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## Sustainability and financial performance of transport and logistics firms: Does board gender diversity matter?

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### ABSTRACT

This study examines the influence of corporate environmental performance (CEP) and corporate social performance (CSP) on corporate financial performance (CFP) of transport and logistics firms. Moreover, the moderating effects of board gender diversity (BGD) on the relationship between CEP and CFP, and CSP and CFP are also investigated. We use a cross-country sample of 56 transport and logistics firms with 243 firm-year observations between 2013 and 2017. We estimate the hypothesised relationships using fixed effect and random effect models. The findings reveal that CEP has a significant negative effect on CFP but the positive moderating effects of BGD mitigates the adverse effect. We further find a significant negative effect of CSP on CFP, but no moderating effect of BGD therein. The findings indicate that transport and logistics firms should maintain their board gender diversity to achieve a positive outcome of their investments into environmental performance.

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### KEYWORDS

Board gender diversity; environmental performance; social performance; upper echelon theory; stakeholder theory; sustainability

## 1. Introduction

Global carbon emissions are rising continuously, resulting in amplified earth temperature (Hofmann, Butler, and Tans 2009). These emissions are partly caused by some multinational companies (MNCs) (Skarmeas and Leonidou 2013; Wagner, Lutz, and Weitz 2009), which outsource their production facilities to subsidiaries located in countries that are pollution havens (Surroca, Tribó, and Zahra 2013). These MNCs focus on the extrinsic (profit) motive of their operations at the expense of the global ecosystem (Graafland and Mazereeuw-Van der Duijn Schouten 2012; Orlitzky, Schmidt, and Rynes 2003). The MNCs rely heavily on the transport and logistics industry to export and import operations, including intra-county movements of products.

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Meanwhile, transport and logistics firms are operating globally, and their operations are heavily dependent on energy consumption, including fossil fuels. Transport and logistics companies considerably pollute the environment due to their businesses operations in diverse sectors such as land, water and air (Rondinelli and Berry 2000). Their diverse activities, such as vehicle operations, services operations, and equipment maintenance, may adversely influence the environment and society since they pollute soil, groundwater, and surface water (Rondinelli and Berry 2000). In recent times, however, many companies are introducing sustainability measures to minimise the adverse influence of their operations on the environment and society due to the ongoing global sustainability discussions which led to launching the United Nations' 17 Sustainable Development Goals (SDGs) in 2015.

In the transport and logistics industry, companies are taking many sustainability initiatives driven by internal and external factors (Evangelista 2014; Lin and Ho 2011). The external factors include customer pressure, supplier pressures and stakeholder pressure. Internal factors include cost savings motive, achieving greater operational efficiency and driving competitive advantage. For instance, active involvement in the sustainability agenda helps firms improve their goodwill which works as insurance for them during financial downturns and extreme market conditions (Godfrey, Merrill, and Hansen 2009). However, studies also find contrasting evidence indicating the inverse effect of environmental and social performance (ESP) on firm financial performance (Duque-Grisales and Aguilera-Caracuel 2019; Lee, Faff, and Langried-Smith 2009). Thus, ESP has both positive and negative influence on firm performance due to different shareholders responses to ESP activities. One explanation for the mixed findings could be attributed to the research settings. For instance, findings may differ from industry to industry, such as oil and gas, transport and logistics and banking due to their diverse operations.

Revising internal management practices is one of the key initiatives taken by transport and logistics firms to improve their sustainable performance (Govindan et al. 2021). Such practices include balancing board gender diversity by ensuring a balance between male and female board members. Gender diversity plays a vital role in improving a firm's financial performance (Abdullah, Ismail, and Nachum 2016; Simionescu et al. 2021). For instance, Simionescu et al. (2021) found that the share of women directors is positively associated with price-earnings ratio. In terms of sustainability reporting, it is generally believed that female board members are more conscious of the ESP of a firm than their male counterparts (Haque and Ntim 2018; Shakil, Tasnia, and Mostafiz 2020). Horbach and Jacob (2018) found that firms with highly qualified women on board initiate more environmental related innovations. Moreover, studies suggest that female board members can be more efficient in firms' strategic decision-making than male counterparts due to their distinctive perspectives and opinions on strategic decisions (Burgess and Tharenou 2002; Sila, Gonzalez, and Hagendorff 2016). Their strategic decisions can assist the firm to reduce risk and boost the firm's financial performance. Thus, boardroom gender diversity can influence the strategic choice of ESP of the firm. Firms that neglect ESP is eventually penalised in the markets by responsible stakeholders (Benlemlih and Girerd-Potin 2017).

Based on the above discussion, it is evident that ESP may affect firm financial performance and heterogeneity of strategic decision of top management due to board gender

diversity may indirectly influence the link between ESP and financial performance of transport and logistics firms. We, therefore, propose the following research questions to fill the gap in the existing literature:

(1a) Is there any effect of corporate environmental performance on corporate financial performance? (1b) Does board gender diversity moderate the nexus between corporate environmental performance and corporate financial performance? (2a) Is there any impact of corporate social performance on corporate financial performance? (2b) Does board gender diversity moderate the nexus between corporate social performance and corporate financial performance?

We focus on the transport and logistics firms due to their direct influence on the environment and society and their negligence on women participation in the boardroom as the percentage of women members in transport and logistics firms are extremely low compared to other industries. Govindan et al. (2021) reported that female board members accounted for only 11.49% on average in their sample of logistics firms. Using a sample of 56 transport and logistics firms in 18 countries globally, we find that CEP has a negative effect on CFP, but this effect is mitigated by BGD. We further find a negative effect of CSP on CFP, but no moderating effect of BGD therein. The findings indicate that boardroom gender diversity in terms of including female board members is beneficial for transport and logistics firms in aligning their sustainable performance with financial performance.

## 2. Literature review and hypothesis development

### 2.1. Corporate environmental performance, board gender diversity and financial performance

Environmental sustainability emerged as a vital issue for managing firms, especially the transport and logistics firms due to concerns such as climate change and global warming (Evangelista, Colicchia, and Creazza 2017). Transport and logistics firms are directly responsible for environmental degradation due to the nature of their operations. Apart from shareholders, there are other stakeholders of a firm (e.g. government, customers and suppliers) who penalise firms that perform poorly on the environment, social and governance (ESG). Based on the stakeholder theory, the value of shareholder declines due to the negligence of firms towards the environment (Eccles, Ioannou, and Serafeim 2014; Freeman 2010). Previous literature reasons that firms' active participation in CEP improves their financial performance (Ting et al. 2020; Velte 2017). However, some studies find a negative influence of CEP on firm financial performance (Duque-Grisales and Aguilera-Caracuel 2019; Lee, Faff, and Langried-Smith 2009). Conversely, some studies argue that CEP has an inconclusive influence on firm financial performance (Deswanto and Siregar 2018; Qiu, Shaukat, and Tharyan 2016). Overall, previous findings from different industries show mixed effect of CEP on financial performance.

It is argued that male board members are generally more concerned with shareholder interest (economic performance) while female directors are concerned with the welfare of all stakeholders (Adams, Licht, and Sagiv 2011; Manita et al. 2018). As of evidence, studies find a positive impact of BGD on CEP (Arayssi, Jizi, and Tabaja 2020; Kyaw, Olugbode, and Petracci 2017), a negative effect of BGD on CEP (Husted and Sousa-

Filho 2019) and also an inconclusive relationship between BGD and CEP (Manita et al. 2018). Studies on the moderating role of BGD on the link between CEP and CFP in the context of transport and logistics firms is limited. This study, therefore, proposes a non-directional hypothesis to test the direct effect of CEP on CFP, and moderating influence of BGD on the CEP- CFP link.

H1a: There is an influence of corporate environmental performance on the corporate financial performance of transport and logistics firms.

H1b: Board gender diversity moderates the association between corporate environmental performance and the corporate financial performance of transport and logistics firms.

## **2.2. Corporate social performance, board gender diversity and financial performance**

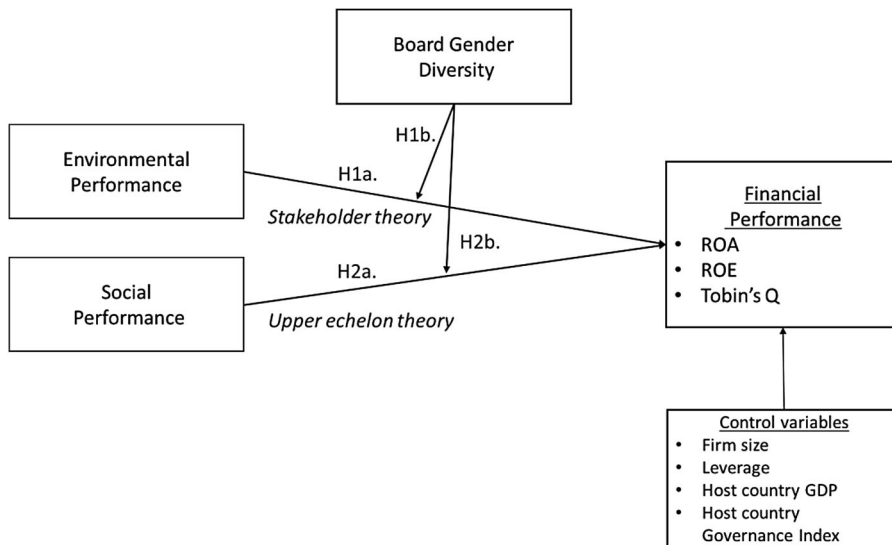
In the last three decades, scholars are trying to answer whether it pays off for firms to be socially responsible, that is whether CSP affects CFP (Barnett and Salomon 2012). Previous studies find mixed and inconclusive relationship between CSP and CFP (Barnett and Salomon 2012; Qiu, Shaikat, and Tharyan 2016; Ting et al. 2020; Wright and Ferris 1997; Yang and Baasandorj 2017). CSP is the strategic decision of the firm. Stakeholders may reward or penalise the firm due to their CSP. Overinvestment (and under-investment) in CSP may lead to the low (or high) financial performance of the firm. Friedman (2007) reports that firms' CSP and CFP relationship is negative. The firms' CSP incurs additional cost to the firm, which leads to low financial gain (Friedman 2007). In contrast, Freeman (2010) argues that the CSP and CFP relationship is positive. Based on the stakeholder theory, CSP plays the role of moral capital which increases market reputation, resulting in increased financial performance (Freeman 2010; Godfrey 2005).

Since the board makes the final CSP decision, the level of CSP may vary based on board composition, including BGD. Female board member backgrounds, experience and psychological characteristics can affect CSP decision (Manita et al. 2018). Relying on upper echelon theory, female board members characteristics can influence the CSP strategic decision, which has implications for firm financial performance (Hambrick and Mason 1984). Having more female directors can increase the likelihood of achieving a firm's CSP goals, which helps the firm to meet stakeholders expectations (Haque and Ntim 2018). Hence, the impact of BGD on the relationship between CSP and CFP can be positive, negative or inconclusive depending on the context of the study. We, therefore, hypothesise a non-directional prediction that:

H2a: There is an influence of corporate social performance on the corporate financial performance of transport and logistics firms.

H2b: Board gender diversity moderates the association between corporate social performance and the corporate financial performance of transport and logistics firms.

Figure 1 depicts the theoretical framework of this study. This study investigates the direct effects of two sustainability measures (environment and social performance) on financial performance and the indirect effect of board gender diversity on such relationships.



**Figure 1.** Theoretical framework.

### 3. Sample, data and methodology

#### 3.1. Sample selection and data collection

We use data from the transport and logistics firms available in the Refinitiv database as the sample (Refinitiv Eikon Datastream 2021). In the Refinitiv Eikon Datastream, the data of 68 firms are available under the transport and logistics industry cluster. We exclude 12 firms due to the unavailability of CEP and CSP data. This results in a final sample of 56 transport and logistics firms from 18 countries worldwide (Appendix B) for 2013-2017, giving a total of 243 firm-year observations. We also collect financial data from the Refinitiv Eikon Datastream database and country-level data from the World Bank database.

#### 3.2. Variable measurements

##### 3.2.1. Dependent variables

We use returns on assets (ROA) and returns on equity (ROE) as a measure of financial performance (Buallay 2019; Shakil et al. 2019; Yang and Baasandorj 2017). Further, we use Tobin's Q as a proxy for firm market performance (Aouadi and Marsat 2018; McConnell, Servaes, and Lins 2008; Zolotoy, O'Sullivan, & Chen, 2019). Tobin's Q is measured as 'the book value of total assets minus the book value of equity and balance sheet deferred taxes plus the market value of equity, all divided by the book value of total assets' (Aouadi and Marsat 2018, 1031).

##### 3.2.2. Independent variables

The Refinitiv Eikon Datastream is the most popular database for environmental social and governance (ESG) data worldwide (Refinitiv Eikon Datastream 2020b). Prior studies also considered Refinitiv Eikon Datastream for ESG (Benlemlih et al. 2018;

Chollet and Sandwidi 2018; Ioannou and Serafeim 2012). Refinitiv collects environmental and social data based on 68 CEP and 62 CSP indicators (Refinitiv Eikon Datastream 2020b). A detailed description of environmental and social metrics are provided in Appendix C available online. The description of corporate environmental and social indicators are obtained from the Refinitiv Eikon Datastream database (Refinitiv Eikon Datastream 2020b).

**3.2.2.1. Corporate environmental performance.** Corporate environmental performance score is based on twenty indicators of resource use, twenty-eight indicators of emissions and twenty indicators of innovation (Refinitiv Eikon Datastream 2020b; Shakil 2021). Refinitiv Eikon Datastream provides corporate environmental performance scores ranging from 0 to 100 (Refinitiv Eikon Datastream 2020b).

**3.2.2.2. Corporate social performance.** Corporate social performance score includes thirty workforce, eight human rights, fourteen community and ten product responsibility indicators (Refinitiv Eikon Datastream 2020b). Refinitiv Eikon Datastream also provides corporate social performance score ranging from 0 to 100 (Refinitiv Eikon Datastream 2020b).

### 3.2.3. Moderating variable

Board gender diversity is measured as the percentage of female members on the board of transport and logistics firms (Refinitiv Eikon Datastream 2020a). Prior studies also use the same proxy to measure board gender diversity (Albitar et al. 2020; Cucari, De Falco, and Orlando 2018; Husted and Sousa-Filho 2019; Shakil 2021).

### 3.2.4. Control variables

To estimate the hypothesized relationships, we control for firm size, leverage, macro-economy and country governance quality due to their significant influence on firms' performance (Chang, Shim, and Yi 2019; Chollet and Sandwidi 2018; Shakil et al. 2019; Zamore, Beisland, and Mersland 2019). We show the variable measurements in Table A1.

## 3.3. Descriptive statistics

Table 1 presents the descriptive statistics, variance inflation factor (VIF) score, and pairwise correlations among explanatory variables. Average CEP and CSP are 61.78 per cent and 61.84 per cent, respectively. The scores convey the transport and logistics firms' commitments towards CEP and CSP. Firms average CEP and CSP are above the average score compared to other industries. However, the board gender diversity of transport and logistics firms are only 11.16 per cent, which shows a weak representation of women on firms' board. The VIF values are all less than five and all the correlations are also below suggested thresholds such as 0.90 (Hair et al. 2006). This indicates no severe multicollinearity problem in our study.

## 3.4. Model specification

For estimation, we first run the Breusch–Pagan test (Greene 2003), which confirms the need for panel regression. Then, the Hausman (1978) specification test is used to

**Table 1.** Descriptive statistics and pairwise correlations

Variable	N	Mean	Std. Dev.	VIF	Environment	Social	Board diversity	Size	Leverage	GDP	Gov. index
ROA	282	4.5017	7.2872								
ROE	282	7.9532	25.8779								
Tobin's Q	288	1.5211	0.8075								
Environment	270	0.6178	0.2478	1.11	1.0000						
Social	270	0.6184	0.2608	1.14	0.6668*	1.0000					
Board diversity	270	0.1116	0.1115	1.41	0.2236*	0.2620*	1.0000				
Size	283	17.2590	2.5000	1.35	0.0980	−0.0556	−0.3769*	1.0000			
Leverage	283	0.2627	0.1460	1.05	0.0990	0.1657*	−0.1143	0.1142	1.0000		
GDP	283	25.1826	1.8765	1.81	0.0319	0.0747	0.3662*	−0.2909*	−0.0926	1.0000	
Gov. index	283	1.4523	5.4685	1.76	0.0075	0.0718	0.3087*	−0.0052	−0.1474	0.6055*	1.0000

Notes: The table reports descriptive statistics and pairwise correlations among explanatory variables. Board diversity represent board gender diversity, Size = natural logarithm of total assets, GDP = natural logarithm of Gross Domestic Product, Gov. index = Governance Index (consists of six indicators: voice and accountability, political stability and absence of violence, government effectiveness, regulatory quality, rule of law, and control of corruption), and VIF = variance inflation factor. \*Denotes statistical significance at the 5 per cent level or lower.



decide whether random or fixed effects estimation is preferable for each model. We primarily use fixed-effects estimation to eliminate the unobserved endogeneity bias (Shahzad, Lu, and Fareed 2019). Moreover, we apply pooled OLS estimation to check the consistency of the results of fixed-effects and random-effects. Our empirical model is given in equation (1).

$$CFP_{it} = \beta_0 + \beta_1 X_{it} + \beta_2 BGD_{it} + \beta_3 X_{it} * BGD_{it} + \gamma Z_{it} + U_{it} \quad (1)$$

Here,  $CFP_{it}$  represents the financial performance of firm  $i$  at time  $t$ ,  $X_{it}$  represents independent variables, CEP or CSP of firm  $i$  at time  $t$ ,  $BGD_{it}$  represents board gender diversity of firm  $i$  at time  $t$ ,  $X_{it} * BGD_{it}$  represent the interaction term for moderating effect of board gender diversity on the relationship between CEP/CSP and CFP, and  $Z_{it}$  is the vector of control variables.  $\beta_0$  is the intercept,  $\beta_1$ ,  $\beta_2$ ,  $\beta_3$  and  $\gamma$  are estimated coefficients.  $U_{it}$  is the error term that differs across both  $i$  and  $t$ .

## 4. Results

Table 2 presents the estimates of fixed effects and random effects panel models concerning CEP, board gender diversity and CFP. The results show a significant negative effect of CEP on CFP. The finding implies that focusing more on the environmental performance of a firm leads to lower financial performance. This can be due to allocating more resources to meet environmental goals at the expense of core operational activities (Zhao and Murrell 2016). In contrast, some studies find a significant positive effect of

**Table 2.** Environmental performance, board gender diversity and financial performance.

Variables	(1) ROA	(2) ROA	(3) ROE	(4) ROE	(5) Tobin's Q	(6) Tobin's Q
Environment (Env)	−9.5026* (4.8276)	−11.0305** (5.3715)	2.6415 (8.9505)	−11.0850 (11.0172)	−0.4055* (0.2118)	−0.6121*** (0.2339)
Board diversity	−11.7783 (9.6988)	−24.1276 (21.2574)	31.6962 (22.0738)	−66.5382 (51.9174)	−0.6670 (0.4283)	−2.3333** (0.9329)
Env * board diversity		19.5538 (29.9387)		150.1520** (71.5450)		2.6367** (1.3143)
Size (log total assets)	3.2196 (2.4247)	3.3801 (2.4409)	−4.2648 (2.6829)	−4.7142* (2.6212)	−0.2746** (0.1121)	−0.2499** (0.1118)
Leverage	−23.0919*** (6.4720)	−23.2162*** (6.4850)	−34.8742** (14.5964)	−30.6723** (14.4578)	−0.1053 (0.2961)	−0.1286 (0.2938)
GDP (log)	20.1788** (8.1719)	20.3326** (8.1883)	2.1588 (1.6235)	2.4534 (1.5871)	0.7406** (0.3643)	0.7569** (0.3614)
Governance index	−1.1968 (1.0471)	−1.1996 (1.0488)	0.8703 (0.5580)	0.9450* (0.5443)	−0.0385 (0.0466)	−0.0393 (0.0462)
Constant	−544.5721** (209.2941)	−550.3115*** (209.8106)	−12.8953 (49.6191)	−9.8316 (48.3052)	−11.9745 (9.2862)	−12.6863 (9.2155)
Observations	243	243	243	243	240	240
Number of firms	56	56	56	56	55	55
R-squared	0.116	0.118	0.263	0.289	0.119	0.138
F/Chi2 test ( $p$ -value)	0.0009	0.0017	0.0000	0.0000	0.0008	0.0004
Hausman test ( $p$ -value)	0.0350	0.0617	0.3055	0.4160	0.0002	0.0000
Estimator	Fixed effects	Fixed effects	Random effects	Random effects	Fixed effects	Fixed effects

Notes: This table reports fixed effects and random effects estimation of the effects of environmental performance on financial performance.

Notes: Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

CEP on CFP (Li et al. 2017; Wong et al. 2018). Although CEP is usually associated with a higher cost, Jo, Kim, and Park (2015) argue that executives can reduce environmental cost by effectively investing in CEP, which results in better CFP.

Board gender diversity generally shows a non-significant negative effect on CFP. This finding is inconsistent with previous studies, which find a significant positive relationship between gender diversity and CFP (Campbell and Mínguez-Vera 2008; Reguera-Alvarado, de Fuentes, and Laffarga 2017; Simionescu et al. 2021). We also find that board gender diversity has a significant positive moderating effect on the relationship between CEP and CFP. Therefore, gender diversified board reduce the negative effect of CEP on CFP.

Table 3 presents the estimates of fixed effects and random effects panel models concerning CSP and CFP. We find a significant negative effect of CSP on CFP. Also, board gender diversity has a significant positive effect on CFP, which is consistent with previous literature (Reguera-Alvarado, de Fuentes, and Laffarga 2017; Simionescu et al. 2021). However, board gender diversity does not moderate the relationship between CSP and CFP.

Concerning the control variables (both in Tables 2 and 3), firm size has a significant negative effect on CFP, consistent with previous studies such as Govindan et al. (2021). The negative relationship can occur due to diseconomies of scale (Yu, Guo, and Luu 2018). When a firm or business grows so large, the diseconomies of scale occur due to increased costs per unit. In contrast, some studies find a positive association between firm size and financial performance (Yang and Baasandorj 2017). Firm leverage has a significant negative effect on CFP, which is consistent with Yang and Baasandorj (2017). GDP has a significant positive impact on CFP, indicating that firms in high-income

**Table 3.** Social performance, board gender diversity and financial performance.

Variables	(7) ROA	(8) ROA	(9) ROE	(10) ROE	(11) Tobin's Q	(12) Tobin's Q
Social (soc)	−11.3514*** (4.2731)	−9.4144* (5.1076)	−17.5975** (8.3796)	−24.8876** (10.3621)	−0.4770** (0.1900)	−0.3663 (0.2273)
Board diversity	−12.0072 (9.5341)	3.2399 (23.9365)	47.2226** (21.7272)	−13.0528 (55.7234)	−0.6965* (0.4203)	0.1689 (1.0615)
Soc * board diversity		−21.9764 (31.6374)		88.1930 (74.0040)		−1.2470 (1.4044)
Size (log total assets)	2.7111 (2.3286)	2.7683 (2.3334)	−3.3075 (2.6069)	−3.7326 (2.5802)	−0.2959*** (0.1079)	−0.2943*** (0.1080)
Leverage	−24.0740*** (6.3676)	−24.1678*** (6.3782)	−28.9299** (14.6203)	−27.0375* (14.5198)	−0.1542 (0.2920)	−0.1564 (0.2921)
GDP (log)	22.3068*** (8.1112)	21.5044*** (8.2045)	2.4794 (1.6205)	2.5061 (1.5877)	0.8208** (0.3621)	0.7774** (0.3656)
Governance index	−0.9212 (1.0447)	−0.8189 (1.0565)	0.8065 (0.5550)	0.9246* (0.5520)	−0.0279 (0.0465)	−0.0219 (0.0470)
Constant	−588.3992*** (205.3189)	−570.5146*** (207.2187)	−19.3216 (49.3783)	−12.9598 (48.6101)	−13.5881 (9.1247)	−12.5984 (9.1979)
Observations	243	243	243	243	240	240
Number of firms	56	56	56	56	55	55
R-squared	0.131	0.134	0.263	0.272	0.131	0.135
F/Chi2 test ( <i>p</i> -value)	0.0002	0.0005	0.0000	0.0000	0.0003	0.0005
Hausman test ( <i>p</i> -value)	0.0207	0.0441	0.2947	0.2816	0.0003	0.0005
Estimator	Fixed effects	Fixed effects	Random effects	Random effects	Fixed effects	Fixed effects

Notes: This table reports fixed effects and random effects estimation of the effects of social performance on financial performance.

Notes: Standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0$ .

countries may experience higher financial performance. For instance, in our sample, the mean ROA values for firms from the U.S. and the U.K. are 10.31% and 8.01% respectively which are far higher than those for firms from countries like South Korea (0.36%) and Brazil (−0.99%). GDP represents the economic development of a country and firms that are operating in countries with high GDP are likely to have high CSP (Yu, Guo, and Luu 2018). Interestingly, country governance has no significant effect on CFP. Table A2 and A3 in Appendix A presents the pooled OLS estimates, which are generally identical to those reported in Tables 2 and 3.

## 5. Discussion and conclusion

This study contributes to the sustainability literature by providing empirical evidence on the relationship between sustainable performance and financial performance in the transport and logistics industry. The results show that environmental and social performance adversely influences the financial performance of firms. However, the findings suggest that a balance of gender diversity of a firm's board is better for aligning its environmental performance with financial performance. To our surprise, the results do not support the moderating effect of BGD on the association between social and financial performance. The findings contribute to literature and policy implications.

### 5.1. Contribution to literature

In the context of the transport and logistics industry, previous studies have reported a positive relationship between BGD and CEP (Govindan et al. 2021). Studies have also shown a negative association between CEP and CFP (Duque-Grisales and Aguilera-Caracuel 2019; Lee, Faff, and Langfield-Smith 2009). This study brings the body of knowledge one step further by showing the moderating effect of BGD on the relationship between CEP and CFP. This study also shows that CSP is negatively associated with CFP in the transport and logistics industry context. The moderating effect of BGD is not statistically significant on this association. Besides, in addition to firm-level controls, we included country-level variables such as GDP and governance index as control variables, as suggested by Govindan et al. (2021).

### 5.2. Policy implications

As of policy implications, we evidence a considerably low percentage of female board members on average in transport and logistics companies. As reported in Table 1, the companies in our sample have only 11.16% female board members on average. Govindan et al. (2021) also reported a similar percentage (11.49%) in their sample. Firms with a lower percentage of female board members should consider increasing the number as this study showed that a gender-balanced board positively associates environmental performance with financial performance.

The negative associations of environmental and social performance with financial performance can be attributed to the capital-intensive nature of sustainability initiatives in the transport and logistics industry. Investments into environmentally friendly transport and logistics include retrofitting vehicles, procuring equipment made of sustainable

materials, training employees, establishing reverse logistics and recycling systems (Centobelli et al. 2020; Evangelista 2014) might reduce financial return in the short run. Similarly, investment in emerging technologies such as a blockchain for traceability of carbon footprint or simply reducing paper use also requires large investments. Such investments may not seem beneficial to investors unless the benefits are communicated properly with the investors. Studies suggest that a gender-balanced board is more efficient in communicating their sustainability initiatives (Ben-Amar, Chang, and McIlkenny 2017). Hence, transport and logistics firms, particularly those with unbalanced board diversity, must consider appointing more female directors.

### 5.3. Limitations and future research directions

This study analysed data of 56 transport and logistics companies listed in the Refinitiv database; see the country-wise number of firms in Appendix B. It is apparent that many of the transport and logistics firms from the listed countries, particularly small and medium-sized ones, are not included in the sample due to the unavailability of data. Hence, the findings of this study may not be generalised over a large population of firms. Future studies should consider validating the findings by collecting data from a large number of transport and logistics firms from different countries. Also, the sample data of this study is from 2013-2017. The industry is moving fast and adopting new sustainable initiatives. The association between the variables might change in the future, which should be considered in future studies.

Furthermore, this study is limited to the environmental and social performance score of firms. Future research may consider the effect of CSR investment on financial performance by considering the firms in diverse industries to see the variation of results in different industry settings. Besides, we consider only board gender diversity as a moderator. Other board characteristics, such as age, education, tenure, nationality, can moderate the nexus between ESG and firm performance. Therefore, future research should investigate other board characteristics to test their impact on firms' overall performance. Quantitative methods sometimes fail to explain certain findings clearly, such as the negative association between ESP and CFP. Qualitative case studies would be useful in explaining such unexpected findings.

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## Appendix A

**Table A1.** Variable measurements.

Name of the variable	Description
<b>Dependent variable</b>	
ROA	Net income/Total assets
ROE	Net income/Shareholder's equity
Tobin's Q	'The book value of total assets minus the book value of equity and balance sheet deferred taxes plus the market value of equity, all divided by the book value of total assets' (Aouadi and Marsat 2018 p. 1031).
<b>Independent variables</b>	
Environment	Environmental score of Refinitiv.
Social	Social score of Refinitiv.
<b>Moderating variable</b>	
Board diversity	Percentage of female members on transport and logistics firms board.
<b>Control variables</b>	
Size	Natural logarithm of total assets
Leverage	Long term debt/Total assets
GDP	Natural logarithm of Gross Domestic Product
Gov. index	Governance Index consists of six indicators: (1) voice and accountability, (2) political stability and absence of violence, (3) government effectiveness, (4) regulatory quality, (5) rule of law, and (6) control of corruption.

**Table A2.** Environment, board gender diversity and financial performance.

Variables	Environmental performance					
	ROA	ROA	ROE	ROE	Tobin's Q	Tobin's Q
Environment	0.6242 (1.7611)	−0.9238 (2.0710)	6.3183 (7.3864)	−10.8334 (9.8341)	0.1109 (0.2196)	0.2685 (0.2474)
Board diversity	5.0697 (3.9953)	−6.2490 (9.0242)	48.8672*** (11.6975)	−73.2453* (37.8765)	1.8734*** (0.4125)	2.9985** (1.3529)
Env*diver		16.4052 (11.1805)		178.3320*** (58.7186)		−1.6341 (1.8136)
Size (log total assets)	−0.9911* (0.5726)	−1.0700* (0.5530)	−3.3059 (2.5745)	−4.0489 (2.5301)	−0.2057*** (0.0515)	−0.1958*** (0.0507)
Leverage	−14.2013*** (3.6698)	−13.6231*** (3.6774)	−31.9503** (12.4634)	−25.6367** (12.6280)	−1.3403*** (0.3780)	−1.3928*** (0.3921)
GDP (log)	0.7296** (0.3285)	0.7827** (0.3305)	1.8665* (1.0124)	2.4300** (1.0108)	0.0327 (0.0284)	0.0279 (0.0302)
Governance index	0.1488 (0.1013)	0.1541 (0.1004)	0.9074*** (0.3376)	0.9729*** (0.3350)	0.0375*** (0.0104)	0.0368*** (0.0107)
Constant	−4.1818 (10.2368)	−4.0805 (10.0760)	−17.5440 (38.9612)	−16.9361 (37.6631)	2.2568** (0.9212)	2.2190** (0.9380)
Observations	243	243	243	243	240	240
R-squared	0.261	0.265	0.275	0.304	0.398	0.400
F-test (p-value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: This table reports pooled OLS estimates of the effects of sustainable reporting on financial performance. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

**Table A3.** Social, board gender diversity and financial performance.

Variables	Social performance					
	ROA	ROA	ROE	ROE	Tobin's Q	Tobin's Q
Social	−2.9002* (1.7289)	−1.7148 (2.0936)	−16.3828** (6.7535)	−26.0130*** (9.1586)	−0.2523 (0.1612)	0.1391 (0.1771)
Board diversity	8.0357**	18.8105**	70.5775***	−14.8553	2.1771***	5.7189***

(Continued)



**Table A3.** Continued.

Variables	Social performance					
	ROA	ROA	ROE	ROE	Tobin's Q	Tobin's Q
	(3.9446)	(8.9539)	(12.9868)	(32.7667)	(0.4200)	(1.2035)
Soc*diver		−15.1053 (12.1964)		120.5400** (51.9983)		−4.9666*** (1.5629)
Size (log total assets)	−0.8788 (0.5569)	−0.7784 (0.5514)	−2.1072 (2.3788)	−2.8476 (2.3736)	−0.1935*** (0.0471)	−0.1565*** (0.0461)
Leverage	−12.9525*** (3.6250)	−13.2773*** (3.7383)	−24.4982* (13.0107)	−21.8226 (13.5976)	−1.2254*** (0.3855)	−1.3212*** (0.3786)
GDP (log)	0.7272** (0.3317)	0.7070** (0.3452)	1.7966* (1.0243)	1.9493* (1.0162)	0.0323 (0.0291)	0.0265 (0.0312)
Governance index	0.1443 (0.1001)	0.1253 (0.0948)	0.9105*** (0.3383)	1.0678*** (0.3494)	0.0370*** (0.0107)	0.0304*** (0.0115)
Constant	−3.4687 (10.1432)	−4.3799 (9.9629)	−15.5051 (38.1927)	−8.4858 (36.8061)	2.3333** (0.9257)	1.9828** (0.9424)
Observations	243	243	243	243	240	240
R-squared	0.270	0.273	0.293	0.306	0.402	0.424
F-test ( <i>p</i> -value)	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

Notes: This table reports pooled OLS estimates of the effects of sustainable reporting on financial performance. Robust standard errors in parentheses. \*\*\*  $p < 0.01$ , \*\*  $p < 0.05$ , \*  $p < 0.1$

## Appendix B

**Table B1.** Country list and number of firms.

No.	Country	No. firms	No.	Country	No. firms
1.	Australia	4	11.	Netherlands	1
2.	Belgium	1	12.	Singapore	2
3.	Brazil	2	13.	South Africa	3
4.	Canada	4	14.	South Korea	3
5.	China	3	15.	Switzerland	1
6.	Denmark	3	16.	Taiwan	5
7.	Germany	1	17.	United Kingdom	3
8.	Hong Kong	3	18.	United States	11
9.	Japan	5			
10.	Malaysia	1			