2020) observed a positive relationship in US manufacturing firms due to higher trade credit from suppliers and higher trade credit to their customers. Consistent with the discussed evidence, Xu et al. (2020) argued that the positive relationship occurs mainly due to the reduction of information asymmetry, increasing creditworthiness, and the increasing demand for financing. The empirical results show that superior ESG performance enhances its capacity to secure trade credit financing. This relationship comes through reducing information asymmetry, mitigating corporate risk, and enhancing corporate efficiency. In contrast, Shou et al. (2020) found a curvilinear relationship between CSR performance and a firm's access to trade credit. Drawing upon signalling theory, the study analyzed the small and medium-sized manufacturing enterprises (SMEs) in China and observed a non-linear relationship between CSR score and trade credit. The study claims that increased investment in non-financial activities signals to suppliers that buyer firms possess adequate cash flows, reducing the necessity for trade credit. Similarly, (Nguyen and Nguyen, 2022) also identified a non-linear relationship with the trade credit provision.

However, there are no such studies that examined the relationship in the Indian context, even though being a large economy, unique legal institutional mechanisms, and new regulations on corporate governance in 2013-14 justify an India-specific study. Based on the above literature review, this study explores the ESG-Trade credit relationship among Indian-listed companies with the following hypothesis:

H1: There exists a significant non-linear relationship between ESG disclosure and Trade credit.

The individual components of ESG disclosure reflect distinct parts of the ESG activities, and each component may provide suppliers and customers with distinct information. Each dimension acts as a channel to the aggregate disclosure score. So, in addition to the aggregate effect of ESG disclosure on trade credit, this study proposes the following hypothesis:

H2: A significant non-linear relationship exists between environmental disclosure and trade credit.
H3: A significant non-linear relationship exists between social disclosure and trade credit.
H4: A significant non-linear relationship exists between governance disclosure and trade credit.

2.2 ESG disclosure and Working capital efficiency
Efficient management of working capital serves as a pivotal driver in enhancing a firm's value and operational efficiency. The aggressive management of firms' working capital components (inventory, trade payables, advance payments, and trade receivables) enables multiple streams of cash

flow (Boisjoly et al., 2020). By meticulously balancing these three components, businesses optimize their cash conversion cycle, ensuring smoother operations and increased liquidity. Concurrently, the cash conversion cycle provides a thorough assessment of working capital management (Deloof, 2003). When businesses manage their working capital better, they use their resources wisely, spend less on financing, and make more profit. Handling working capital smartly also helps companies increase return on equity, be more stable financially, react quickly to market changes, and be more competitive, giving stakeholders more confidence in them. Efficient working capital management makes a company more valuable through operational efficiency and helps it stay flexible and successful in a fast-changing business world (Aktas et al., 2015).

Barros et al. (2022) argued that the firms working capital requirements are closely connected to the level of risk, and higher-risk firms need more working capital requirements. Moreover, employing better ESG practices serves as a way to handle risk. This allows companies to demonstrate to the market that they are perceived as less risky, enabling them to run their operations with reduced capital requirements while maintaining profitability (Barros et al., 2022). Based on the arguments, the study identified an inverse relationship between ESG disclosure and firms' cash conversion cycle in US publicly listed firms. In addition to the aggregate ESG score, the study examined the relationship between individual pillars of ESG and working capital requirements. The findings suggest that the inverse relationship between ESG and the cash conversion cycle is linked to social and environmental scores.

However, there is limited evidence regarding the connection between ESG disclosure and working capital efficiency. To the best of our knowledge, no study has explored how ESG disclosure influences each aspect of the cash conversion cycle to establish the relationship between ESG and WCE. This study aims to bridge this gap in the Indian context. Based on the above literature review, we hypothesize the relationship between both the overall and individual components of ESG disclosure and WCE measures as:

H5: There exists a significant non-linear relationship between ESG disclosure and WCE
H6: A significant non-linear relationship exists between environmental disclosure and WCE.
H7: A significant non-linear relationship exists between social disclosure and WCE.
H8: A significant non-linear relationship exists between governance disclosure and WCE.

3. Data and Methodology

3.1 Sample selection
This study uses a sample of 586 Indian firms listed on the NSE from 2015–2022. The sample includes firms from multiple industries. We set the panel data period as 2015 onwards, considering the new regulatory changes during 2013 and 2014, which may have created a structural break in the data. Further, we exclude financial firms from the analysis. To mitigate the effect of outliers, all variables except disclosure variables were winsorized at their 1st and 99th percentiles.

3.2 Dependent variable
This study used two sets of dependent variables. First, trade credit finance is measured using the formula accounts payable scaled by total sales (Li et al., 2023). Second, to identify the WCE following (Boisjoly et al., 2020), we include the cash conversion cycle and three components of the cash conversion cycle ie, accounts payable turnover days, accounts receivable turnover days, and inventory turnover days as dependent variables. These are measured using the formulas below:
Cash Conversion Cycle (CCC) = Accounts receivable turnover days + Inventory turnover days - Accounts payable turnover days
Accounts Payable Turnover Days (APD)= (Average accounts payable / Purchases)*365

Accounts Receivable Turnover Days (ARD) = (Average accounts receivable / Sales)*365
Inventory Turnover Days (ITD)= (Average inventory / COGS)*365

To gain a deeper understanding of the cash conversion cycle, the study examined three components: (1) how quickly a company pays its suppliers (accounts payable turnover days), (2) how fast it collects money from customers (accounts receivable turnover days), and (3) how efficiently it manages its inventory (inventory turnover days). This helps figure out if the different components of the cash conversion cycle have different relationships with the company's ESG disclosure. This can help managers to optimize their working capital efficiency.

3.3 Independent variable

The independent variable, ESG disclosure score, is taken from the Bloomberg database in numerical figures, which includes the extent of data that a company reports publicly related to its ESG activities (the degree of transparency in disclosing ESG data). Ranging from 0 to 100, lower scores denote weaker ESG disclosure, while higher scores signify stronger disclosure. Obtained from CSR reports, annual reports, and websites, the Bloomberg score encompasses 120 ESG indicators, covering areas like pollution, diversity, carbon emissions, discrimination, human rights, climate impact, political contributions, and renewable energy. Additionally, Bloomberg furnishes individual ESG scores, such as environmental, social, and governance, alongside the combined disclosure score.

3.4 Control variables

Consistent with prior literature, this study uses several control variables in the regression model to take other influences on the trade credit and WCE (Barros et al., 2022; Cheung and Pok, 2019) such as firm size (SIZE) which represents the natural logarithm of total assets, leverage (LEV) which is measured as the ratio of total debt to total equity, higher leverage indicates more debt finance in the firm's capital structure. Liquidity (LIQY), which is measured as current assets divided by current liabilities, and tangibility (TANGIB) capture the ability of firms to pool cash.

3.5 Model and estimation method

Equation 1 is the regression equation that examines the effect of ESG disclosure on trade credit finance and WCE. This ordinary least square (OLS) regression model tests hypotheses 1 and 5

$$Y_{i,t} = \beta_0 + \beta_1\,ESG_{i,t} + \beta_2\,ESG^2_{\,i,t} + \beta_3\,Y_{i,t-1} + \beta_4\,SIZE_{\,i,t} + \beta_5\,LEV_{\,i,t} + \beta_6\,LIQY_{\,i,t} + \beta_7\,TANGIB_{\,i,t} + \delta_t + \varepsilon_{i,t}\ldots\ldots\ldots\ldots\ldots(1)$$

We further examine the relationship of components of ESG disclosure—i.e., environmental disclosure, social disclosure, and governance disclosure on trade credit finance and WCE using equation 2.

$$Y_{i,t} = \beta_0 + \beta_1\,(ENV/SOC/GOV)_{i,t} + \beta_2\,(ENV/SOC/GOV)^2_{\,i,t} + \beta_3\,Y_{\,i,t-1} + \beta_4\,SIZE_{\,i,t} + \beta_5\,LEV_{\,i,t} + \beta_6\,LIQY_{\,i,t} + \beta_7\,TANGIB_{\,i,t} + \delta_t + \varepsilon_{i,t}\ldots\ldots\ldots\ldots\ldots(2)$$

Where Y represents the proxies for Trade credit finance and WCE, in all the models, standard errors are clustered at the firm level, and i and t refer to firm and year, respectively. To examine the non-linear effect of the disclosure scores, we include the square terms of the aggregate and components of the ESG disclosure score. The control variables are firm size (SIZE), leverage (LEV), liquidity (LIQY), and tangibility (TANGIB). δ_t represents the time dummy and $\varepsilon_{i,t}$ denotes the error term.

When exploring the relationship between ESG and trade credit and ESG and WCE, it is important to tackle various types of endogeneity. To accomplish this, we utilize year-fixed effects (δ_t) to control for potential time trends in all the models. To control for the influence of past values on the current value, the study included the lagged value of the dependent variables. In addition to the OLS regression method, we employ a dynamic panel data estimation method, the generalized method of

moments (GMM), developed by Arellano and Bond (1991) and Blundell and Bond (1998). We use a two-step system GMM to obtain unbiased results since two-step estimation gives consistent estimation when the panel data are short and dynamic. The sample consists of 586 firms over eight years, which is considered a short dynamic panel because the number of years is shorter than the firm dimensions. The two-step system GMM estimator provides robust estimates for short dynamic panels in the presence of endogeneity problems and fixed effects and also addresses weak instrument problems. GMM estimator solves endogeneity issues by creating internal instruments and lagged endogenous variables as explanatory variables. We ensured that the precautions suggested by Roodman (2009) for using the GMM tool were duly followed. Roodman (2009) showed that in the presence of fixed effect and other forms of endogeneity problems, the OLS estimate is biased upward, while the fixed effect models provide estimates that are biased downward. In such a case, the two-step system GMM estimator provides robust estimates. Additionally, the study uses the Arellano-Bond test to examine the serial correlation and confirm that the GMM technique adequately addresses the concerns with endogeneity from simultaneity and omitted variable bias.

4. Empirical Results

4.1 Baseline results

Table 1 presents the summary statistics of the variables used for the empirical analysis. Mean value of ESG is 33.298, the standard deviation is 9.319, the maximum value is 77.608 and the minimum value is 4.768. This suggests a significant divergence in ESG across various companies, with a favourable overall average ESG. The table shows that ESG has a low standard deviation (SD) in the data. However, there is heterogeneity in its components. While the ENV component has a very high SD, the GOV has a very low SD. This provides prima facie support for analyzing the separate impact of these components on trade credit and WCE. The WCE proxies (CCC, APD, ARD, and ITD) have a very high SD, and the trade credit proxy (APSA) has a low SD. Because the sampling is not random, a high SD and heterogeneity signifies the importance of a larger sample for robust estimates. The disparity between the minimum and maximum values of the WCE signifies a substantial variation in the extent of working capital requirements among distinct companies.

Table 1 Descriptive Statistics

Variables	N	Mean	SD	Median	P25	P75	Min	Max
APSA	4452	0.175	0.197	0.128	0.075	0.202	0.005	1.455
CCC	3851	103.505	169.397	73.356	17.053	148.601	-96.855	341.412
APD	3939	126.382	119.339	95.172	57.619	197.594	6.263	315.049
ARD	4475	74.295	81.681	57.092	29.924	87.734	1.871	169.411
ITD	3851	208.358	162.486	115.709	71.573	210.181	1.817	365.374
ESG	4136	33.298	9.319	31.114	28.206	37.964	4.768	77.608
ENV	4136	9.968	15.019	2.416	1.423	16.128	0.000	76.080
SOC	4136	16.082	10.668	14.087	7.830	22.34	0.000	69.891
GOV	4136	76.043	8.305	78.597	75.527	78.597	12.131	98.615
LEV	4316	0.711	0.681	0.553	0.244	0.689	0.000	0.863
LIQY	4603	1.708	1.064	1.394	1.012	2.099	0.444	4.641
SIZE	4605	9.981	2.127	10.139	8.859	11.328	1.253	16.397
TANGIB	4597	0.961	0.070	0.996	0.962	1.000	0.745	1.000

Table 2 shows the pairwise (raw) correlation between the dependent variables and the main independent variables included in the empirical analysis. The low pairwise correlation coefficients alleviate concerns about potential multi-collinearity issues in the estimation. The data shows that the trade credit proxy and key independent variables (ESG, ENV, SOC, and GOV) are positively correlated. The table also shows that CCC is negatively correlated with the disclosure scores.

Table 2 Correlation Analysis

Variables	APSA	CCC	APD	ARD	ITD	ESG	ENV	SOC	GOV
APSA	1.000								
CCC	-0.030	1.000							
	(0.065)								
APD	0.256	-0.197	1.000						
	(0.000)	(0.000)							
ARD	0.578	0.297	0.107	1.000					
	(0.000)	(0.000)	(0.000)						
ITD	0.245	0.492	0.321	0.173	1.000				
	(0.000)	(0.000)	(0.000)	(0.000)					
ESG	0.075	-0.091	0.003	-0.156	-0.017	1.000			
	(0.000)	(0.000)	(0.074)	(0.000)	(0.014)				
ENV	0.058	-0.071	0.023	-0.121	-0.027	0.901	1.000		
	(0.000)	(0.000)	(0.068)	(0.000)	(0.106)	(0.000)			
SOC	0.084	-0.084	0.026	-0.154	-0.002	0.884	0.738	1.000	
	(0.000)	(0.000)	(0.104)	(0.000)	(0.002)	(0.000)	(0.000)		
GOV	0.053	-0.083	0.023	-0.127	-0.012	0.621	0.326	0.394	1.000
	(0.091)	(0.097)	(0.171)	(0.080)	(0.498)	(0.000)	(0.000)	(0.000)	

Note: Standard errors are in parentheses.

Table 3 reports the estimation results of the impact of ESG disclosure on trade credit financing (column 1) and WCE (columns 2-5) using the GMM estimation method. The results show that in the first column, the variable ESG is positive and significant, with a coefficient of 0.011 at a 1 % level of significance. This implies that Indian firms with superior aggregate ESG disclosure are associated with higher trade credit finance. This finding is in line with the findings of prior studies (Dong and Liu, 2022; Luo et al., 2023). Column 2 shows the empirical results of the relationship between ESG and firms' CCC. The GMM estimation shows that the ESG coefficient is negative and significant at a 5% significance level. This result supports the argument that firms' ESG disclosure reduces their working capital requirements (Barros et al., 2022). To be specific, active involvement in ESG initiatives lowered Indian firms' CCC, enhanced their operational efficiency and consequently improved their overall working capital efficiency.

Columns 3,4 and 5 show the impact of ESG on APD, ARD, and ITD, respectively. These results give more clarity regarding the three components of CCC. The coefficient of ESG in column 3 is positive and significant at a 5% significance level. This suggests that increased ESG disclosure is associated with higher accounts payable turnover days. More specifically, robust ESG practices enable firms to extend the duration for repaying trade payables, yielding additional benefits. The variable of ESG is negative and significant at 10 % in column 4 and column 5 with a coefficient of -1.354 and 15.242, respectively. These results indicate a company's dedication to ESG activities and a decrease in both the time it takes to collect on accounts receivable and the time inventory is held before being sold or used. More precisely, it implies that companies with stronger commitments to ESG practices tend to manage their accounts receivable and inventory more efficiently, resulting in shorter turnover periods for these aspects of their business operations. The overall findings suggest that disclosing more about their environmental, social, and governance practices helps companies secure better financial support from suppliers and improves working capital efficiency. In addition to the main findings, the empirical analysis identified some non-linearity in the relationship in all the models, which supports our hypothesis. However, the economic significance is very low compared to the linear coefficient.

Table 3 *ESG Disclosure, Trade Credit and WCE*

	APSA	CCC	APD	ARD	ITD
	(1)	(2)	(3)	(4)	(5)
ESG	0.011***	-11.719**	6.215*	-1.354*	-15.242*
	(0.003)	(4.942)	(3.211)	(0.787)	(9.192)
ESG^2	-0.000***	0.122**	-0.005*	0.015*	0.150*
	(0.000)	(0.048)	(0.063)	(0.008)	(0.087)
LEV	0.001***	0.050	0.056**	0.010*	-0.014
	(0.000)	(0.063)	(0.058)	(0.009)	(0.129)
LIQY	-0.010***	15.557***	-3.112	0.965*	4.168**
	(0.003)	(5.772)	(2.225)	(0.542)	(6.806)
SIZE	-0.015	-1.555*	9.659**	0.803**	25.482
	(0.017)	(14.304)	(10.231)	(2.469)	(20.379)
TANGIB	0.008*	5.305**	-12.002	-0.654	-16.952
	(0.017)	(12.045)	(9.889)	(2.449)	(19.698)
L.Dep variable	0.451***	0.707***	0.774***	0.843***	0.809**
	(0.144)	(0.161)	(0.223)	(0.080)	(0.343)
Constant	5.353*	19.661*	-38.523	34.044**	39.778
	(3.247)	(21.102)	(13.164)	(15.956)	(17.326)
Observations	3237	2,755	2816	3270	2,755
Time dummies	Yes	Yes	Yes	Yes	Yes
p value of AR(3) statistic	0.781	0.136	0.774	0.391	0.629
p value of Hansen statistic	0.311	0.196	0.426	0.281	0.142
Number of Instruments	18	41	41	58	17

Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

4.2 Individual ESG Components, Trade Credit and WCE

Table 4 - 6 exhibits the empirical results of the effect of individual ESG components (i.e., ENV, SOC, and GOV) on trade credit and WCE using the GMM estimation method. The result of Table 5 shows that the coefficient of ENV is negative and statistically significant with CCC at a 10% level of significance and positive and statistically significant with APSA and APD at a 5% level of significance each. Unlike the aggregate ESG disclosure, the analysis identified an insignificant relationship between ENV and ARD (column 4) and ENV and ITD (column 5). The findings from Table 4 indicate that improvements in environmental (ENV) performance lead to higher trade credit finance and a reduction in a firm's cash conversion cycle, as well as an increase in payable turnover days. This increase in payable turnover days and reduction in the cash conversion cycle signifies an improvement in working capital efficiency. Consequently, as a company's environmental performance improves, it manages its cash flow cycle more efficiently, takes longer to pay its debts, optimizes its working capital, and gains more opportunities for trade credit finance.

Table 5 shows the effect of social disclosure (SOC) on firms' trade credit finance and WCE using the GMM estimation technique. Similar to the ESG and ENV, the coefficient of SOC is negative and statistically significant with CCC and positive and statistically significant with APSA and APD. Unlike the environmental disclosure, the analysis identified a significant relationship between SOC and ARD (column 4). The relationship between SOC and ITD was found to be insignificant. The findings of Table 5 indicate that improvements in social disclosure led to higher trade credit finance and a reduction in a firm's cash conversion cycle and receivable turnover days, as well as an increase

in payable turnover days. This increase in payable turnover days and reduction in the cash conversion cycle and receivable turnover days signifies an improvement in working capital efficiency. Moreover, a firm's engagement in social activities enhances its ability to efficiently manage its cash flow cycle, extend its debt repayment period, accelerate the conversion of cash from receivables, optimize its working capital, and create more opportunities for trade credit finance. In Table 4 and Table 5, we discovered a non-linear relationship characterized by very low coefficients. Both the environmental (ENV) and social (SOC) scores exhibit a non-linear connection concerning the proxies for trade credit and WCE. Lastly, the signs of the control variables coefficients in our study are largely consistent with the prior studies (Barros et al., 2022; Cheung and Pok, 2019; Luo et al., 2023; Zhang et al., 2014)

Table 6 shows how governance disclosure (GOV) affects the firm's trade credit and WCE using the GMM estimation method. The findings indicate that unlike the combined ESG score and its components (ENV and SOC), governance disclosure does not significantly influence a firm's ability to obtain trade credit finance and enhance its effectiveness in managing working capital. The overall outcome suggests that the primary channel through which ESG influences trade credit and WCE is predominantly linked to the environmental and social dimensions. This finding is important from a policy action perspective, particularly given the considerably high standard deviation (SD) of environmental scores (ENV) and the comparatively lower SD of governance scores (GOV).

Table 4 *Environmental Disclosure, Trade Credit and WCE*					
	(1)	(2)	(3)	(4)	(5)
	APSA	CCC	APD	ARD	ITD
ENV	0.003**	-1.243*	2.516**	0.289	-0.144
	(0.001)	(0.691)	(1.252)	(0.570)	(3.133)
ENV^2	-0.000***	0.023**	-0.043**	-0.011	-0.020
	(0.000)	(0.011)	(0.020)	(0.008)	(0.061)
LEV	0.002***	0.080	0.031*	-0.009**	0.595*
	(0.000)	(0.051)	(0.062)	(0.026)	(0.328)
LIQY	-0.013***	15.749***	-5.088**	-0.971	17.179*
	(0.005)	(5.444)	(2.331)	(1.214)	(9.865)
SIZE	-0.027	-22.837*	23.924*	6.384*	14.626
	(0.018)	(12.696)	(10.984)	(5.299)	(3.297)
TANGIB	0.023	21.957*	-13.760	-0.456	5.022**
	(0.019)	(12.559)	(9.814)	(5.104)	(6.064)
L.Dep variable	0.194	0.671***	0.887***	0.727***	-0.057
	(0.167)	(0.117)	(0.141)	(0.226)	(0.612)
Constant	-1.858	13.490	10.421	-24.112	-21.300
	(2.693)	(22.037)	(16.106)	(14.222)	(12.206)
Observations	3237	2,755	2816	3270	2,755
Time dummies	Yes	Yes	Yes	Yes	Yes
p value of AR(3) statistic	0.919	0.110	0.898	0.354	0.963
p value of Hansen statistic	0.390	0.234	0.406	0.157	0.496
Number of Instruments	18	50	46	27	18

*Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 5 *Social Disclosure, Trade Credit and WCE*

	(1) APSA	(2) CCC	(3) APD	(4) ARD	(5) ITD
SOC	0.006*	-10.289***	1.221**	-1.038*	-2.050
	(0.003)	(3.589)	(5.112)	(0.551)	(4.031)
SOC ^{2}	-0.002	0.141***	-0.023	0.017**	0.033
	(0.000)	(0.053)	(0.021)	(0.008)	(0.052)
LEV	0.002*	-0.011	0.174**	0.029*	0.147
	(0.000)	(0.086)	(0.156)	(0.017)	(0.203)
LIQY	-0.005	11.675**	-4.291	2.415**	11.381*
	(0.004)	(10.659)	(3.225)	(0.968)	(9.422)
SIZE	-0.003**	-2.282	1.714**	-1.029	17.371**
	(0.026)	(7.954)	(3.887)	(4.130)	(7.646)
TANGIB	-0.006*	13.801**	-6.011*	1.183**	-12.181
	(0.023)	(9.315)	(4.114)	(3.578)	(5.990)
L.Dep variable	-0.406	0.632**	0.301	0.029*	0.778***
	(0.551)	(0.265)	(0.402)	(0.017)	(0.294)
Constant	0.228	-3.729	-0.787	22.317	-20.112
	(0.273)	(31.741)	(41.051)	(17.133)	(15.021)
Observations	3237	2,755	2816	3270	2,755
Time dummies	Yes	Yes	Yes	Yes	Yes
p value of AR(3) statistic	0.440	0.162	0.911	0.347	0.634
p value of Hansen statistic	0.166	0.291	0.188	0.190	0.340
Number of Instruments	21	17	20	24	23

*Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1*

Table 6 *Governance Disclosure, Trade Credit and WCE*

	(1) APSA	(2) CCC	(3) APD	(4) ARD	(5) ITD
GOV	-0.003	-21.625	4.720	-5.513	-10.898
	(0.031)	(21.418)	(13.792)	(3.672)	(11.117)
GOV ^{2}	-0.001	0.173	-0.017	0.034	0.045
	(0.002)	(0.146)	(0.086)	(0.024)	(0.072)
LEV	0.003**	0.165*	0.017**	0.023*	0.273**
	(0.000)	(0.120)	(0.048)	(0.013)	(0.138)
LIQY	-0.004	8.936**	-2.918*	1.835**	9.119**
	(0.003)	(8.077)	(3.073)	(0.870)	(8.290)
SIZE	0.006*	13.577***	11.249	0.819*	14.130
	(0.013)	(10.063)	(10.105)	(3.224)	(15.955)
TANGIB	-0.003**	-15.417***	-13.421*	-0.440	-11.716**
	(0.012)	(8.695)	(17.491)	(3.170)	(15.697)
L.Dep variable	0.873***	0.786***	0.905***	0.794***	0.538**
	(0.167)	(0.136)	(0.116)	(0.147)	(0.259)
Constant	0.107	26.639	-33.342	38.037*	32.905
	(1.112)	(11.059)	(17.896)	(11.567)	(12.375)
Observations	3237	2,755	2816	3270	2,755

Time dummies	Yes	Yes	Yes	Yes	Yes
p value of AR(2) statistic	0.853	0.137	0.970	0.472	0.634
p value of Hansen statistic	0.230	0.164	0.384	0.254	0.340
Number of Instruments	19	24	46	28	26

Note: Standard errors are in parentheses. *** p<0.01, ** p<0.05, * p<0.1

In addition to the GMM estimation method, this study employed the OLS[3] regression method to check the robustness of the results. The findings of the analysis are qualitatively similar to the results obtained in the GMM estimation. Those results are untabulated for brevity purposes.

5. Discussion

The first part of the findings of our study suggests that firms with higher ESG disclosure tend to experience better trade credit from suppliers, which is consistent with the finding of Luo et al. (2023) and supports the argument better ESG disclosure enhances stakeholder trust and increases supplier finance provisions. The impact is achieved by reducing risk, mitigating information asymmetry, and achieving market power over suppliers. Second, we observed that ESG disclosure reduces firms' cash conversion cycle and improves working capital efficiency through better operational performance. The result is consistent with Barros et al. (2022) and supports the argument outperforming companies in ESG activities have lesser working capital requirements.

However, the findings regarding the impact of ESG on APD, ARD, and ITD offer some new insights about the impact of ESG on a firm. As per working capital theories (Brigham and Houston,2013) in finance, a reduction in the cost of debt for a firm can result in increasing ARD (liberal credit policy) and decreasing APD (to avoid the implied cost in trade credit), ceteris paribus. In Indian firms, however, the finding is that ESG reduces the cost of debt (Prasad et al., 2022), yet its impact on ARD and APD is decreasing and increasing, respectively. To explain this contradiction, we propose an alternative explanation based on Porter's Five Forces model, specifically addressing how ESG (Environmental, Social, and Governance) disclosure impacts the three components of the cash conversion cycle. This approach allows for a more comprehensive assessment of working capital efficiency. The findings of this study suggest that by enhancing ESG practices, firms can strengthen their market power over customers and suppliers, consequently improving operational efficiency. Market power over suppliers and customers comprises two key components of Porter's Five Forces model. Having better control over a firm's suppliers can reduce costs and enhance overall firm value through improved working capital efficiency. If the ESG does not increase the market power over the customers and suppliers, the ARD and APD will behave according to working capital theories (Brigham and Houston,2013). These relationships are explained in Table 7.

Table 7 Framework for Working Capital Theory and Market Power		
	Impact of lower cost of debt on working capital	
	No impact on Market power	**Market power Increase**
APD	Decrease	Increase
ARD	Increase	Decrease

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[3] OLS result is positively biased in the presence of endogeneity. The statistical results of the OLS estimation method are available upon request.

These findings are novel in ESG literature. Further, we observed all these effects are channelled through the external components of the ESG disclosure score (ENV and SOC), while the internal ESG component (GOV) shows insignificance. This outcome aligns with the findings of Luo et al. (2023), suggesting that suppliers and customers prioritize the risks linked to external ESG components over the firm's internal governance mechanisms. This may also reflect the preference of suppliers to provide better financing options to the firms performing better on the environmental and social front. This identification can provide more relevant inputs to decision-makers in a firm. The results of the empirical analysis also identified a non-linear relationship, but the economic significance of the non-linear coefficient is very low compared to the base.

Overall, the paper examined different aspects of the relationship between ESG and working capital efficiency. The first view is the stakeholder engagement view, which argues that ESG, as a trust-enhancing device, improves the stakeholders' engagement in the firms and makes the provision of trade credit more sustainable, as it circumvents the limitations of the incompleteness of a trade credit contract. Hence, it strengthens the positive relationship between supplier and buyer, which, in turn, enhances trade credit and further reduces the firm cash conversion cycle. The second view is the signalling view. It argues that non-financial disclosure, such as ESG disclosure, signals the creditors regarding the firms' non-financial activities and helps them analyze the creditworthiness evaluation. Unveiling the method by which companies strategically communicated their strong commitment to environmental, social, and governance principles, they intended to draw the attention of conscientious investors, attain confidence among stakeholders, reduce potential risks, attain a competitive advantage, and underscore their dedication to openness and responsibility. This method of signalling effectively showcased their commitment to sustainability, ethical conduct, and the generation of lasting value. This, in turn, helped suppliers to make appropriate decisions.

The results of the study align with the notion that firms with better ESG-oriented policies have better access to trade credit finance, lower cash conversion cycle, and better relations with their stakeholders. All the findings of this paper are novel and have not been explored before in the context of India. This study adds to the growing body of ESG literature in the corporate finance area. By focusing on trade credit, the empirical findings suggest that management decisions to invest in ESG activities are beneficial to gaining the trust of stakeholders and helping the firm get more external financing.

6. Conclusion

This paper examines the effect of aggregate and individual ESG disclosure on the trade credit and WCE for firms in India. In addition, this paper examined the non-linearity effect of the disclosure scores on trade credit and WCE. We employ the two-step GMM estimation technique to estimate our model. The study's findings suggest that firms with superior aggregate and individual ESG disclosure scores enjoy the benefit of higher trade credit from suppliers and reduce the working capital requirements through improved WCE. Further, the impact is channelled through environmental and social components. Also, the impact of the governance component on trade credit and WCE proxies is insignificant in both GMM and OLS estimation results. Moreover, the study identified a non-linear relationship in both the GMM and OLS estimation models with a low level of economic significance compared to the base.

This result is consistent with the prior studies and supports the arguments of stakeholder theory and signalling in Indian firms. The empirical results are qualitatively similar after addressing the endogeneity problem using the system GMM estimation technique. However, prior literature has not revealed how the aggregate and components of ESG disclosure affect all three components of the cash conversion cycle. This study documents that the ESG disclosure is positively related to payable turnover days and negatively related to the receivable and inventory turnover days. The findings of

the study imply that the suppliers and customers favour engagement in ESG disclosure by the companies.

These findings add to the ongoing discussion about whether a company's enhanced ESG efforts generate value, decrease value, or remain neutral by demonstrating that improved ESG disclosure can enhance working capital efficiency and bolster trade credit from suppliers. This study provides managers with evidence that better ESG disclosure strategies can result in improved supplier finance, reduced cash conversion cycle, longer accounts payment periods, and decreased turnover days for receivables and inventory. Furthermore, these findings should boost managers' confidence in pursuing ESG-related activities as they not only contribute to society but also enhance a company's operational efficiency for the firm's better working capital management practices.

Notwithstanding these contributions, this paper has a few limitations that can be overcome by other studies, as follows. First, the current study is focused only on listed non-financial firms in India. The financial firms are excluded, and future research can focus on the financial firms to get more insights and extend the study into unlisted or small and medium firms. A practical limitation of this study is that results may be different from our findings with a sample of developed countries because the emerging countries working capital management practices are different. Finally, this paper did not assess whether firms are using trade credit or short-term financing options as substitutes or complements for debt and equity financing. Companies upholding higher ESG practices likely employ trade credit as additional support alongside their traditional financing sources.

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