

The effect of CEO facial masculinity on ESG performance: evidence from Canada

European Journal
of Management
Studies

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Received 21 October 2025
Revised 1 April 2026
Accepted 23 June 2026

Abstract

Purpose – Given the scarcity of empirical studies exploring the relationship between CEO characteristics and Environmental Social and Governance (ESG) performance, this research aims to investigate whether the CEO facial masculinity affects the ESG performance.

Design/methodology/approach – To achieve our purpose, we selected non-financial firms listed on the Canadian S&P/TSX Composite index spanning an 11-year period from 2012 to 2022. CSR performance is proxied by ESG score. By utilizing the ImageJ software, we calculated the facial width-to-height ratio as a measure of CEO facial masculinity. Data collection was derived from several sources, including annual reports, the Datastream database and other online sources. A multiple regression model, including industry and year fixed effects, was estimated using STATA software.

Findings – The findings reveal that the greater the CEO facial masculinity, the more likely he is to encourage CSR initiatives in his company. This supports the predictions of the upper echelon theory which posits that the demographic, psychological and biological traits of top executives influence firm decisions and outcomes. It suggests that implementing CSR within a company is a strategic decision made by risk-tolerant and competitively aggressive CEOs in order to achieve the objectives of the company, penetrate new markets and capitalize on opportunities for positive outcomes.

Originality/value – This study contributes to the existing literature on the impact of CEO attributes on ESG performance by examining a new CEO biological characteristic, facial masculinity, in the Canadian context.

Keywords CEO facial masculinity, Upper echelon theory, ESG performance, Canada

Paper type Research article

1. Introduction

The Chief Executive Officer (CEO) serves as the leader and the primary decision-maker of a firm, responsible for developing, implementing and supervising the firm's overall strategy, long and short-term. The CEO plays a crucial role in shaping financial and non-financial decisions, ultimately driving the company's outcomes and success.

Referring to the Upper Echelon Theory (UET), the CEO's decisions are influenced by his attributes: experiences, values, culture and demographic, psychological and biological traits (Hambrick, 2007). These characteristics dictate the company's strategy, long-term or short-term and associated risks (Hambrick, 2007; Hambrick and Mason, 1984; Kamiya *et al.*, 2019; Mayew and Venkatachalam, 2012; Malmendier and Tate, 2005).

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European Journal of Management
Studies
Emerald Publishing Limited
e-ISSN: 2635-2648
p-ISSN: 2183-4172
DOI 10.1108/EJMS-10-2025-0187

Numerous studies have demonstrated that the CEO's characteristics drive the firm's outcomes: financial performance, Research and Development investments, tax payments, CSR disclosure, ESG performance, . . . (Ma *et al.*, 2026; Anita *et al.*, 2025; Prasetyo *et al.*, 2023; Prasetyo *et al.*, 2023; Hsu and Lee, 2024; Hooy and Phua, 2023; Kobbi-Fakhfakh and Trigui, 2025; Chouaibi *et al.*, 2023; Lassoued and Khanchel, 2023; Abdullah *et al.*, 2024; Effah *et al.*, 2026; Li and Liu, 2025; Martinez-Ferrero *et al.*, 2024; Oyinlola, 2025; Velte, 2019; Wang *et al.*, 2026; Wu *et al.*, 2025).

One specific characteristic that has gained attention is facial masculinity, which refers to the extent to which an individual's facial features are perceived as masculine. Influenced by a key male hormone, testosterone, facial masculinity has emerged in recent accounting and financial literature as a biological attribute that affects the CEO's objectives and decisions. Notably, facial masculinity, measured by facial width-to-height ratio (fWHR), is an indicator of his masculine behavior: risk tolerance, dominance, aggressiveness, ambition, egocentricity, hostility, trustworthiness, competitiveness and strong need to retain the social status (Alrajih and Ward, 2014; Campbell *et al.*, 2010; Carré *et al.*, 2009; He *et al.*, 2019; Lewis *et al.*, 2012; Ormiston *et al.*, 2017; Tsujimura and Banissy, 2013). Previous studies indicate mixed findings regarding the impact of CEO facial masculinity on firm outcomes. For instance, aggressive behavior and risk tolerance among CEOs with higher facial masculinity could be detrimental to the firm and can lead to negative outcomes, including heightened corporate fraud risk (Kim *et al.*, 2022), increased risk of the firm or the bank (Kamiya *et al.*, 2019; Ahmed *et al.*, 2019), greater corporate leverage (Asyik *et al.*, 2022), higher tax avoidance (Harymawan *et al.*, 2023), enhanced earnings management (Elsheikh *et al.*, 2022), limited CSR disclosure (Nasih *et al.*, 2023) and less conservative accounting (Amin *et al.*, 2024). Conversely, some studies suggest that such CEO's behaviors benefit the firm by helping it achieve objectives and exploit value-creating opportunities that boost the organizational success. For instance, Wong *et al.* (2011) found that CEOs with facial masculinity traits led firms to superior performance -a result echoed by Elsheikh *et al.* (2024) among the Bumiputera group. Finally, a third line of research shows that CEOs' masculine facial traits-reflecting aggressiveness and risk tolerance -do not necessarily translate into financial outcomes. Elsheikh *et al.* (2024) found no significant association with performance in Bursa Malaysia-listed firms. Kobbi-Fakhfakh and Trigui (2025) also reported no link with tax avoidance in Canada.

In recent years, ESG performance has emerged as an indicator of a company's success, reflecting the effectiveness of its CSR strategy. This performance is influenced by a CEO who seeks to implement a long-term vision for sustainable organizational growth. Although several studies have investigated the relationship between CEO characteristics and ESG performance (Abdullah *et al.*, 2024; Effah *et al.*, 2026; Li and Liu, 2025; Martinez-Ferrero *et al.*, 2024; Oyinlola, 2025; Velte, 2019; Wang *et al.*, 2026; Wu *et al.*, 2025), no previous study has examined the link between ESG performance and the CEO's biological attributes. To fill this gap, this study investigates the effect of the CEO facial masculinity on the ESG performance within the Canadian context.

To fulfill our purpose, we analyze non-financial firms listed on the S&P/TSX Composite Index in Canada over an 11-year period (2012–2022). This focus on the Canadian context is justified as Canada relies primarily on voluntary measures, which are strongly supported by government policy, stakeholder pressures and sector-specific initiatives. Companies implement CSR practices to guarantee their durability, improve their reputation, meet stakeholders' expectations, comply with international standards, enhance competitiveness, penetrate new markets and exploit opportunities.

To measure ESG performance, we use ESG scores sourced from the Datastream database, while to assess CEO masculinity, we hand-collected CEOs images from different sources (Annual reports, Wikipedia, Wallmine, MarketScreener and Zonebourse). Then, following the approach of Harymawan *et al.* (2023), we computed the facial width-to-height ratio (fWHR) using ImageJ software. This ratio is calculated by dividing the distance between the cheekbones (the bizygomatic width) by the distance between the upper lip and the midpoint of

the inner end of the eyebrow (The upper facial height). A multiple regression model, including various control variables and industry and year fixed effects, is estimated using STATA software.

Our findings indicate that firms led by CEO with higher facial masculinity are more committed to enhancing their ESG performance. This suggests that CEO masculinity is a strong predictor of a CEO's ambition to drive organizational success. These CEOs tend to prioritize long-term projects over short-term investments, as they exhibit greater confidence, are not afraid, seek to assert dominance over individuals and competitors, pursue new markets and capitalize on valuable opportunities. This focus contributes to improving their reputation by leveraging effective CSR strategies and maximizing ESG performance, reflecting the aspirations of a CEO committed to leading a sustainable and growth-oriented organization.

Our study offers two key contributions. First, it contributes to the existing literature by examining the impact of CEO facial masculinity on ESG performance in the Canadian context. To our knowledge, this is the first study to provide evidence on this relationship.

Second, our findings support the Upper Echelon Theory, demonstrating that the demographic, psychological and biological traits of top executives influence firm decisions and outcomes. They support the view that CSR implementation is a strategic decision made by CEOs known for their aggressiveness, ambition and strong achievement drive in a competitive environment, in pursuit of achieving firm goals, maximizing opportunities and occupying dominant positions.

The following sections will present the research background and the theoretical framework, develop the literature review and the research hypothesis, describe the research design, discuss the main empirical findings, provide additional analysis, and conclude the study.

2. Research background

In recent decades, corporate social responsibility (CSR) has evolved from a niche concept with limited appeal into a significant focus within academic research and corporate management (Acuti *et al.*, 2024; Wirba, 2024; Zhang and Hao, 2024). This shift is driven by the growing necessity for corporations to consider not only financial factors but also the social and environmental consequences of their decisions. In fact, businesses face increasing pressure to meet stakeholder expectations regarding the adoption and implementation of CSR practices.

While some countries, such as those in the European Union, have made CSR reporting mandatory, and others, like the United States, are progressing toward this goal (Velte, 2024), several nations, including Canada, have opted for a voluntary approach to CSR reporting.

Although financial reporting in Canada is regulated, CSR reporting remains unlegislated, making such activities strictly voluntary (Bebbington *et al.*, 2008). Many Canadian companies recognize CSR as a catalyst for business growth and a means of gaining a competitive advantage. Consequently, they have chosen to publish voluntary reports, enhancing their transparency and demonstrating their commitment to good governance and ethics (Erusalimsky *et al.*, 2006).

For years, regulatory efforts to enhance CSR disclosure have steadily increased [1]. Canadian companies are required to submit annual reports on the representation of four recognized groups within their boards of directors and senior management teams: women, people with disabilities, members of visible minorities and Indigenous peoples (First Nations, Inuit and Métis).

In November 2022, the Canadian Securities Administrators (CSA) recommended that firms establish guidelines to prevent greenwashing and ensure that ESG claims are substantiated. From 2024, the CSA also intends to make some ESG disclosure requirements mandatory for major financial institutions. Moreover, the CSA released ESG Investment Fund Disclosure guidelines, dedicated to "Investment Funds" and aimed at promoting environmental sustainability by integrating environmental considerations into investment processes.

In March 2023, the Sustainable Finance Action Council (SFAC) of Canada issued the Canadian Climate Investment Taxonomy, providing a framework for the coherent description of climate-compatible investments. This initiative aims to support the Canadian climate objectives by mobilizing financial resources for sustainable development.

From April 1, 2023, large Canadian government suppliers are mandated to disclose their greenhouse gas emissions (GHG) and establish reduction targets for procurements exceeding 25 million dollars under the new Supplier ESG Disclosure rules for federal contractors.

Bill S- 211, which took effect on January 1, 2024, compelled companies to unveil actions taken to prevent forced and child labor in their supply chains. This legislation, known as “The Fighting Against Forced Labour and Child Labour in Supply Chain Act” mandates that Canadian companies prepare and publish annual reports detailing their efforts in this area, starting May 31, 2024.

Based on the recommendations of the International Sustainability Standards Board (ISSB), the Canadian Sustainability Standards Board (CSSB) proposed the Canadian Sustainability Disclosure Standards (CSDS) in March 2024. These standards will be effective as of January 1, 2025, with the purpose of standardizing sustainability and climate-related disclosures.

3. Theoretical framework

The upper echelon theory, developed by [Hambrick and Mason \(1984\)](#), posits that the personality, preferences and individual characteristics of top executives, including demographic, psychological and biological, shape their perception of the situations and challenges they encounter. These factors subsequently influence their choices, strategic decisions and firms’ outcomes. These characteristics help distinguish effective managers from less effective ones ([Wong et al., 2011](#)). In particular, CEO characteristics remain the focus of the upper echelon theory analysis as the CEO acts as the conductor of the firm’s management team, deciding on strategies and driving firm outcomes, including ESG performance.

In this study, we focus on a specific biological characteristic of CEOs that has been the subject of several empirical studies, namely, CEO facial masculinity.

CEO facial masculinity is associated with testosterone levels, and biological research has demonstrated its positive association with a set of masculine behaviors. Previous studies have shown that CEOs with high facial masculinity tend to engage in unethical behavior and exhibit traits such as ambition, aggressiveness, dominance, success, power and competitiveness. They also possess a strong drive for achievement and a significant desire to maintain their social status ([Wong et al., 2011](#); [Carré and McCormick, 2008](#); [Carré et al., 2009](#); [Tsujiura and Banissy, 2013](#); [Lewis et al., 2012](#); [Ahmed et al., 2019](#); [Amin et al., 2024](#); [Harymawan et al., 2023](#); [Nasih et al., 2023](#)). However, it is important to note that CEOs with high facial WHRs may truly have a face only an investor could love [2]. While their behavior might not be valued in personal relationships, it can lead to significant organizational success in a professional context ([Elsheikh et al., 2022](#)). In this regard, [Kim et al. \(2022\)](#) stated that “CEO’s facial masculinity has a double edged impact on corporate outcomes”. Powerful CEOs have the potential to make harmful decisions for the firm ([Kamiya et al., 2019](#); [Kim et al., 2022](#)), but they are also more likely to take risks to enhance competitiveness, enter new markets, achieve the firm’s goals and steer their companies to success through different strategies they implement and monitor ([Wong et al., 2011](#); [Elsheikh et al., 2022](#)).

4. Literature review and hypothesis development

The upper echelon theory, developed by [Hambrick and Mason \(1984\)](#), posits that the demographic, psychological and biological attributes of top executives shape their perceptions and decision-making processes. This theory emphasizes that the personal traits of CEOs not only influence their strategic choices but also impact organizational outcomes. For firms that navigate complex environments, understanding the attributes of their leaders remains essential for predicting corporate behavior and performance.

Empirical evidence found that CEOs with higher facial masculinity are more likely to engage in tax avoidance (Araujo *et al.*, 2021; Harymawan *et al.*, 2023). This finding aligns with the predictions of the upper echelon theory, which posits that a CEO's biological attributes can influence his decision-making and may also indicate a more masculine CEO's desire to assert dominance in competition, thereby attracting a greater number of investors. Additionally, facially masculine CEOs are more likely to misreport (Jia *et al.*, 2014; Kim *et al.*, 2022), to lead riskier and more leveraged firms (Kamiya *et al.*, 2019; Asyik *et al.*, 2022) and to minimize their corporate social responsibility disclosures (Nasih *et al.*, 2023). This suggests that the face width-to-height ratio may embody some masculine behaviors, such as a heightened need to maintain social status, diminished fear of engaging in risky activities, and displays of aggression and achievement drive, all of which influence strategic decisions made by CEOs. It was also found that CEOs with higher facial masculinity increase their earnings management practices but decrease their conservative reporting practices (Elsheikh *et al.*, 2022; Amin *et al.*, 2024), confirming the interrelationship between the biological traits of leaders and their risk-related decisions.

Moreover, the study by Wong *et al.* (2011) indicated that higher levels of facial masculinity are associated with improved financial performance. Similarly, Elsheikh *et al.* (2024) found that this effect is particularly evident within the Bumiputera group. These findings reinforce the relationship between masculinity and a heightened sense of power, coupled with increased aggressiveness toward competitors and a strong drive for achievement. This dynamic facilitates entry into new markets and capitalizes on promising opportunities, yielding positive outcomes.

Conversely, studies by Kobbi-Fakhfakh and Trigui (2025) and Elsheikh *et al.* (2024) found no significant effects of facial masculinity on tax avoidance or financial performance, suggesting that the influence of such traits may be context-dependent and potentially moderated by regulatory environments. This contrasts with upper echelon theory predictions.

Given these mixed findings, our study contributes by focusing on a specific outcome: environmental social governance performance. The aim is to clarify how facial masculinity influences ESG performance in Canada.

Implementing a CSR strategy boosts the overall social welfare, bolsters a firm's financial stability, mitigates potential risks related to environmental and social concerns, serves as a pathway for social recognition, and strengthens the firm's reputation (Abdullah, 2024; Martinez-Ferrero *et al.*, 2024; Pareek and Sahu, 2024; Mondal and Sahu, 2025). Furthermore, it attracts investors favoring firms adopting sustainable practices, facilitates the firm's entry into new markets where CSR standards are imposed and offers a competitive advantage (Pareek and Sahu, 2024). And even in the absence of a mandate, adopting CSR practices enhances corporate reputation by instilling investor confidence and contributing to a more sustainable organization (Abdullah, 2024; Pareek and Sahu, 2024).

Building on the aforementioned studies, we assume that, in the Canadian context, where CSR adoption strategy is not mandatory, CEOs with higher facial masculinity, characterized by competitiveness, make bold and long-term CSR decisions that draw investors focused on sustainability. And as a marker of a "healthy business", CEOs seek to enhance the ESG performance to penetrate new markets, unlock attractive investment opportunities and, most importantly, maintain their social status at the helm of sustainable firms. Moreover, leaders with high facial masculinity are often characterized by traits such as aggressiveness, ambition, and a strong desire for power. Their voluntary adoption of CSR programs can solidify their dominant market position, even when these strategies involve high costs. Such leaders perceive CSR primarily as an avenue for social recognition and reputation enhancement, driven by their need to sustain social status and to be perceived by stakeholders as visionaries who prioritize long-term strategies. Thus, we formulate our research hypothesis as follows:

H. The CEOs' facial masculinity positively affects ESG performance.

5. Research design

5.1 The variables

5.1.1 ESG performance (ESG SCORE). ESG performance refers to the extent to which a company is committed to environmental, social and governance responsibilities, as well as its effectiveness in implementing these three pillars. In our study, ESG performance represents the dependent variable.

Previous studies have used the ESG score to measure ESG performance ([Saini et al., 2023](#); [Zhou et al., 2022](#); [Cheng et al., 2014](#)). This score is calculated as the weighted average of three pillars: environmental, social and governance [3]. Each pillar score ranges from 0 (the worst) to 100 (the best).

According to previous studies, assessments of ESG performance can vary significantly between rating agencies ([Dorfleitner et al., 2015](#); [Berg et al., 2022](#)). This variability stems primarily from three factors. First, there is “scope divergence”, where agencies base their evaluations on different sets of attributes. Second, the “measurement divergence” occurs when agencies assess the same attribute using distinct indicators. Lastly, “weight divergence” refers to the differing importance assigned to various attributes by different agencies. This variability can result in substantial differences in assessments of corporate responsibility, leading to markedly different ESG scores.

In this study, the Datastream database was used to collect ESG scores, which were prepared by the ESG rating agency, Refinitiv. The rationale for selecting these scores is similar to that of [Abdullah \(2024\)](#): (1) Refinitiv employs comprehensive and detailed factors in its assessment, enabling a thorough evaluation of each firm’s performance; (2) Refinitiv’s robust data collection and analysis methodology enhances reliability; (3) Refinitiv’s standardized approach to ESG ratings facilitates comparability across companies and sectors.

5.1.2 CEO facial masculinity (MASCUL). Referring to previous studies, we used the ratio of facial width to height (fWHR) as a proxy for CEO facial masculinity ([Amin et al., 2024](#); [Elsheikh et al., 2024](#); [Hambrick and Mason, 1984](#); [Harymawan et al., 2023](#); [Kamiya et al., 2019](#); [Kobbi-Fakhfakh and Trigui, 2025](#); [Mills and Hogan, 2020](#)). fWHR is calculated by dividing the bizygomatic width-the distance between the left and right zygion (the cheekbones)-by the height of the upper face-the vertical distance from the upper lip to the lowest point where the eyebrows meet. For calculating this ratio, we needed the photos of all the CEOs of the firms in the sample.

First, we compiled a list of CEOs from the firms in our sample. Following the methodology of previous studies, we manually collected photographs of these CEOs from annual reports and online sources such as Wikipedia, Wallmine, MarketScreener and Zonebourse [4]. Subsequently, we used ImageJ software to convert each selected photo into an 8-bit grayscale image with a height of 400 pixels ([Amin et al., 2024](#); [Asyik et al., 2022](#); [Kamiya et al., 2019](#); [Kim et al., 2022](#)). Finally, with the same software, we measured the necessary distances to calculate the facial width-to-height ratio.

5.1.3 Control variables. In order to accurately examine the CEO facial masculinity-ESG performance relationship, we incorporated additional CEO attributes and firm-level characteristics as control variables (CONTROLS).

The CEO attributes include age (AGE), tenure (TENURE), duality (DUALITY) and nationality (FOREIGNCEO). Previous literature has found associations between these attributes and CSR performance ([Uyar et al., 2022](#); [Chu et al., 2023](#); [Dunbar et al., 2020](#); [Meier and Scheir, 2021](#); [Rehman and Hamdan, 2023](#); [Bhaskar et al., 2023](#); [Bertrand et al., 2021](#); [Malik et al., 2020](#); [Shahab et al., 2019](#)). According to the upper echelon theory, the age of the CEO plays a significant role in shaping strategic decisions related to CSR commitment. Older CEOs typically possess greater experience, making them more attuned to environmental and social concerns, and empirical studies support this assertion ([El Ghouli et al., 2016](#); [McCarthy et al., 2017](#); [Yan et al., 2024](#); [Chen et al., 2019](#); [Khan et al., 2020](#)). Longer CEO tenure might be detrimental to ESG performance ([Yan et al., 2024](#); [Khan et al., 2020](#)). They might be risk-averse and their incentives could be based on financial indicators rather than CSR results. The duality of the CEO

fosters managerial opportunism and a drive to maximize his personal profits. As a result, this duality is negatively associated with CSR performance, likely due to a reluctance to engage in CSR initiatives (Bhaskar *et al.*, 2023, 2024). Regarded as an out-group by stakeholders, the foreign CEO strives to change this perception and earn their trust. To establish his legitimacy and credibility, he adopts more CSR practices, demonstrating that the firm he leads is making a meaningful contribution to society (Bertrand *et al.*, 2021; Adomako and Tran, 2023).

Firm-level characteristics were controlled by the following variables: firm size (FSIZE), leverage (LEV) and profitability (ROA). These variables have been identified in prior literature as factors influencing CSR (Aristananda and Risman, 2022; Jeong *et al.*, 2021; Ghardallou, 2022; Swandari and Sadikin, 2016; Tang *et al.*, 2012). Large firms are typically distinguished by high ESG performance, owing to their financial capacity to support sustainable investments and their visibility in the market (Jeong *et al.*, 2021; Ghardallou, 2022). Previous studies have shown that over-indebted firms are less likely to engage in CSR investments due to financial constraints and pressure from creditors (Ghardallou, 2022; Swandari and Sadikin, 2016). Firms with high profitability generate surplus financial resources, enabling them to finance sustainable projects that, while costly, align with their long-term objectives (Aristananda and Risman, 2022; Jeong *et al.*, 2021; Ghardallou, 2022; Swandari and Sadikin, 2016).

5.2 Sample selection

Our sample comprises all the companies listed on the Canadian S&P/TSX Composite Index. Initially, 227 listed firms were identified, all of which were active in the Datastream database and operating in different sectors. From these 227 firms, we excluded financial ones and those whose market is outside Canada. We also removed firms whose start dates mentioned in the Datastream were after 2012, firms that do not use calendar year, non-sector-classified firms and those led by women CEOs (Jia *et al.*, 2014; Kamiya *et al.*, 2019; Ahmed *et al.*, 2019; Elsheikh *et al.*, 2024).

The above selection process yielded a sample of 88 firms, resulting in 993 firm-year observations spanning the years 2012–2022.

In our regression model, the dependent variable, CSR performance, is proxied by ESG score. We excluded firm-year observations that did not have available ESG scores and removed observations that had missing data for any required variable.

Table 1 outlines the selection process of our sample to estimate the regression model. The final sample includes a total of 833 firm-year observations (Table 1, Panel A). Panel B and Panel C of Table 1 display the sample split by year and by industry, respectively.

5.3 Model specification

To test our hypothesis, we conducted the following regression model:

$$\text{MODEL:ESG SCORE}_{i,t} = \beta_0 + \beta_1(\text{MASCUL})_{i,t} + \beta_n(\text{CONTROLS})_{i,t} + \varepsilon_{i,t}$$

Our variable of interest is MASCUL and the main coefficient of interest in the regression model is β_1 . This coefficient represents an estimate of the impact of CEO facial masculinity on ESG performance.

In our regression model, we incorporated additional CEO attributes and firm-level characteristics as control variables (CONTROLS).

The measurements and the sources of all the study variables are summarized in Table 2.

6. Results and discussion

6.1 Descriptive statistics for variables

The final sample of our study consists of 833 observations from firms listed on the Canadian S&P TSX Composite Index, examined during the period 2012–2022.

Table 1. Summary of the sample selection process

Panel A: Sample selection criteria		
		Number of firms
All Canadian firms listed on the Canadian stock exchange (S&P TSX) and active in the Datastream database		
227		
<i>Excluding firms:</i>		
• Operating in financial sector		(4)
• Whose market is not Canada		(44)
• Whose start dates are after 2012		(25)
• Without calendar year		(60)
• Not assigned to any sector		(1)
• With a women CEO		(5)
<i>Number of firms in the initial sample</i>		88
<i>Total initial firm-year observations</i>		993
<i>Excluding firm-year observations:</i>		
• Due to unavailability of ESG SCORE		(156)
• With missing data from any of the necessary control variables		(4)
<i>Total final firm-year observations</i>		833
Panel B: Distribution of firm-year observations by year		
Year	Number of obs.	Percentage
2012	65	7.80
2013	68	8.163
2014	69	8.283
2015	73	8.763
2016	77	9.244
2017	77	9.244
2018	79	9.484
2019	82	9.844
2020	83	9.964
2021	83	9.964
2022	77	9.244
<i>Total</i>	833	100
Panel C: Distribution of firm-year observations by industry		
Industry type	Number of obs.	Percentage
Basic materials	213	25.57
Consumer discretionary	52	6.24
Consumer staples	30	3.60
Energy	241	28.93
Industrials	131	15.73
Technology	11	1.32
Telecommunications	33	3.96
Utilities	122	14.65
<i>Total</i>	833	100

Table 2. Variables' measurement

Acronyms	Definitions	Measures	Sources/Tools
<i>Dependent variable: CSR performance</i>			
ESG SCORE	Performance ESG	Score ESG	Datastream
<i>Independent variable of interest</i>			
MASCUL	CEO facial masculinity	Ratio of facial width to height (fWHR)	Annual reports; Wikipedia; Wallmine; MarketScreener; Zonebourse; ImageJ software
<i>Independent control variables</i>			
AGE	CEO age	Age of the CEO	Annual reports; Wikipedia; Wallmine; MarketScreener; Zonebourse
TENURE	CEO tenure	Number of years holding the position of CEO	Annual reports; Wikipedia; Wallmine; MarketScreener; Zonebourse
DUALITY	CEO Duality	1 (0 otherwise) if the CEO of the firm is also the chair of the board of directors	Annual reports; Wikipedia; Wallmine; MarketScreener; Zonebourse
FOREIGNCEO	CEO nationality	1 (0 otherwise) if the CEO's origin is not Canada	Annual reports; Wikipedia; Wallmine; MarketScreener; Zonebourse
FSIZE	Firm size	Natural logarithm of total assets	Datastream
LEV	Leverage	Total debt to total assets	Datastream
ROA	Profitability	Net income to total assets	Datastream

To preserve valuable information and mitigate the undesirable impact of outliers, all continuous variables were winsorized at the 1st and 99th percentiles.

The descriptive statistics for the study variables are summarized in [Table 3](#).

[Table 3](#) shows that the average (median) value of ESG SCORE is 48.448 (48.65), with a range from 10.82 to 83.24. In addition, our variable of interest, MASCUL, ranges from 1.331 to 2.499, with an average (median) value of 1.897 (1.898).

To ensure the absence of multicollinearity among the independent variables in our regression model, we conducted Pearson and Spearman correlation tests. The results of these tests are resumed in [Table 4](#). The Pearson correlations are displayed in the bottom left and the Spearman correlations in the top right.

Table 3. Summary descriptive statistics for variables

Variables	Mean	Median	Standard deviation	Minimum	Maximum
ESG SCORE	48.448	48.65	18.934	10.82	83.24
MASCUL	1.897	1.898	0.231	1.331	2.499
AGE	55.25	55	7.514	35	79
TENURE	7.854	6	5.89	1	25
DUALITY	0.162	0	0.369	0	1
FOREIGNCEO	0.267	0	0.442	0	1
FSIZE	15.606	15.554	1.414	12.4	18.422
LEV	0.28	0.282	0.175	0	0.72
ROA	0.043	0.045	0.081	-0.279	0.314

Note(s): This table reports the descriptive statistics for the study variables using 833 firm-year observations from 2012 to 2022. All variables are defined in [Table 2](#). All continuous variables are winsorized at the 1st and 99th percentiles

Table 4. Correlation matrix

Variables	1	2	3	4	5	6	7	8
1. MASCUL	1	0.028	0.085**	−0.074**	0.081**	0.137***	−0.052	−0.022
2. AGE	0.029	1	0.310***	0.169***	0.001	0.008	0.015	0.033
3. TENURE	0.044	0.317***	1	0.223***	−0.132***	−0.115***	0.032	−0.095***
4. DUALITY	−0.050	0.192***	0.264***	1	0.184***	−0.011	−0.009	0.031
5. FOREIGNCEO	0.143***	0.025	−0.112***	0.184***	1	0.085**	−0.055	−0.017
6. FSIZE	0.098***	−0.009	−0.088**	−0.020	0.079**	1	0.463***	0.022
7. LEV	−0.080**	0.010	0.056	−0.024	−0.064*	0.462***	1	−0.050
8. ROA	−0.042	0.079**	−0.093***	0.043	0.004	0.095***	−0.068**	1

Note(s): This table reports the correlation matrix using 833 firm-year observations for ESG SCORE from 2012 to 2022. All variables are defined in [Table 2](#). All continuous independent variables are winsorized at the 1st and 99th percentiles. The bottom left half of the table contains Pearson's parametric correlation coefficients, while the upper right half of the table shows Spearman's non-parametric correlation coefficients. ***, **, and * denote significant at the 1%, 5%, and 10% levels, respectively

In previous studies, there has been no consensus on the threshold for identifying multicollinearity issues. However, it is generally accepted that the absolute value of the correlation coefficient should not exceed 0.8, as suggested by Kennedy (2008) and Green (2008).

The highest correlation coefficient observed in this study was 0.463, which occurred between FSIZE and LEV. Thus, all calculated correlation coefficients fall within the acceptable range, indicating that there is no multicollinearity problem among the independent variables of the study.

6.2 Empirical results and discussion

The objective of this study is to examine the effect of the CEO facial masculinity on ESG performance. To achieve this, we analyzed a sample of non-financial firms listed on the Canadian S&P/TSX Composite Index and utilized STATA software to conduct a linear regression model on panel data from 2012 to 2022.

To ensure the reliability of our results, we conducted different econometric tests, including tests of specification, heteroscedasticity and autocorrelation. The “Breusch–Pagan test” and the “Wooldridge test” indicated the presence of a heteroscedasticity problem and autocorrelation issues, respectively. Consequently, we estimated our model using *Feasible Generalized Least Squares (FGLS)*.

Table 5 below summarizes the FGLS estimates derived from the study’s model. Since the Wald χ^2 test is significant at the 1% level, we confirm that the model has a significant explanatory power.

Table 5 presents a positive and statistically significant coefficient for MASCUL, confirming the study’s hypothesis that CEO facial masculinity positively influences CSR performance. This result confirms the predictions of the upper echelon theory. Our findings suggest that CEOs with higher facial masculinity—who are often characterized by ambition, dominance, competitiveness, a strong drive for achievement, and a pronounced desire to maintain social status—are more likely to adopt and actively implement CSR strategies that enhance firm ESG performance. Such leaders tend to favor bold, risk-taking decisions designed to boost firm competitiveness, achieve

Table 5. Baseline results of regression model estimation

Variables	Coef.	<i>p</i> -value	Coef.
MASCUL	4.292**	0.015	2.43
AGE	0.123**	0.047	1.99
TENURE	−0.243***	0.000	−3.74
DUALITY	1.851	0.261	1.12
FOREIGNCEO	2.154	0.110	1.60
FSIZE	5.143***	0.000	5.72
LEV	−6.062*	0.053	−1.94
ROA	−2.472	0.392	−0.86
Intercept	−26.441*	0.077	−1.77
IND-FE	YES		
Y-FE	YES		
FIRM-FE	YES		
Wald χ^2	5172.54		
Prob > χ^2	0.000		
Adjusted R^2	0.847		
<i>N</i>	833		

Note(s): This table reflects results of FGLS estimates for regression model. The dependent variable is a proxy of CSR performance, ESG SCORE. The variable of interest: the CEO facial masculinity, MASCUL. The sample selection process is described in Table 1, and all variables are defined in Table 2. All continuous independent variables were Winsorized at the 1st and 99th percentiles. The model includes year, industry and firm fixed effects. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

strategic goals, attract new investors, and penetrate markets with higher CSR expectations (Wong *et al.*, 2011; Elsheikh *et al.*, 2022). In the Canadian context, where CSR practices remain largely voluntary, these CEOs appear willing to bear the upfront costs and implementation burdens associated with robust CSR programs because they recognize the reputational, market-access, and investor-attraction benefits that follow. By pursuing CSR strategically, high-masculinity CEOs both safeguard their status and drive firm success, which helps explain the positive association we observe between facial masculinity and ESG outcomes.

Regarding the control variables, Table 5 shows that their impact on CSR performance is inconclusive. The direction and significance of the coefficients associated with these variables are mixed.

Table 5 indicates that ESG SCORE is positively (negatively) and significantly associated with AGE (TENURE). Those results suggest that older CEOs (CEOs with less seniority) are more engaged in corporate social responsibility strategy. In fact, previous studies (Yan *et al.*, 2024; Chen *et al.*, 2019; Khan *et al.*, 2020) have confirmed that older CEOs have greater expertise and awareness of the social responsibility of firms. Additionally, longer CEO tenure may have a detrimental impact on CSR performance because these leaders often prefer short-term financial objectives over long term social responsibilities.

For the CEO duality and CEO nationality, these factors were found to be positively associated with CSR performance, though not significantly (Rehman and Hamdan, 2023; Bhaskar *et al.*, 2023; Bertrand *et al.*, 2021).

Furthermore, Table 5 shows a significant positive (negative) effect of FSIZE (LEV) on ESG SCORE, confirming the findings of Jeong *et al.* (2021) and Ghardallou (2022). Larger firms and less indebted firms are generally more involved in CSR strategy. In contrast, the results suggest the absence of any impact of the firm's profitability (ROA) on CSR performance.

7. Additional analysis

To strengthen our findings, we conducted three robustness tests. All specifications included control variables along with control variables for year, industry and firms. The three dependent variables, included in the regression models, correspond to the three pillars of the ESG score: Environmental Score (ENV SCORE), Governance Score (GOV SCORE) and Social Score (SOC SCORE). Table 6 reports the results of the robustness tests.

Results presented in Table 6 remain consistent with our baseline findings for ENV SCORE and SOC SCORE, indicating that both environmental and social performance increase with the CEO facial masculinity. However, the insignificance of the coefficient for GOV SCORE found suggests that the governance performance is not affected by the CEO facial masculinity.

8. Conclusion

The objective of this study was to investigate the effect of CEO facial masculinity on ESG performance in the Canadian context. Using a sample of 88 non-financial firms listed on the S&P/TSX Composite Index, and drawing on Upper Echelons Theory, we find a positive and statistically significant association between CEO facial masculinity and firm ESG performance. In the Canadian voluntary-CSR setting, firms led by CEOs with higher facial masculinity appear more likely to adopt and effectively implement CSR strategies. We interpret this finding as consistent with the fact that higher facial masculinity is a leadership trait such as long-term strategic orientation, ambition, competitiveness, status-preserving motives, and a greater willingness to undertake risk-bearing investments that can enhance firm competitiveness and reputational benefits. These results are robust to alternative specifications using the three CSR pillars as dependent variables. At the same time, our conclusions are qualified by measurement and endogeneity limitations discussed below.

Table 6. Results of additional analysis

Variables	ESG SCORE		GOV SCORE		SOC SCORE	
	ENV SCORE Coef.	p-value	Coef.	p-value	Coef.	p-value
MASCUL	4.770*	0.067	−3.470	0.236	6.100**	0.002
AGE	0.107	0.189	0.490***	0.026	0.012	0.872
TENURE	−0.282***	0.001	−0.542***	0.000	−0.203***	0.010
DUALITY	−1.842	0.314	7.11***	0.004	2.593	0.234
FOREIGNCEO	1.872	0.236	−4.087*	0.057	2.977*	0.061
FSIZE	4.731***	0.000	1.518	0.282	3.935***	0.000
LEV	−2.457	0.514	−14.305***	0.003	0.182	0.962
ROA	−0.714	0.828	−6.872	0.208	−0.243	0.941
Intercept	−37.072**	0.040	48.748	2.07	−3.393	0.844
IND-FE	YES		YES		YES	
Y-FE	YES		YES		YES	
FIRM-FE	YES		YES		YES	
Wald χ^2	5329.56		3781.27		4320.86	
Prob > χ^2	0.000		0.000		0.000	
Adjusted R^2	0.846		0.599		0.826	
N	833		833		833	

Note(s): This table reflects results of the additional analysis. The dependent variables are the proxies of CSR performance: Environmental Score (ENV SCORE), Governance Score (GOV SCORE) and Social Score (SOC SCORE). The variable of interest is the CEO facial masculinity, MASCUL. The sample selection process is described in Table 1, and all variables are defined in Table 2. All continuous independent variables were Winsorized at the 1st and 99th percentiles. All specifications include year, industry and firm fixed effects. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively

8.1 Policy implications

Our results carry several implications for corporate governance, investors, and policymakers. First, CEO behavioral traits traditionally viewed as aggressive or risk-seeking need not be uniformly detrimental: in institutional environments where CSR yields reputational, investor-attraction, or market-access benefits, such traits may facilitate decisive investments in substantive CSR activities. Boards and nominating committees should therefore consider the strategic fit between CEO characteristics and firm objectives—particularly for firms targeting markets or investors with strong CSR expectations. Second, investors and ESG evaluators should be aware that CEO profile may condition firm CSR strategies and outcomes; integrating executive trait information with standard financial and ESG analyses may improve investor assessment of management quality and strategic intent. Third, policymakers and standard-setters aiming to promote high-quality CSR should recognize that voluntary contexts create heterogeneous firm responses; policies that increase transparency and align short-term incentives with long-term CSR benefits may encourage broader and more consistent CSR adoption.

8.2 Limitations and scope for further research

We acknowledge two main limitations that delimit the scope of inference and point to directions for future work. First, ESG measurement varies across rating agencies, and our analysis relies on Refinitiv scores from Datastream; differing methodologies and coverage can produce divergent assessments of corporate responsibility, so future studies should triangulate across multiple ESG providers or alternative CSR proxies. Second, our empirical specification establishes an association but does not resolve endogeneity concerns such as reverse causality, omitted time-varying variables, or CEO self-selection. To strengthen causal claims, subsequent research could employ instrumental-variable or panel-IV strategies, or incorporate CEO-level fixed effects with richer longitudinal data. Finally, extending the

analysis to other national institutional settings, industry contexts, and firm outcomes (e.g. innovation, risk exposure, disclosure quality) will help clarify when and why CEO facial masculinity translates into substantive strategic behavior.

Notes

1. For all upcoming information relating to ESG disclosure regulatory efforts in Canada, please refer to the following address: <https://www.brightest.io/canada-esg-reporting> (accessed 01/04/2025).
2. Wong *et al.* (2011, p. 482)
3. Candio (2024, p. 3)
4. We started by searching for CEO photographs in annual reports, selecting only high-quality images that were taken from a frontal angle and depicted a neutral expression. Additionally, we explored various online sources to broaden our collection and ensure that we captured photographs of all CEOs that met our established criteria.

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