# Greenwashing and Audit Fees: Moderating Roles of Media Attention, Digitalization, and Cash Flow Volatility

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**Abstract.** This study examines the impact of corporate greenwashing practices on audit fees and explores the moderating roles of positive media attention, digital transformation degree, and cash flow variability. Using panel data from listed companies in China from 2012 to 2022, the findings reveal that corporate greenwashing leads to lower audit fees, suggesting reduced audit quality. The results further indicate that positive media attention and cash flow variability amplify the negative effect of greenwashing on audit fees, while a higher degree of digital transformation mitigates this effect. Specifically, positive media coverage may create an illusion of corporate transparency, leading auditors to relax their vigilance in the presence of greenwashing. Similarly, high cash flow volatility exacerbates the negative impact, as auditors may overlook potential risks amidst the favorable image portrayed by greenwashing. Conversely, advanced digital transformation facilitates access to comprehensive company data, enabling auditors to better assess the true financial situation and mitigate the influence of greenwashing. The study contributes to the literature by highlighting the complex interplay between greenwashing, media attention, cash flow dynamics, and digitalization in shaping audit quality. The findings have practical implications for auditors, investors, and regulators in evaluating corporate disclosures and ensuring transparent financial reporting.

**Keywords:** greenwashing, audit fee, media attention, digital transformation degree, cash flow variability

# 1. Introduction

With the rise of Environmental, Social, and Governance (ESG) ratings as the "second report" beyond traditional financial statements, many companies attempt to greenwash their own disclosures and financial reports in order to achieve a more favorable ESG rating (Nielsen, 2023). In September 2023, U.S. Securities and Exchange Commission amend the Investment Company Act. This amendment requires portfolios with names suggesting a focus on ESG factors to invest at least 80% of their assets according to these standards. It also prohibits misleading investors by using ESG-related terms in fund investments. This shows that capital market participants value ESG investments but are often misled by information of uncertain authenticity.

Corporate image improvement on environment and society is a strategic activity that emphasizes the selection and communication of key information, aiming to shape and maintain the company's image in the public eye (Aldehayyat, 2021). Research has found that the environmentally conscious companies perform better in the commodity market, making it easier to generate profits (Volschenk et al., 2022). Therefore, investors perceive these companies as having better growth prospects in the capital market, leading to increased investment attraction. The use of vague ESG-related language in fund names has surged since the signing of the Paris Agreement in 2015, often attracting investors deceptively (Mazzacurati et al., 2023).

Because ESG can create a positive impression of companies among capital market participants and artificially inflate company value, many companies engage in greenwashing behaviors. The concept of "greenwashing" emerged during the flourishing period of the environmental movement in the United States, initiated by manufacturers with the primary goal of diverting attention to reduce government regulation and lower production costs (D'Souza et al., 2006). The term "greenwashing" was also coined by American environmentalist Jay Westerveld in 1986 to describe instances where businesses promoted activities like towel reuse in hotels not for environmental conservation but to save laundering costs (Majeed & Kim, 2022).

Greenwashing has become a global concern and a significant topic in sustainable development, with widespread financial and reputational risks in companies (Li et al., 2015). In China, compared to developed countries, requirements for corporate environmental disclosure enacted relatively late, with relatively low mandatory requirements. This situation, combined with differences among ESG rating agencies and inadequate accountability mechanisms, provides opportunities for unethical businesses. Some companies in China engage in greenwashing practice by selectively disclosing information, packaging investments in green projects, and redirecting funds to non-green initiatives (Du, 2015; Xia et al., 2023). Greenwashing practice is not a rare corporate behavior. Many well-known companies, under the pressure of achieving carbon neutrality and reducing their carbon footprint, employ greenwashing strategies in the content and depth of their disclosures to portray a green image to the public.

Greenwashing can enhance a company's ESG image, creating a favorable illusion for auditors, which reduces their vigilance and audit workload, leading to lower audit fees. It is believed that there is a significant correlation between greenwashing behavior and audit quality, with auditors charging relatively lower fees for companies with higher greenwashing tendencies. Corporate impression management behavior influences auditors to charge lower audit fees for companies implementing greenwashing strategies and decreases the probability of issuing non-standard audit opinions (Huang, 2020). Moreover, although greenwashing behavior decrease the actual audit quality, it does not increase the probability of auditors issuing non-standard audit opinions (Du et al., 2018). Existing research has already demonstrated that greenwashing can impact audit quality (Del Giudice & Rigamonti, 2020), but there has been limited investigation into the factors that can exacerbate this negative influence.

To address the aforementioned issues, this paper reclaimed the finding of the negative impact of greenwashing behaviors on audit fees, the main result consistent with the study (Huang, 2020). Audit

work is a crucial component in uncovering corporate greenwashing practices. Audit workload measurement is often positively correlated with audit fees (Wang, 2020). A higher audit workload indicates a more rigorous audit process and a higher risk for auditors to face (Bronson et al., 2017). Due to the illusion created by greenwashing, auditors reduce the workload of audits, subsequently lowering audit fees (Huang, 2020). Specifically, the paper utilizes data from Huazheng and Bloomberg ESG rating agencies to calculate the extent of greenwashing, which follows the approach of Hu (Hu et al., 2023). The calculation of greenwashing involves the E-score of ESG ratings from both Bloomberg and HuaZheng. A higher positive value for greenwashing indicates a more severe greenwashing behavior involved. After a series of robustness tests, the negative impact of greenwashing on audit fees still holds true.

To identify variables that can amplify the impact of greenwashing on audit fees, three moderation effects studies were conducted. Past research indicates that strengthening internal oversight within companies (Geiger & Rama, 2003; Testa et al., 2018) and supervision by small to mid-sized shareholders (Rodriguez et al., 2023) can decrease the greenwashing behaviors of the company. Therefore, both internal factors within the company and external attention can impact greenwashing behaviors. From this perspective, this paper selected three variables for exploration. Cash flow variability and the degree of digital transformation are related to the internal aspects of the company, while positive media attention is associated with external factors. The construction for the variable which measures positive media attention follows previous study (Shen & Wang, 2021). Variable for calculating cash flow variability follows the approach (Allayannis & Weston, 2003). The degree of digital transformation is measured following the method to measure the intangible assets (Trequattrini et al., 2022). The empirical findings demonstrate that positive media attention and cash flow variability would exacerbate the main effect, meaning their combined effect with greenwashing behavior has a negative impact on audit fees on greenwashing.

Furthermore, this paper investigates whether the industry characteristics and ownership features of the company have an impact on the significance of the main effect. This paper found that for stateowned enterprises, heavily-polluted enterprises, and non-high-tech enterprises, the main effect is more significant.

This paper makes contributions to various aspects of the existing literature from three perspectives.

First, this paper supplements the research on the reduction of audit fees caused by greenwashing. Current literature mainly focuses on the relationship between audit fees and a company's ESG performance (Du et al., 2018; K. Zhang et al., 2023), but it has not examined the relationship between audit fees and greenwashing from the perspective of moderating variables. Although previous studies have found that a company's environmental performance can negatively impact the modified audit opinion, with internal controls strengthening this negative influence, and greenwashing practices mitigating it (Du et al., 2018), these studies do not consider the potential influence of existing greenwashing factors on audit fees. K. Zhang et al. (2023) and Burke et al. (2019) focus on the positive role of media attention, suggesting that as an external oversight mechanism, it can reduce the risk of corporate financial fraud and decrease audit fees. However, they did not consider the potential negative role of media attention, which may create an illusion of a good corporate image for auditors, leading to reduced vigilance and a decrease in audit workload. This study validates the conclusion that greenwashing practice leads to a decrease in audit fees. Moreover, it identifies that positive media attention and cash flow variability increase the negative impact of greenwashing on audit fees, whereas a higher level of digital transformation reduces this effect.

Second, this paper aims to provide recommendations for the audit process by exploring factors that exacerbate the impact of greenwashing practice on audit fees. Yue and Li analysed the impact of media attention on corporate greenwashing behavior and found that media attention significantly inhibits

greenwashing behavior (Yue & Li, 2023). Another study examined auditor responses to negative media coverage of client environmental, social, and governance (ESG) practices, finding that auditors take note and incorporate negative ESG information provided by the media into their risk response (Burke et al., 2019). However, these articles overlook the potential impact of positive news on corporate greenwashing behavior and auditing. With increasing media attention, more information about companies is available. Whether this information deters or enables greenwashing is a key focus of this research. Through empirical research, using media attention as a moderating variable, this paper found that it promotes companies in establishing a positive image through greenwashing, adversely affecting audit quality and outcomes. The drastic fluctuation of cash flow reflects significant financial risk for the company. The moderating role of cash flow volatility in the impact of greenwashing on audit fees also exacerbates its negative effects. This suggests that auditors should not be misled by the illusion created by greenwashing practice in companies with high cash flow volatility. They should ensure an appropriate level of audit workload to guarantee audit quality. Digital transformation makes information easier to share and transmit, enabling auditors to more easily access and review data relevant to company operations, thereby comprehensively assessing the company's financial and operational situation. This helps to dispel the illusion of a favorable image created by corporate greenwashing behavior. Therefore, for enterprises with a high degree of digital transformation, auditors can more easily utilize digital means to collect company information, reconstructing the true operational and financial situation of the enterprise, thereby reducing the impact of greenwashing practice on the quality of the audit.

The final contribution is a recommendation for financial report users to approach financial statements with caution. Auditors favor companies that demonstrate strong environmental performance, leading to a notable decrease in the likelihood of modified audit opinions for these firms (Du et al., 2018). Companies with high cash flow volatility and significant positive media attention are more likely to create an illusion through greenwashing that reduces audit quality for auditors. Investors should be cautious when interpreting financial reports from such companies to avoid increased investment risk. When skeptical about a company's ESG performance, investors may prefer companies with extensive digital transformation, which offers greater information accessibility and financial transparency. High digital transformation levels enhance the credibility of financial reports, reducing auditors' susceptibility to corporate greenwashing illusions.

The main purpose of this article is to illustrate how greenwashing behavior can influence auditors' professional judgments, leading to lower audit fees. Additionally, it analyzes three moderating variables to determine which factors can impact this process. Finally, the study classifies companies into different categories to investigate whether the impact of greenwashing on audit fees varies across company types.

The rest of this paper is organized as follows. Section 2 provides the literature review and the seven hypotheses. Section 3 presents the data and the variables used. Section 4 describes the empirical research design and the main result about the relationship between greenwashing and audit fee. Section 5 provides the results of analysis regarding the industry characteristics and ownership features of the company. The conclusion presents in Section 6.

# 2. Literature Review and Hypotheses Development

In this section, a review of relevant literature is undertaken, and key hypotheses are formulated. This encompasses examining the relationship between corporate greenwashing and audit fees, exploring associated mechanisms, and presenting additional analyses.

### 2.1. Media attention and audit fee

In companies that regularly disclose environmental information, greenwashing affects audit fees through impression management. By selectively disclosing and manipulating information, companies reduce perceived risks and associated costs. Auditors prioritize environmental reports, where a positive

image indicates transparency, decreasing the likelihood of regulatory scrutiny and audit failures. Despite higher costs for environmental responsibility, companies demonstrate commitment to stakeholders, improving societal acceptance and reducing auditor demand for heightened risk assessments and corresponding premiums (Huang, 2020).

Auditing can independently verify the environmental information disclosed by companies by scrutinizing their activities to reveal whether greenwashing practices exist (Chen & Duan, 2023; Testa et al., 2018). Companies that perform well in terms of ESG tend to have lower abnormal audit fees. Auditors consider this information as an indication of the company's commitment to transparency, reducing audit uncertainty and workload, consequently lowering audit costs (Singh et al., 2022). Since greenwashing can increase ESG scores, this paper hypothesizes that greenwashing will lead auditors to lower their guard, reduce audit workload, and decrease audit fees. Hence, the first hypothesis is proposed.

H1: There is a negative relationship between corporate greenwashing and audit fee.

### 2.2. The mechanisms

For the general public, the authenticity of green advertising is seldom a focal point. Instead, when a company or brand is perceived as having a good reputation and trustworthy green advertising, the public tends to hold a more positive attitude toward the brand (Olsen et al., 2014; Szabo & Webster, 2021). These positive effects are intensified when a company's greenwashing is exposed in the media. Once the public recognizes this deception, they are more inclined to trust companies genuinely committed to environmental sustainability and avoid those implicated in greenwashing (de Jong et al., 2020; De Vries et al., 2015).

Particularly in the case of online news with low originality and frequent reposts, green concerns can strengthen consumers' willingness to make purchases (McShane et al., 2011). This suggests that the media's portrayal of corporate news regarding greenwashing can significantly impact a brand's external image.

Increased media attention creates the impression of enhanced corporate transparency, reducing information asymmetry among investors (Hammami & Hendijani Zadeh, 2020; Merkl-Davies & Brennan, 2007). However, excessive media attention can conceal greenwashing behavior, thereby exacerbating its negative impact on audit fees (Lyon & Montgomery, 2013). Media attention not only fails to decrease audit fees but, due to heightened pressure from media reporting, increases audit efforts and subsequently raises audit fees (Hoitash et al., 2007; Joe, 2003).

This dual role of the media in the context of greenwashing, either promoting transparency or exacerbating negative effects, highlights the complexity of its influence. This research expects to find that positive media attention amplifies the negative effect of greenwashing on audit fees.

Therefore, the proposed hypothesis is:

H2: Positive media attention exacerbates the negative effects between corporate greenwashing and audit fees.

The high volatility of cash flows often reflects business instability and uncertainty, posing greater challenges for auditors in assessing a company's financial condition (Kinney & McDaniel, 1989). This uncertainty can prompt auditors to conduct more thorough audits to avoid overlooking potential risks, thereby increasing audit complexity and costs. High cash flow volatility is associated with financial risk, indicating that companies are more susceptible to external disruptions, necessitating deeper audits by auditors.

Research suggests that auditors perceive high volatility as a sign of heightened risk, which leads to higher audit fees to compensate for increased risk management efforts (Bryan & Mason, 2020). Additionally, heightened cash flow volatility provides companies with opportunities to engage in complex financial maneuvers to conceal or disguise their true financial position, particularly in the

context of greenwashing. This makes it more challenging for auditors to identify potential financial misconduct, increasing the difficulty of preventing greenwashing behavior (X. Li, 2010).

Given these, cash flow variability is expected to amplify the negative effect of greenwashing on audit fees. Based on these insights, the following hypothesis is proposed.

H3: Cash flow variability exacerbates the negative effects between corporate greenwashing and audit fees.

The use of digital technology has streamlined information transmission and retrieval, bolstered the quality of the information environment, and heightened visibility in financial markets. Corporate digital transformation, leveraging big data technology, improves data accuracy and ensures transparency in ESG (Environmental, Social, Governance) information disclosure through robust regulatory and audit mechanisms (Cerchiaro et al., 2021; Saxena et al., 2022). This allows investors to more accurately assess the financial condition of companies, increasing overall market efficiency and strengthening external governance mechanisms. Regulatory bodies, investors, and analysts can more easily monitor corporate behavior, mitigate potential misconduct, and promote a healthier corporate environment (Asif et al., 2023).

Digital innovation reduces financial friction and enhances the dissemination effects of financial mechanisms through the use of new technologies and financial tools (Kame Babilla, 2023). Consequently, information dissemination related to "greenwashing" behavior becomes more widespread in the era of digitization (Z. Sun et al., 2023). Advanced digital transformation in firms improves data accuracy and reliability by facilitating data collection, processing, and storage. Digital technologies also enhance transparency and timeliness in enterprise information disclosure to external stakeholders. This transparency encourages more cautious management of financial and business activities, reducing incentives for greenwashing.

Thus, the paper argues that extensive digital transformation in firms helps auditors maintain audit quality by avoiding disruptions caused by greenwashing's misleading favorable image. With the expectation that a higher degree of digital transformation mitigates the negative effect of greenwashing on audit fees, the following hypothesis is proposed.

H4: Degree of digital transformation mitigates the negative effects between corporate greenwashing and audit fees.

### 2.3. The effects of internal and external characteristics

Investors react negatively to environmental pollution incidents disclosed by listed companies through stock price fluctuations. High-pollution enterprises may face stricter supervision and penalties, causing heightened investor concerns and larger declines in stock prices for these companies (Wu et al., 2022). In the face of intense market competition, large-scale operations, and modest profitability, high-pollution enterprises may be more inclined to alleviate external pressures by presenting false environmental responsibility. Simultaneously, weak government regulation and lack of media attention drive them (Jie & Jiahui, 2023). This inclination leads these companies to adopt "greenwashing" strategies to address potential negative impacts. The fifth hypothesis is proposed as follows:

H5: The negative correlation between corporate greenwashing and audit fees will be more pronounced in heavily-polluted industry enterprises.

Advanced technologies such as data analytics and artificial intelligence facilitate firms in the hightech industry to gather, analyze, and present ESG information more efficiently, enhancing access to data (Macpherson et al., 2021). Furthermore, there is a higher frequency of intangible asset disclosure observed in high-tech firms. This disclosure pattern is attributable to the substantial influence of intangible assets on shareholder value (Marrone et al., 2024). As a consequence, heightened external investor pressure and increased awareness of ESG risks and opportunities are experienced by high-tech firms. These arguments lead to our sixth hypothesis: H6: The negative correlation between greenwashing and audit fees will be more significant in nonhigh-tech firms.

State-owned enterprises may have advantages in financing, easily securing external funding and relying less on internal cash flows. In contrast, private enterprises may struggle more with financing, relying heavily on internal cash flows and being more vulnerable to financial conditions (Wang & Yung, 2011). Regional isomorphism behavior is more pronounced in state-owned enterprises, as they tend to gain legitimacy through institutional mimicry, particularly by adopting "greenwashing" practices (Ren & Ting, 2021). In this context, our seventh hypothesis is:

H7: The negative correlation between corporate greenwashing and audit fees will be more significant in state-owned enterprises.

# 3. Data

#### 3.1. Data sources

The sample includes all stocks of listed companies on the main board of the Shanghai and Shenzhen Stock Exchanges from 2012 to 2022. ESG rating data comes from two agencies, Bloomberg and Huazheng, both of which are highly familiar with the Chinese market and provide authoritative data widely used in research (Deng et al., 2023; Nielsen, 2023). Media coverage data is sourced from CNRDS, covering over 400 online media outlets and more than 600 newspapers and periodicals. Audit fees, cash flow variability, the degree of digital transformation, and data related to company management are extracted from the China Stock Market and WIND databases. Excel and Stata17 are utilized for data cleansing, processing, and conducting regression analysis.

The data processing steps are as follows: exclude companies labeled as ST, \*ST, PT, and financial institutions; exclude samples with missing key audit matters in the audit reports; exclude samples with missing data in any variable; to mitigate the impact of outliers on regression results, all variables are winsorized at the 1st and 99th percentiles before regression.

The total sample for the main analysis includes 7294 firm-year observations.

#### 3.2. Main variables

Dependent variable: Audit fee. Audit fees play a complementary role in analysts' forecasts, providing information about potential changes in a client's future earnings (Stanley, 2011). Through the payment of audit fees, investors can gain insights into the genuine perspectives of auditors, as higher fees are associated with increased perceived risks by auditors (McShane et al., 2011). The present study refers to Cao and Hou (2024) in using the natural logarithm of the audit total fee (AuditFee) for the current year of listed companies.

Main independent variable: Greenwashing. The measurement (Hu et al., 2023) of a company's peerrelative greenwashing score is defined using the formula presented in Eq. (1).

$$GW_{i,t-1} = \left(\frac{ER_{i,t-1} - E\bar{R}_{dis}}{\sigma_{dis}}\right) - \left(\frac{ER_{i,t-1} - E\bar{R}_{per}}{\sigma_{per}}\right)$$
(1)

To more explicitly investigate the impact of companies' greenwashing behavior in the previous period, which refers to the past year, all data on greenwashing for companies are lagged by one period. Greenwashing behavior is mainly associated with the environmental dimension and has little relevance to the social and governance dimensions. Therefore, this paper primarily focuses on the Environmental (E) score.  $E\bar{R}_{dis}$  utilizes the E score from Bloomberg's ESG rating data regarded as the ER disclosure score, while  $E\bar{R}_{per}$  uses the E score from Huazheng's ESG rating data considered as the ER real-performance score.  $\sigma_{dis}$  represents the standard deviation of environmental disclosure scores, while  $\sigma_{per}$  represents the standard deviation of greenwashing.

The followings are the three moderator variables. Positive Media Attention: This dataset includes

traditional newspapers and periodicals such as The First Financial Daily, 21st Century Business Herald, Securities Daily, Securities Times, Shanghai Securities News, The China Securities Journal, and others. The information from online financial news primarily originates from a diverse array of mainstream websites, including Jinrongjie, Hexun, Huaxun, Sina, Phoenix Finance, Sohu Finance, NetEase, Zhongjin Online, and East Fortune Network. The prevalence of news reports from online media surpasses that of newspapers and periodicals by a significant margin. This observation underscores the extensive reach of online media, enabling quicker dissemination of information compared to traditional print sources. Widely read by financial professionals, investors, government regulatory agencies, scholars, and the general public, these publications serve as important news sources for China's securities market and financial sector due to their authority, professionalism, and extensive coverage. After filtering data from both the internet and newspapers, sum up the two datasets, match them with the corresponding stock codes for the respective years, and divide by 1000 due to the large values.

Cash Flow Volatility: To estimate the volatility of cash flows and profits, it is required that each sampled company provides complete annual data, including net profit and operating cash flows, during their respective estimation periods. Utilizing corresponding data for each year, the standard deviation of diluted earnings per share and operating cash flow per share is calculated as the volatility measures for profits and cash flows (Shin & Stulz, 2000). In specific terms, the definition of cash flow volatility can be expressed by the following formula (2):

Cash Flow Volatility = 
$$\sqrt{\frac{1}{2}\sum_{n=1}^{3} (\frac{\text{Operating Net Cash Flow}_{i,t}}{\text{Total Assets}_{i,t}} - \frac{1}{3}\sum_{n=1}^{3} \frac{\text{Operating Net Cash Flow}_{i,t}}{\text{Total Assets}_{i,t}})^2}$$
 (2)

The degree of digital transformation: Following previous approach (Trequattrini et al., 2022), the first step is to use details of year-end intangible assets disclosed Notes to the Financial Statements to identify digital content within the company's intangible assets. The measurement of the degree of digital transformation in the enterprise is the already digitized intangible assets divided by the total intangible assets. The variable "Digital" encompasses content related to cloud computing, blockchain, big data, automation, and other aspects. Calculating the proportion of digital intangible assets to total intangible assets as an indirect indicator for assessing the degree of digitalization within the company.

Control Variables: Following the previous literature (Cullinan & Roush, 2011; Huang, 2020), several control variables are incorporated in the regression model. The variable NI is the net inventory. Since the level of net inventory would reflect the complexity and scale of company operations, it affects audit workload and audit fees. Indep is the ratio of independent directors, and the presence of independent directors can enhance corporate governance transparency and oversight, potentially reducing audit workload by mitigating corporate financial risks. INST is the ratio of institutional ownership. Institutional investors typically pay closer attention to company financial reports and engage in active oversight, which enhances financial transparency and leads to lower audit fees. WW (Whited & Wu, 2006) is an index which reflects the degree of financial constraints. The reason to include this variable is because financial constraints may indicate that a company faces limitations in financing and capital structure, which can affect the complexity and transparency of its financial reporting. As a result, this influences the difficulty and workload of audits, thereby impacting audit fees.

MtFee represents the natural logarithm of management expenses. The level of management expenses reflects the complexity of company management and operations, directly increasing the workload of audits. FinBack is an indicator variable, taking the value of 1 if the board and senior management possess a financial background and 0 otherwise. Having a financial background in the board and senior management typically implies a deeper understanding and experience in financial management. This contributes to enhancing the transparency and compliance of financial reporting, reducing auditors' skepticism towards financial reports. TmtPay signifies the natural logarithm of the total compensation for the top three executives. High total compensation indicates a large company size and complex operations, involving more financial transactions and cash flows, which could increase auditors' difficulty when auditing financial reports.

Net\_OR denotes the net amount of other receivables. A high net amount of other receivables indicates that the company is involved in complex financial arrangements or significant transactions with other entities, which increases the workload for auditors. Additionally, Opinion is an indicator variable that takes the value of 1 if the company's financial report for the year receives a standard audit opinion, and 0 otherwise. Big4 serves as an indicator variable, taking the value of 1 if the firm is audited by one of the Big Four international accounting firms, and 0 otherwise. TBalance represents the ratio of the sum of the shareholding ratios of the second to fifth largest shareholders divided by the shareholders compared to the shareholding ratio of the largest shareholder is relatively high, it would indicate a dispersed shareholder structure with multiple interests, potentially increasing audit complexity and workload. All the variable definitions are listed in Table 1.

Table 2 presents summary statistics for the main variables used in the analysis. The average value of GW is approximately -0.471. For AuditFee, the mean is 14.14, with a standard deviation of 0.786, indicating the natural logarithm of audit fees. Media has an average of 0.33, and Cashvol exhibits a mean of 0.036. As for other firm-level characteristics, an average firm exhibits the following mean values for control variables: Indep of 37.683, INST of 56.604, WW of -1.076, MtFee of 19.867, FinBack of 0.678, TmtPay of 14.907, Net\_OR of 18.407, Opinion of 0.985, Big4 of 0.152.

Variable	Definition
GW	The difference between the firm's environmental disclosure and actual environmental performance scores and the mean and standard deviation of peers in the same industry for the same period.
AuditFee	The natural logarithm of audit fees.
Media	The total number of positive news reports in newspapers and online media divided by 1000.
NI	The natural logarithm of net inventory.
Indep	Ratio of independent directors.
INST	Ratio of institutional ownership multiplied by 1000.
WW	Index used to measure the degree of financial constraints.
MtFee	The natural logarithm of management expenses.
FinBack	An indicator variable that equals 1 if the board and senior management have a financial background, and 0 otherwise.
TmtPay	The natural logarithm of the total compensation for the top three executives.
Net_OR	Net amount of other receivables.
Opinion	An indicator variable that equals 1 if the company's financial report for the year receives a standard audit opinion, and 0 otherwise.
Big4	An indicator variable that equals 1 if the firm is audited by one of the Big Four international accounting firms, and 0 otherwise.
TBalance	Ratio of the sum of the shareholding ratios of the second to fifth largest shareholders divided by the shareholding ratio of the largest shareholder.
Cashvol	The three-year volatility of the ratio of Operating Net Cash Flow to Total Assets for a company, representing the variability in cash flow over the specified period
Digital	The degree of digital transformation, specifically, the proportion of year-end detailed items of intangible assets related to digital technology disclosed in the company's financial reports relative to the total intangible assets.

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Variable	Observations	Mean	Std. Dev.	Min	Max
GW	7294	-0.471	1.268	-5.546	5.691
AuditFee	7294	14.14	0.786	11.918	18.143
Media	7294	0.33	0.825	0.001	28.145
NI	7294	20.904	1.896	8.061	27.704
Indep	7294	37.683	5.967	18.18	80
INST	7294	56.604	22.125	0.001	152.119
WW	7294	-1.076	0.088	-4.107	-0.774
MtFee	7294	19.867	1.215	15.402	25.168
FinBack	7294	0.678	0.467	0	1
TmtPay	7294	14.907	0.764	11.321	18.584
Net_OR	7294	18.407	2.016	9.842	26.332
Opinion	7294	0.985	0.12	0	1
Big4	7294	0.152	0.359	0	1
TBalance	7294	0.66	0.59	0.007	3.615
Cashvol	7294	0.036	0.032	0.001	0.254
Digital	7294	0.001	0.004	0	0.120

Table 2: Summary Statistics

### 4. Research Design and Main Results

#### 4.1. Research design

The main regression of this paper is to explore whether the lagged greenwash will have an impact on the audit fees on the current period. In order to control for potential macroeconomic fluctuations and factors such as company size and industry impact, and to more accurately estimate the relationship between GW and audit fees in the model, both time fixed effects and firm fixed effects models are simultaneously employed. Therefore, to test hypothesis H1, the following regression model is constructed. The model construction is based on previous studies (Lu et al., 2015), where panel data analysis also utilized time and firm fixed effects models.

 $AuditFee_{i,t} == \alpha_0 + \alpha_1 GW_{i,t-1} + \gamma X_{i,t} + Year_{FE} + Firm_{FE} + \varepsilon_{i,t}$ (3)

AuditFee<sub>i,t</sub> is the natural logarithm of audit fees of firm i in year t.  $GW_{i,t-1}$  is the degree of greenwashing of firm i in year t-1.  $X_{i,t}$  is the control variable vector defined in the former text, which includes NI, Indep, INST, WW, MtFee, FinBack, TmtPay, Net\_OR, Opinion, Big4 and TBalance. This paper aims to specifically investigate whether the illusion of the positive image created by the company's past greenwashing behavior affects the current audit fees. Therefore, the occurrence of GW should precede the determination of audit fees. The timing for other variables remains within the current period, without considering any lag effects of these variables on audit fees.  $Year_{FE}$  and  $Firm_{FE}$  represent the year fixed effects and firm fixed effects, respectively. In this regression equation, the main focus lies on the coefficient of  $GW_{i,t-1}$ . If it is significantly negative, it indicates that the illusion created by a company through greenwashing to shape a positive image can have a negative impact on the current audit fees, leading to a decline in audit quality.

The mechanisms proposed by H2, H3, and H4 are tested by continuing to use panel data and constructing a model that is inclusive of year fixed effects and firm fixed effects.

 $\begin{aligned} AuditFee_{i,t} &= \beta_0 + \beta_1 GW_{i,t-1} + \beta_2 Media_{i,t} + \beta_3 GW_{i,t-1} \times \\ Media_{i,t} + \gamma X_{i,t} + Year_{FE} + Firm_{FE} + \varepsilon_{i,t} \quad (4) \\ AuditFee_{i,t} &= \beta_0 + \beta_1 GW_{i,t-1} + \beta_2 \text{Cashvol}_{i,t} + \beta_3 GW_{i,t-1} \times \\ \text{Cashvol}_{i,t} + \gamma X_{i,t} + Year_{FE} + Firm_{FE} + \varepsilon_{i,t}(5) \end{aligned}$ 

 $AuditFee_{i,t} = \beta_0 + \beta_1 GW_{i,t-1} + \beta_2 \text{Digital}_{i,t} + \beta_3 GW_{i,t-1} \times \text{Digital}_{i,t} + \gamma X_{i,t} + Year_{FE} + Firm_{FE} + \varepsilon_{i,t}$ (6)

 $\gamma X_{i,t}$  is still the control variable vector. The construction of the moderation effects model is based on the approach outlined in the research (Dewi & Fachrurrozie, 2021). Variables  $Media_{i,t}$ , Cashvol<sub>*i*,*t*</sub> and Digital<sub>*i*,*t*</sub> are included as moderating variables in the equation. The hypothesis posits that positive media attention and cash flow variability can amplify the negative impact of GW on audit fees, but the degree of digital transformation would mitigate the negative impact. Therefore, when  $Media_{i,t}$  and Cashvol<sub>*i*,*t*</sub> are considered as moderating variables, the coefficients of the interaction terms are expected to be negative. When Digital<sub>*i*,*t*</sub> is considered as a moderating variable, the coefficient of the interaction term is expected to be positive.

### 4.2. Main results

The main results are presented in Table 3, with the dependent variable of AuditFee and independent variable of GW. The regression in the first column does not include control variables, while the regression in the second column includes control variables. The coefficients are -0.006 and -0.007 respectively for Column (1) and (2), and they are statistically significant at the 5% significance level. This indicates that one standard deviation increase of the greenwashing would lead to 1.12% decrease in audit fees. The findings suggest that a company's past greenwashing behavior can impact auditors' judgments by creating a positive illusion, thereby influencing the quality of audit work and leading to a reduction in audit fees. This regression result supports hypothesis H1, that corporate greenwashing has a negative effect on audit fees.

Table 3: Main Results					
Variable	AuditFee				
	(1)	(2)			
GW	-0.006**	-0.007**			
	(0.003)	(0.003)			
NI		0.053***			
		(0.005)			
Indep		-0.004***			
		(0.001)			
INST		0.001***			
		(0)			
WW		-0.134***			
		(0.042)			
MtFee		0.204***			
		(0.009)			
FinBack		0.012*			
		(0.007)			
TmtPay		0.023***			
		(0.008)			
Net_OR		0.036***			
		(0.003)			
Opinion		-0.074***			
		(0.023)			
Big4		0.182***			
		(0.02)			

Tbalance		0.008
		(0.01)
Constant	14.138***	7.944***
	(0.003)	(0.179)
Firm Fixed	YES	YES
Year Fixed	YES	YES
Observstions	7294	7294
Adj <i>R</i> <sup>2</sup>	0.921	0.941

Notes: This table reports the main results, with AuditFee as the dependent variable. In column (1), controlling for firm and year fixed effects, no control variables are included. In column (2), control variables are added. All variables are defined in Table 1. Standard errors (in parentheses) are clustered at the firm level. \*, \*\*, and \*\*\* denote significance at the 10%, 5%, and 1% levels.

#### 4.3. Mechanism analysis

In exploring the mechanism of greenwashing's impact on audit fees, this paper primarily considers moderating effects. By testing hypotheses H2, H3, and H4, it aims to assess whether variables media attention and cash flow variability have the amplifying effect on the negative impact of greenwashing on audit fees, and whether the degree of digital transformation has the mitigating effect on the negative impact of greenwashing on audit fees.

By running the three regression equations for the moderating mechanisms, the regression results for Table 4 are obtained. All three regressions include control variables, year fixed effects and firm fixed effects. The columns correspond to media attention, cash flow variability and the degree of digital transformation as the respective moderating variables: Column (1) for media attention, Column (2) for cash flow variability and Column (3) for the degree of digital transformation.

Here, the main focus is on the coefficients of the three interaction terms.

For the interaction term of media attention, the coefficient is -0.011, and it is significant at the 1% level of significance. This indicates that positive media attention can intensify the shaping of a favorable image for the company in relation to greenwashing (GW). This may be because positive media coverage, like greenwashing, can embellish the company's image, which could influence auditors' impressions and judgments for this company. For companies with abundant positive media coverage and high levels of greenwashing, auditors may relax their vigilance, leading to a reduction in audit workload and consequently resulting in decreased audit fees. Therefore, the result confirms the hypotheses H2.

The coefficient of the interaction term for cash flow volatility is significantly negative at the 1% significance level, with the coefficient of -0.234. This indicates that the volatility of cash flow exacerbates the negative effect of greenwashing. This regression result validates hypothesis H3. Cash flow reflects a company's risk resistance capability (Zhang et al., 2023). Companies with high cash flow volatility typically face more uncertainty and risk, which should increase auditors' attention. However, if companies engage in greenwashing behavior, it may lead auditors to develop an illusion of a positive corporate image, reducing their focus on potential issues or errors related to cash flow volatility. Auditors may rationalize problems with cash flow for the sake of maintaining a positive impression of the company, and greenwashing may even be attributed as the cause of cash flow fluctuations. Auditors may also be more inclined to believe that financial statements are transparent and reliable, thereby reducing the depth and scope of the audit work.

The significance level of the coefficient for digitalization as an interaction term is positive and statistically significant at the 5% level. The regression results confirm the hypotheses H4. This indicates that the digitalization of companies mitigates the negative impact of greenwashing on audit fees. With high levels of digital transformation in companies, auditors may easily perceive that the data generation process involves minimal human intervention and is highly automated (Tiberius & Hirth, 2019).

Through digital platforms and tools, the public and regulatory bodies can more easily access corporate ESG information. Additionally, with more accurate data, auditors can more effectively assess the financial condition of companies, reducing the potential impact of greenwashing practice on information accuracy.

In summary, the media attention and cash flow variability can amplify the negative impact of greenwashing on audit fees, but the degree of digital transformation would mitigate the negative impact of greenwashing practice on audit fees.

Table 4. Mechanism Analysis

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Variable	AuditFee		
	(1)	(2)	(3)
GW	-0.003	-0.0005	-0.008***
	(0.003)	(0.004)	(0.003)
Media	0.005		
	(0.009)		
GW×Media	-0.011***		
	(0.002)		
Cashvol		-0.472***	
		(0.114)	
GW×Cashvol		-0.234***	
		(0.076)	
Digital			-0.002
			(2.606)
GW×Digital			2.574**
			(1.06)
Controls	YES	YES	YES
Constant	7.919***	7.891***	7.946***
	(0.179)	(0.188)	(0.179)
Firm Fixed	YES	YES	YES
Year Fixed	YES	YES	YES
Observstions	7294	7294	7294
Adj <i>R</i> <sup>2</sup>	0.941	0.943	0.941

Notes: This table presents the outcomes of mechanism tests with the dependent variable being AuditFee. The definition of GW\*Cashvol is the interaction term between GW and Cashvol. GW\*Digital is the interaction term between GW and Digital. Firm and year fixed effects are controlled for, and all relevant control variables are included, as defined in Table 1. Standard errors (in parentheses) are clustered at the firm level. Significance levels are denoted by \*, \*\*, and \*\*\*, indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

### 4.4. Robustness tests

This section conducts the following robustness tests to demonstrate that the main result of the negative impact of greenwashing on audit fees holds true for changes in model settings.

First, considering that the illusion of greenwashing behavior on a company's image may have lagged effects, as the length of the lagged period is not easy to capture, in the main regression analysis of this paper, the greenwashing considered is lagged by one period, meaning that the greenwashing behavior of companies one year ago negatively impacts audit fees in the current period. Here, robustness tests are conducted by lagging greenwashing by two periods while the control variables remain in the current

period, to assess the impact of greenwashing lagged by two periods on audit fees for the current period.

The regression results are shown in Table 5. Column (1) does not include control variables, while column (2) includes control variables. Except for the independent variable GW lagged by two periods, the dependent variable and control variables follow the definitions provided earlier. Moreover, time fixed effects and firm fixed effects are still employed. The regression results indicate that before adding control variables, the impact of greenwashing on audit fees is significant at the 10% level of significance. After adding control variables, the impact of greenwashing on audit fees is significant at the 5% level of significance. Furthermore, the coefficients of greenwashing are negative, indicating that greenwashing can create an illusion of shaping a positive corporate image, leading auditors to relax their professional vigilance and be more inclined to trust the company's financial reports, thereby reducing the audit workload. This indicates that the greenwashing behavior of companies in earlier periods can have a negative impact on audit fees in later periods, thus demonstrating the robustness of the main results of this paper.

Second, altering the time span (Shangkun et al., 2012). The time span of this paper covers 11 years, from 2012 to 2022. To test the robustness of the main regression results, three new time spans, 2014-2020, 2015-2021 and 2016-2022, are constructed by changing the start and end years of the regression and the number of years included for the model.

In the regression, GW is still defined as lagged by one period as previously defined. The dependent variable and control variables remain the same as defined in the previous text. These three regressions still include year fixed effects and firm fixed effects. The negative coefficients of GW are all significant at the 5% level, with the coefficient values at -0.011 for 2014-2020, -0.012 for 2015-2021 and -0.007 for 2016-2022. This regression result indicates that the main findings of this paper remain significant regardless of changes in the regression time span.

Third, change the data source for greenwashing whitewashing. The calculation method remains consistent with the initial GW calculation. GW\_1 represents actual scores from SusallWave and disclosed scores from Huazheng. GW\_2 is a new calculation of greenwashing, with SynTao as the actual score and Huazheng as the disclosed score. The robustness of the main regression results is tested by altering the data source for greenwashing whitewashing. In the regression, consistent with the previously defined variables, the independent and control variables remain the same as defined earlier. This regression still includes annual fixed effects and company fixed effects. The negative coefficient of GW is significant at the 1% level. These regression results indicate that the primary findings of This paper remain significant after changing the independent variable's data source for greenwashing whitewashing.

Therefore, all of these robustness tests indicate that the main result of this paper is robust, but because the sample is only from China, caution is needed when generalizing to other countries or regions.

Variable	AuditFee		
	(1)	(2)	
GW_new	-0.006*	-0.008**	
	(0.003)	(0.003)	
Controls	NO	YES	
Constant	14.221***	8.375***	
	(0.003)	(0.231)	
Firm Fes	YES	YES	
Year Fes	YES	YES	
AdjR <sup>2</sup>	0.939	0.9513	

Table 5: Robustness Tests- GW Lagged by Two Periods

Note: This table presents the outcomes of robustness tests. The data for GW is lagged by two periods, and the new data is defined as GW\_new. In Column (1), without the inclusion of control variables, the significance level is at 10%. In Column (2), with the inclusion of control variables, the significance level is at 5%. Significance levels are denoted by \*, \*\*, and \*\*\*, indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

Table 6: Robustness Tests- Altering the Time Span					
Variable	AuditFee				
	(1) (2)		(3)		
	2014-2020	2015-2021	2016-2022		
GW	-0.011***	-0.012***	-0.007**		
	(0.004)	(0.004)	(0.004)		
Controls	YES	YES	YES		
Constant	8.355***	8.83***	9.562***		
	(0.243)	(0.268)	(0.253)		
Firm Fes	YES	YES	YES		
Year Fes	YES	YES	YES		
Observstions	3854	3977	4292		
$\mathrm{Adj}R^2$	0.955	0.955	0.966		

Note: This table presents the outcomes of robustness tests. The definition of GW\*Cashvol is the interaction term between GW and Cashvol. GW\*Digital is the interaction term between GW and Digital. All other variables have been defined in Table 1. In Column (1), the moderator variable is changed to Cashvol, while in Column (2), the moderator variable is changed to Digital. Standard errors (in parentheses) are clustered at the firm level. Significance levels are denoted by \*, \*\*, and \*\*\*, indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

	e	•
Variable	AuditFee	
	(1)	(2)
GW_1	-0.013***	
	(0.005)	
GW_2		-0.011***
		(0.004)
Controls	YES	YES
Constant	8.355***	8.83***
	(0.243)	(0.268)
Firm Fes	YES	YES
Year Fes	YES	YES
Observstions	3854	3977
$\mathrm{Adj}R^2$	0.9681	0.9658

Table7: Robustness Tests- Altering the Independent Variable

Note: This table presents the outcomes of robustness tests. GW\_1 is a new calculation of greenwashing metrics, derived from data provided by SusallWave and Huazheng. GW\_2 is a new calculation of greenwashing metrics, derived from data provided by SynTao and Huazheng. The calculation method remains the same. Significance levels are denoted by \*, \*\*, and \*\*\*, indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

# 5. Further Research

The following research aims to assess whether the negative impact of greenwashing on audit fees varies based on industry characteristics and company ownership features. Table 7 presents the results of the heterogeneity analysis regression in this paper, primarily aimed at testing hypotheses H5, H6, and H7.

### 5.1. Industry heterogeneity

Heavily-Polluted and Lowly-Polluted companies: First, it is considered whether the impact of greenwashing on audit fees varies between heavily-polluted and lowly-polluted companies. Because heavily-polluted companies generate more pollution and are more likely to cause environmental damage, they place greater emphasis on whether their corporate image is environmentally friendly (Yang & Zhang, 2022). Therefore, heavily-polluted companies are more motivated to engage in greenwashing behaviors. Following the approach (Sun et al., 2024), this paper categorizes companies in the sample into two groups: Heavily-Polluted and Lowly-Polluted companies.

Column (1) presents the regression results of lowly-polluted companies, whereas Column (2) presents the regression results of heavily-polluted companies. The coefficient of greenwashing for heavily-polluted companies is -0.012, and it is significant at the 5% level of significance. The coefficient of greenwashing for lowly-polluted companies is not significant. This suggests that the impact of greenwashing on improving the corporate image is greater for heavily-polluted companies and auditors are more likely to reduce audit workload due to the illusion of environmental-friendly corporate image caused by greenwashing. This indicates that assuming H5 is valid, that is, the greenwashing behavior of heavily-polluted companies will have a more significant negative impact on their audit fees.

High-Tech and Non-High-Tech companies:

Next, this paper categorizes the companies in the sample according to a new classification standard. As hypothesis H6 mentioned, the paper posits that high-tech companies, due to their advanced technology and lower opacity of corporate information, are easier for auditors to grasp the true situation of the companies. Therefore, greenwashing is less likely to create a better illusion of corporate image for high-tech companies, resulting in a lower impact of GW on audit fees. High-tech and non-high-tech companies was classified according to the method of Yang & Zhou (2020).

Column (3) is the regression result for non-high-tech companies and Column (4) is the result for high-tech companies. In the regression results for non-high-tech enterprises, the coefficient of GW is - 0.009, and it is significant at the 5% level of significance. The coefficient of GW for high-tech enterprises is not significant. This indicates that non-high-tech enterprises have higher opacity of information, making it difficult for auditors to grasp the true situation of the company. Therefore, companies are more likely to create the illusion of a good corporate image through greenwashing, and auditors are more likely to be deceived by this illusion, resulting in a more pronounced negative impact of greenwashing on audit fees. However, high-tech enterprises have high transparency of information, and it is difficult for greenwashing to change auditors' understanding of the true situation of the company. In summary, this demonstrates that hypothesis H6 holds true.

### 5.2. Ownership heterogeneity

Decisions of state-owned enterprises are more susceptible to government policies (Liang et al., 2015; Lioukas et al., 1993). The positive image of policy compliance by state-owned enterprises makes auditors less likely to suspect greenwashing behavior by the company. Auditors are more inclined to perceive the illusion of a positive image created by greenwashing in state-owned enterprises as the true situation of the company. The following regression results is about the testing hypothesis H7 that is, greenwashing by state-owned enterprises is more likely to relax auditors' professional vigilance, reduce audit workload, and result in a decline in audit quality.

The regression result for non- state-owned enterprises is shown in Column (5) and Column (6) shows the regression result for state-owned enterprises. The coefficient of GW for state-owned enterprises is -0.014, and it is significant at the 1% level of significance. The coefficient of GW for non-

state-owned enterprises is not significant. This indicates that greenwashing behavior by state-owned enterprises is more likely to create a positive illusion of corporate image, and auditors are more inclined to believe the financial information presented by state-owned enterprises. This result validates hypothesis H7.

Table 8: Heterogeneity Tests							
Variable		AuditFee					
-	(1)	(2)	(3)	(4)	(5)	(6)	
	Lowly-	Heavily-	Non-High-	High-Tech	Non- SOE	SOE	
	Polluted	Polluted	Tech				
GW	-0.003	-0.012**	-0.009**	-0.003	0.002	-0.014***	
	(0.003)	(0.005)	(0.004)	(0.004)	(0.004)	(0.004)	
Controls	YES	YES	YES	YES	YES	YES	
Constant	8.332***	7.609***	8.359***	7.845***	8.037***	8.412***	
	(0.219)	(0.321)	(0.254)	(0.261)	(0.268)	(0.264)	
AdjR <sup>2</sup>	0.945	0.938	0.956	0.928	0.934	0.949	

Note: This table presents the results of subgroup analyses, dividing the sample into three subgroups: Non-SOEs and SOEs, Non-Pollutes and Pollutes as well as Non-HighTech amd HighTech. Standard errors are presented in parentheses. Significance levels are denoted by \*, \*\*, and \*\*\*, indicating statistical significance at the 10%, 5%, and 1% levels, respectively.

# 6. Conclusion

This study contributes to the understanding of the relationship between corporate greenwashing and audit fees by examining the moderating roles of positive media attention, digital transformation degree, and cash flow variability. The findings reveal that greenwashing practices lead to lower audit fees, suggesting a reduction in audit quality due to the illusion of a favorable corporate image. Notably, positive media attention and high cash flow variability exacerbate this negative impact, while a higher degree of digital transformation mitigates it.

The results challenge the notion that increased media coverage promotes transparency and accountability, as positive media attention amplifies the negative effect of greenwashing on audit fees. This contrasts with previous studies suggesting that auditors incorporate negative media coverage into their risk assessments. Similarly, the finding that high cash flow volatility intensifies the negative impact of greenwashing highlights the need for auditors to maintain vigilance and not overlook potential risks amidst a favorable corporate image.

Conversely, the mitigating effect of digital transformation underscores the potential benefits of leveraging technology and data-driven approaches in the auditing process. Advanced digital capabilities can facilitate access to comprehensive company data, enabling auditors to better assess the true financial situation and mitigate the influence of greenwashing practices.

The study's findings have practical implications for auditors, investors, and regulatory bodies. Auditors should exercise heightened scrutiny when auditing companies with high positive media attention and cash flow volatility, as these factors may amplify the risks associated with greenwashing. Investors and regulators should approach financial reports and corporate disclosures with caution, particularly for companies exhibiting these characteristics, to ensure transparent and accurate reporting.

While the study makes significant contributions, it is important to acknowledge its limitations. The sample is focused on listed companies in China, and the generalizability of the findings to other contexts should be explored. Additionally, future research could investigate other potential moderating factors or employ alternative methodologies to further understand the dynamics between greenwashing and audit quality. The methodology in the paper could also be improved. The paper only quantitatively

analyzes the increase in audit fees due to greenwashing. Future research could incorporate qualitative analysis, such as interviewing auditors to understand their ability to identify greenwashing and the actual impact of different levels of greenwashing on audit workload.

Overall, this study sheds light on the complex interplay between greenwashing, media attention, cash flow dynamics, digitalization, and audit quality, providing valuable insights for various stakeholders in promoting transparent and ethical corporate practices.

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