Do Masculine CEOs in High-ESG-Rated Companies Avoid Committing Fraud? Evidence From European Countries

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Globally, fraud cases and financial losses remain substantial across European countries. This research offers a novel perspective on the determinants of fraud by examining biological factors—specifically, masculine behavior influenced by the testosterone hormone. CEOs' masculine tendencies may drive riskier and potentially fraudulent behavior. Notably, masculine traits in males are often reflected in facial structure and can be objectively measured using the facial width-to-height ratio (fWHR). Conversely, robust internal controls and sound corporate governance are critical in preventing fraudulent activities. As global business practices evolve, sustainability has emerged as an urgent concern. In response, companies are increasingly adopting Environmental, Social, and Governance (ESG) principles to promote sustainable operations and mitigate fraud risks. This study investigates whether ESG practices moderate the relationship between CEO masculinity and the likelihood of financial statement fraud. The sample comprises high-ESG-rated firms from 2022 to 2024, as ranked by S&P Global, focusing on publicly listed companies on European stock exchanges. Data were analyzed using the STATA software, employing Fixed Effects Model regression. The results reveal that masculine CEOs in high-ESG-rated companies are less likely to engage in financial misreporting. This finding underscores the importance of balanced ESG implementation in reducing opportunities for misconduct.

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1 Introduction

Nowadays, fraud in the European region is a critical issue. Fraud cases and the median loss incurred in the European region remain high. In fact, globally, it has the highest median loss caused by fraud (Association of Certified Fraud Examiners, 2024). According to the *Report to the Nations* by ACFE (2024), fraud cases in the European region—including Western and Eastern Europe, as well as some countries from Western and Central Asia—accounted for 11% of cases and resulted in a median loss of $1,575,000, the highest among all regions. Furthermore, fraudulent financial statements were the most costly fraud schemes, alongside corruption and asset misappropriation schemes. The top-level management, including Chief Executive Officers (CEOs) and executives, were the primary perpetrators responsible for the highest number of cases and losses.

CEOs hold a superior position in making strategic decisions for the company, including disclosures in financial statements (Bouaziz et al., 2020). Interestingly, Wong et al. (2011) stated that a CEO's inherent traits play a crucial role in shaping behavior to make decisions. In line with the Upper Echelons Theory, CEOs' characteristics shape expectations and influence their decision-making (Hambrick & Mason, 1984). Masculine behavior drives males to be more aggressive and leads them to take risky decisions (Harymawan et al., 2023; Prasetyo et al., 2022). Furthermore, Kamiya et al. (2019) linked masculinity to a tendency to commit financial fraud, and Jia et al. (2014) then tied masculinity to social status, which drives males to manipulate accounting records solely to maintain their reputation as top performers. However, companies with strong quality control can limit the board's inclination to commit fraud and mitigate stock crash risk (Li et al., 2021). The growing emphasis on business sustainability has driven companies to adopt new business and management models that go beyond profit generation, incorporating Environmental, Social, and Governance (ESG) factors (Li et al., 2024).

This paper introduces a novel perspective to the literature on accounting behavior and fraud investigation by examining the relationship between individual biological factors and fraudulent activities. Additionally, it highlights the importance of integrating the ESG model into corporate management systems to inhibit fraudulent activities through comprehensive control measures, environmental protection, social inclusion, and good governance. The paper proceeds with theoretical reviews and the rationale for hypotheses, followed by the methodology used to examine the influence of masculine behavior on fraudulent financial statements, with ESG practices serving as a moderating variable. Finally, the discussion covers the results and offers both practical and theoretical recommendations related to accounting fraud.

2 Theoretical Background / Literature Review

Masculine Behavior

Male masculine behavior is influenced by his testosterone hormone (Archer, 2006). High testosterone levels shape males' masculine traits, including aggression, dominance, and risk-taking behavior (Kamiya et al., 2019). Physically, testosterone influences male facial development by promoting the growth of cheekbones during adolescence, leading to a broader facial structure (Tjaraka et al., 2022; Verdonck, 1999).

Environmental, Social, and Governance (ESG)

ESG has become a significant global issue, as corporate performance in the fast-growing global economy and society is increasingly evaluated within the framework of Environmental, Social, and Governance (Li et al., 2021). For example, Henisz & McGlinch (2019) outlined the evaluation criteria for ESG: environmental aspects include energy consumption, carbon emissions, and other sustainability concerns; social criteria focus on maintaining and improving affected communities by addressing issues such as labor rights and poverty; and governance emphasizes the importance of sound corporate practices, including transparency and adherence to organizational codes of conduct.

Fraudulent Financial Statements

ACFE (2024) stated that fraudulent financial statements as the deliberate omission or misstatements of accounting data or critical information in the disclosed financial reports to manipulate the user perception, ultimately influencing their decisions about the company. There are various types of fraud within financial statement fraud schemes, including fictitious or understated revenues, improper disclosure, improper asset valuations, overstated and concealed liabilities, etc.

Hypotheses Development

Masculine Behavior and Fraudulent Financial Statements

Males' masculine behavior is linked to a competitive attitude, aggression, strong determination, dominance, and a tendency for risk-taking (Kim et al., 2022; Tsujimura & Banissy, 2013). A higher level of masculine behavior in males is physically reflected in a wider facial shape or a higher fWHR (Verdonck, 1999). Stirrat and Perrett (2010) further added that a higher fWHR ratio has been correlated with a greater tendency to commit fraud. Zhang et al. (2023) and Harymawan et al. (2023) further reinforced these findings, stating that masculine-faced CEOs are willing to do whatever it takes—even manipulate accounting standards—to sustain their achievements. *H1: Masculine-faced CEOs are more likely to commit fraudulent financial statements.*

ESG and Fraudulent Financial Statements

Companies with strong ESG performance typically have more effective risk management and internal control systems (Li et al., 2024). They possess solid mechanisms to reduce fraudulent activities and enhance corporate compliance with relevant regulations and governance standards (Izzeldin et al., 2021). *H2: High-ESG-rated companies are more likely to avoid committing fraudulent financial statements.*

ESG and The Relationship between Masculine Behavior and Fraudulent Financial Statements.

CEOs with masculine faces are associated with risk-taking behavior and may even be more prone to commit fraudulent activities in order to achieve goals and maintain their social image (Jia et al., 2014; Kamiya et al., 2019; Kim et al., 2022). Conversely, companies with an ESG orientation are more transparent in their organizational management systems and decision-making processes, and they also comply with codes of conduct and regulations (Champagne et al., 2022). Accordingly, masculine CEOs of high-ESG-rated companies are restricted from manipulating financial statements. *H3: Masculine-faced CEOs* in high-ESG-rated companies are more likely to avoid committing *fraudulent financial statements.*

3 Methodology

Research Data

The sample data in this research consist of companies with high ESG ratings from 2022 to 2024. S&P Global, a reputable sustainability expert institution, ranks the selected companies from a pool of over 7,690 global companies based on their ESG practices. Specifically, this research focuses on companies listed on stock exchanges in European countries. Companies in the financial sector, such as banks, are excluded due to differing financial regulations (Kim et al., 2022). Secondary data are sourced from companies' annual, sustainability, and financial reports, as well as from the Sustainability Yearbook released by S&P Global. All secondary data are obtained from companies' official websites, stock exchanges, and the S&P Global website. The sample selection follows a purposive sampling method to identify the most representative samples. The sample criteria include listing in the S&P Sustainability Yearbook, providing clear CEO images, containing data for Benish's M-score calculation, and including other financial data relevant to the control variables. Furthermore, the analysis technique employs Fixed Effect Panel Data Regression, and the data are processed using STATA version 17.0. The regression model is presented below.

$$\begin{aligned} Benish's\ M - score_{i,t} &= \beta_0 + \beta_1 fWHR_{i,t} + \beta_2 ESGR_{i,t} + \beta_3 fWHR\ x\ ESGR_{i,t} \\ &+ \beta_4 CEOAGE_{i,t} + \beta_5 ROA_{i,t} + \beta_6 LEV_{i,t} + \beta_7 FRIMSIZE_{i,t} \end{aligned}$$

Operational Definitions and Measurement

Masculine Behavior

CEOs' masculine facial structure is measured using the facial width-to-height ratio *(fWHR)* (Kamiya et al., 2019; Kim et al., 2022). Harymawan et al., (2023) describe the fWHR calculation as the width (distance between the left and right cheekbones) divided by the height (distance from the midpoint between the inner ends of the eyebrows to the upper lip). The *fWHR* is considered valid only for males (Jia et al., 2014); therefore, female CEOs were excluded from this research. Java-based image processing application ImageJ, along with an AI generator on the *fWHR* calculator website and Phyton package are used to ensure the highest measurement accuracy.

ESG

We use the ESG score released by S&P Global for each company that is included in their Sustainability Year Book. Specifically, only companies listed on the stock exchange in Europe. Companies in the top 1% are assigned a value of 3, while those in the top 5% and top 10% are assigned values of 2 and 1, respectively.

Fraudulent Financial Statements

The Bensih M-Score model is used to indicate fraudulent financial statements (Valaskova & Fedorko, 2021). A company will be classified as engaging in financial manipulation if its M-Score is greater than or less negative than -2.2. Below is the equation of Beneish M-Score.

M-score= -4.84 + 0.92 DSRI + 0.528 GMI + 0.404 AQI + 0.892 SGI + 0.115 DEPI – 0.172
SGAI + 4.679 TATA – 0.327 LVGI

Control Variables

Additionally, the control variables in this research include the CEO's age (CEOAGE), which represents their age in the observation year. Return on Assets (ROA) and Leverage (LEV) ratios are also considered to assess companies' financial performance. ROA is calculated by dividing Net Income by Total Assets, while LEV is determined by dividing Total Debt by Total Equity. Lastly, Firm Size (FIRMSIZE) is measured as the natural logarithm of Total Assets.

4 Results

Descriptive Statistics Analysis

The study population consists of 63 companies listed on stock exchanges in European countries from 2022 to 2024, based on the Sustainability Yearbook released by S&P Global. Based on the summary of observational data, the average **Benish M-score** is **-2.624,** approaching **-2.22**, which indicates a potential risk of fraudulent financial statements. Subsequently, the average **CEO's face ratio** is **1.75**, with a median **fWHR** value also at **1.75**. Nearly half of the CEOs (**49%**) have a face ratio above the median and average value. Moreover, most CEOs are **58 years old**, with the oldest being **76 years** and the youngest **42 years**.

Panel Data Regression

The **Fixed Effect model** is the most appropriate for estimating panel data of this study.

Table 1: Fixed Effect Model Regression

Benish M-score (Y)	Coef.	St.Err.	t-value	p-value	[95% Conf	Interval]	Sig
fWHR (X)	3.839	1.763	2.18	.032	.342	7.336	**
ESG (M)	2.795	1.341	2.08	.04	.134	5.456	**
fWHR*ESG	-1.556	.762	-2.04	.044	-3.067	-.044	**
CEO_AGE	-.004	.016	-0.25	.802	-.037	.029	
ROA	.078	.03	2.63	.01	.019	.137	**
LEV	.094	.084	1.13	.263	-.072	.261	
F_SIZE	.146	.134	1.08	.282	-.121	.412	
Constant	-11.192	3.532	-3.17	.002	-18.198	-4.186	***
R-squared		0.120	Number of obs		170		
F-test		1.970	Prob > F		0.001		
**** p<.01, ** p<.05, * p<.1*							

Source: STATA results, 2025.

Based on the results, the **fWHR variable significantly influences the Benish M-score**, with a p-value of **0.032**. The **ESG variable** also has a significant influence on the Benish M-score at the **95% confidence level**, with a p-value of **0.04**. Furthermore, the **moderating variable**—the interaction between **fWHR and ESG**—has a p-value of **0.044**, which is below the 0.05 significance level. Among the control variables, **ROA** shows a significant influence on the Benish M-score (p-value = **0.01**). However, the other control variables do **not** significantly influence the dependent variable (**Y**).

General Least Square (GLS) Regression

To ensure that the Fixed Effects model is robust and free from heteroscedasticity and autocorrelation, GLS is employed. The results of the GLS regression still show that fWHR, ESG, and fWHR**ESG significantly influence the Benish M-score, even at the higher significance level of 0.01. Specifically, fWHR, ESG, and fWHR**ESG have p-values of 0.005, 0.007, and 0.008, respectively. Furthermore, there is no multicollinearity in the data, as the correlation between the independent variables is below 0.75.

5 Discussion

Masculine Behavior and Fraudulent Financial Statements

The results indicate that masculine behavior, as proxied by the facial width-to-height ratio (fWHR), significantly influences the indication of fraudulent financial statements. Empirical evidence suggests that biological factors shaping human behavior—such as masculinity in males—are associated with heightened aggression, dominance, and an increased propensity for risk-taking (Kim et al., 2022; Tjaraka et al., 2022). The positive coefficient obtained in the analysis reveals a direct relationship, indicating that a higher fWHR is associated with a greater likelihood of financial statement fraud. Consequently, this study concludes that CEOs with more masculine facial features are more likely to engage in financial misreporting—such as manipulating accounting records or breaching accounting standards—to sustain superior performance and achieve higher profitability (Harymawan et al., 2023; Wong et al., 2011).

ESG and Fraudulent Financial Statements

This study demonstrates the significant influence of ESG on financial statement fraud, suggesting that a company's ESG management model is associated with the likelihood of fraudulent financial reporting. Interestingly, the direction of this relationship, as indicated by the positive coefficient value, suggests that even companies implementing ESG initiatives may still engage in financial statement fraud. In this study, the ESG score is calculated as the average of total scores across three dimensions: Environmental, Social, and Governance (including economic factors). At times, a company may achieve a high overall ESG score, while one component—typically Governance and Economic—remains low, offset by higher scores in the Environmental and Social categories. For example, many firms prioritize environmental and social initiatives to enhance public image, often at the expense of internal governance and financial oversight. Such imbalances can increase the risk of executives manipulating accounting records, either to portray profitability or to survive periods of financial distress (Kim et al., 2022). Moreover, according to the ACFE's 2024 report, other forms of fraud—such as asset misappropriation and corruption—remain prevalent and occur more frequently than financial statement fraud.

ESG and The Relationship between Masculine Behavior and Fraudulent Financial Statements.

Support for Hypothesis 3 is evident in the findings of this study. The results suggest that ESG performance can attenuate the positive relation between masculine behavioral traits—proxied by fWHR—and financial statement fraud. In particular, CEOs exhibiting masculine facial characteristics are generally more prone to engage in fraudulent behavior. However, when operating within firms that demonstrate strong ESG performance and implement comprehensive internal control systems, this tendency is substantially reduced (Li et al., 2024).

6 Conclusions

This study introduces a novel determinant in the theory of accounting fraud by investigating the influence of biological factors on human behavior. Specifically, it explores the relationship between CEOs' masculine facial features and the likelihood of issuing fraudulent financial statements, with ESG practices serving as a moderating variable. The findings suggest that CEOs exhibiting more masculine facial characteristics are statistically more prone to engaging in financial statement fraud. However, this tendency can be significantly reduced when companies rigorously implement ESG frameworks within their governance structures. Moreover, the study emphasizes the importance of integrating all three ESG dimensions—Environmental, Social, and Governance—along with economic considerations, treating them as equally vital components of a sustainable corporate strategy. This research is limited to companies listed on European stock exchanges that have high ESG ratings. Therefore, future studies could expand the scope by including companies from different regions with varying ESG ratings, and by incorporating additional variables—such as market reactions—to further enrich the analysis.

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