

GREENWASHING ACROSS SECTORS IN INDONESIA: HOW DOES IT AFFECTS FIRM VALUE?

Fransisca Tharia Hartanto^{1*}, John Iwan Kusno²

Fransisca.tharia@lecturer.prasetiyamulya.ac.id*

Universitas Prasetiya Mulya, Jakarta, Indonesia^{1,2}

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Abstract

The implementation of mandatory sustainability reporting in Indonesia has raised concerns regarding greenwashing and its financial implications. This study investigates the relationship between greenwashing and firm value across sectors in Indonesia. Using Bloomberg ESG disclosure score and ESG score from 160 listed companies (475 firm-year observations) during 2022–2024, greenwashing is measured using a decoupling approach. This study uses a mean-difference test and panel data regression. The results show that sectors suspected of greenwashing behaviour exhibit significantly higher greenwashing scores than sectors without apparent greenwashing behaviour. However, greenwashing does not have a significant effect on firm value in sectors suspected of greenwashing behaviour. In contrast, greenwashing is positively associated with profitability in sectors without apparent greenwashing behaviour, although this effect is not significant when firm value is measured using PBV. These findings extend the greenwashing literature with empirical evidence from Indonesia, demonstrating that the relationship between greenwashing and firm value depends on sectoral characteristics, suggesting that the consequences of greenwashing differ across industries.

Keywords: Greenwashing, ESG Disclosure Score, ESG Score, Firm Value, Sectors

*Correspondence Author



By Authors

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1. Introduction

Environmental, Social, and Governance (ESG) issues in finance have been trending as investors become increasingly aware of sustainability's importance. In Indonesia, Otoritas Jasa Keuangan (OJK) has issued POJK No. 51/POJK.03/2017 (Otoritas Jasa Keuangan, 2017), in which every public company in Indonesia is obligated to produce a sustainable report as a symbol of transparency and accountability. Moreover, since 2022, based on SEOJK No.

16/SEOJK.04/2021 (Otoritas Jasa Keuangan, 2021), sustainability reporting became mandatory for publicly listed companies in Indonesia. Nonetheless, as the ESG trend increased, the possibility of greenwashing would increase too.

The definition of greenwashing is still vague. Previous research has emphasized greenwashing as an act to create a positive image of the company by selectively disclosing positive information about a firm's environmental or social performance without the full disclosure of negative information on the same dimensions (Lyon & Maxwell, 2011; Marquis et al., 2016). Other authors also highlighted that the selective disclosure is done deliberately to mislead stakeholders in order to obtain financial benefits and preserve legitimacy (Walker & Wan, 2012; Seele & Gatti, 2017). Up until now, there has been no standardized definition for greenwashing, as this issue is still expanding. Consequently, measuring greenwashing is no easy task.

Despite the variation in definitions and measurements, previous research has documented evidence on the effect of greenwashing on firm's performance. In Indonesia, the Greenwash Index was established in late 2025 by Transformasi untuk Keadilan (TuK) Indonesia (Transformasi untuk Keadilan Indonesia, 2025). Specifically, they launched an exclusion list for the palm oil sector in November 2025. Based on their publication, out of 185 palm oil companies, only 36 companies met the administrative criteria. The initiative on launching the exclusion list is expected to enhance new standards of financing decisions, strengthen corporate governance, and protect the environment and community within the sustainable finance ecosystem in Indonesia. Moreover, this index was established to punish those companies that cause negative impacts in the context of ESG by restricting their funding. In other words, companies that are included in the greenwashing index should have worse performance compared to those who are truly ESG responsible.

This study contributes to the greenwashing literature in three ways. First, while prior studies in emerging markets mainly examine the direct relationship between greenwashing and firm value, this study highlights that greenwashing behaves differently across sectors. Second, this study focuses on Indonesia, where mandatory sustainability reporting has been implemented since 2022, yet investor monitoring and ESG information quality are still developing. Third, by separating sectors suspected of greenwashing behaviour from sectors without apparent greenwashing behaviour, this study provides evidence that greenwashing does not affect firm value uniformly.

This research aims to find empirical evidence on whether greenwashing causes a negative effect on the firm value in publicly listed companies in Indonesia between 2022 and 2024. In addition to that, we will conduct several measurements to test whether greenwashing is apparent in Indonesia before testing the effect of greenwashing on the firm value in Indonesia. Thus, the research questions for this study are as follows:

1. Is there any difference in the level of greenwashing across publicly listed firms in Indonesia?

If there is indeed a difference in the level of greenwashing between publicly listed firms, we follow up with two other research questions:

2. Is there a negative relationship between greenwashing and the firm value in the sectors suspected of greenwashing behaviour?
3. Is there a positive relationship between greenwashing and the firm value in the sectors without apparent greenwashing behaviour?

Definition and Measurements of Greenwashing

Firms can be divided into poor environmental performers or excellent environmental performers. Next, firms can decide whether they want to be silent about their environmental performance or to actively communicate positively about it. Delmas & Burbano (2011) argued that firms may engage in greenwashing by doing poor environmental performance while at the same time actively communicating positively about their environmental performance. Siano et al. (2017) mentioned a comparable notion of greenwashing, wherein firms tend to downplay minor issues or engage in communicating green behaviour through statements that will satisfy stakeholders without valid actions. Thus, greenwashing involves selective disclosures or symbolic environmental communication that creates a false positive image on sustainability performance.

Due to its multiperspectivity, plenty of measurements are used to determine whether a company practices greenwashing or not. Despite that, Lublóy et al. (2025) stated that the measurement for greenwashing centred on two aspects: selective disclosure and decoupling, in which the latter has been more widely used compared to the other one. Selective disclosure refers to how the companies frame themselves as ESG responsible while at the same time they do not disclose negative aspects of their ESG performance (de Freitas Netto et al.,

2020). By decoupling, companies can maintain positive reputation without incurring actual sustainability costs (Gatti et al., 2019; Uyar et al., 2020). Thus, decoupling measures greenwashing as the gap between the stated and the actual values related to ESG. There are several ways of measuring greenwashing through decoupling, the most well-known one is from Yu et al. (2020) who define greenwashing as the gap between ESG disclosure score and ESG score, adjusted by industry and year.

Grand Theory Related to Greenwashing

Legitimacy theory is very relevant when talking about greenwashing because of how critical it is to help firms gain access to more resources to improve financial performance (Torelli et al., 2020). Suchman (1995) mentioned that to comply with the external policy, companies must constantly monitor whether society perceives them as functioning within the law. Moreover, developing and preserving legitimacy is important because the performance of a firm depends on the relationship with its stakeholders. Thus, companies with poor performance face high social and political pressure, leading them to select their social and environmental reporting to protect their legitimacy (Patten, 2002).

Agency theory is often linked to greenwashing as well. First introduced by Jensen and Meckling (1976), agency theory argues that principals and agents possess different interests, potentially resulting in agency conflict. The conflict of interest between principal (shareholder) and agent (managers) might lead to a greenwashing decision to enhance the company's perceived sustainability (Ghitti et al., 2024). Since managers have better information than the shareholders, the shareholders tend to trust the manager, resulting in improvement in firm's short-term performance.

Aside from legitimacy and agency theory, signalling theory can also explain greenwashing behaviour. Spence (2002) explained that positive environmental disclosures may function as a positive signal to the firm's stakeholders, thereby mitigating the negative aspect of firm's behaviour.

Greenwashing Effect to the Firm Value

Prior studies on greenwashing have yielded inconclusive results. Some studies found that greenwashing has negative effect on firm value (Ghitti et al., 2024; Liang & Gao, 2025; Castro et al., 2025; Xu et al., 2025; Monalisa et al., 2025; Islahuddin et al., 2026). Others found the opposite result, in which greenwashing

has positive effect on firm value (Chen & Dagestani, 2023; Li et al., 2023; Purnamasari & Umiyati, 2024; Liu et al., 2025).

Greenwashing firms will be punished by the market or investors due to detrimental impact on their value; as a result, they will trade at discount. With regard to the relationship between greenwashing and stock return, Xu et al. (2025) employed an event study methodology to assess the market reaction to greenwashing news. Using 121 global greenwashing news, Xu et al. (2025) found a negative stock market reaction on greenwashing news. Moreover, the negative effect was greater on the firms with high ESG score, compared to the firms with low ESG score. Furthermore, the Asia-Pacific market exhibited a strong negative reaction compared to the stock markets in other regions. Following the results of Xu et al. (2025), Zhong et al. (2025) discovered how greenwashing often triggered strong criticism from retail investors in China, prompting negative stock returns for the companies involved.

Castro et al. (2025) mentioned that even though greenwashing is a valid strategy to address the growing demand for environmental involvement, it will lower financial soundness by increasing cost of debt and credit risk. Increased cost of debt and credit risk will lower the firm's fundamental value. Additionally, Castro et al. (2025) also found that robust governance structures, particularly at the board level, may protect the company from reputational and financial risks linked to greenwashing.

A different result regarding the greenwashing effect on firm value was found by Chen and Dagestani (2023). According to Chen and Dagestani (2023), the positive effect of greenwashing behaviour to equity mispricing was evident on emerging capital markets such as China during pre-COVID-19 pandemic. Nonetheless, the following scenarios can lessen the superficial impact of ESG greenwashing on equity mispricing: (1) a strong external audit, (2) fierce market competition, and (3) strict environmental regulation. This result was also confirmed by Li et al. (2023), who found that stakeholders had difficulty identifying greenwashing in emerging market due to high information asymmetry. However, Li et al. (2023) also mentioned that the positive effect of greenwashing towards corporate financial performance in Chinese listed firms was weakened by stricter environmental regulation and low media favourability.

Hypothesis Development

After COVID-19 pandemic, ESG reporting has become mandatory for publicly listed companies in Indonesia. This policy was expected to enhance transparency and green behaviour across firms in Indonesia. With more transparency, information asymmetry can be reduced, hence mitigating agency conflicts and helping firms maintain their legitimacy. Thus, companies need to communicate their “point of difference” to the shareholders to preserve their legitimacy.

ESG disclosure score can serve as an attribute to differentiate a firm from its competitors. However, high ESG disclosure score might not translate into high ESG performance, which is more meaningful. Some companies can have high disclosure score, yet they have low ESG score. This behaviour is called greenwashing. Due to its harmful effect on the environment, it is important to determine whether we can rely on ESG disclosure score and ESG score to find the greenwashing score. If the greenwashing scores are a reliable instrument, then companies suspected of greenwashing exhibit significantly higher scores compared to those who are not. However, since the definition of greenwashing is still vague, it is very hard to test the reliability of the greenwashing score. Nonetheless, the recent launch of The Greenwash Index from TuK Indonesia for palm oil sector shows that greenwashing behaviour is perhaps easier to detect on a sectoral level, leading to the first hypothesis of this study.

H1: The greenwashing scores from sectors suspected of greenwashing behaviour are higher than those of sectors without apparent greenwashing behaviour

If greenwashing scores are useful to separate sectors suspected of greenwashing behaviour from the sectors without apparent greenwashing behaviour, then it is important to know whether greenwashing has negative or positive effects on the firm value. With retail investors dominating the capital markets in Indonesia (Kustodian Sentral Efek Indonesia, 2025), greenwashing serves as a misleading signal to the investors. If retail investors can detect greenwashing behaviour, they will punish the companies in the sectors suspected of greenwashing behaviour, resulting in a decline in the firm value (H2). On the other hand, if greenwashing behaviour is not detected in the sectoral level, investors have difficulty identifying greenwashing. Therefore, companies that belong in the sectors without apparent greenwashing behaviour still have the opportunity to do greenwashing behaviour and save costs since ESG

initiatives can be costly. Thus, greenwashing has positive effect on the firm value (H3).

H2: Greenwashing affects firm value negatively in the sectors suspected of greenwashing behaviour

H3: Greenwashing affects firm value positively in the sectors without greenwashing behaviour

2. Research Method

This study applies a quantitative research design using a mix of mean-difference test and a panel data regression. The data used in this study are Bloomberg ESG disclosure score, Bloomberg ESG score, Price to Book Value (PBV), return on asset (ROA), and total assets from 2022 to 2024. All the data are taken from Bloomberg (Bloomberg L.P., 2024). The total population of this research is 3,081 observations from 1,027 companies. Companies with missing values in the variables and those with negative PBV are excluded to arrive at the total sample of 475 observations from 160 companies.

Variable Measurement

The independent variable in this research is greenwashing, which is measured using the difference between standardized ESG disclosure score and standardized ESG score. Following Yu et al. (2020), standardized scores will be based on year and sector. A positive value for the greenwashing score indicates the company was suspected of greenwashing behaviour, whereas a negative value indicates no greenwashing was detected. Formulas 2.1, 2.2, and 2.3 detail the process to calculate the greenwashing score.

$$\text{Greenwashing} = \text{normalized ESG disclosure} - \text{normalized ESG score} \dots\dots\dots (2.1)$$

$$\text{Normalized ESG disclosure} = \left(\frac{\text{ESG disclosure score} - \mu \text{ ESG disclosure score}}{\sigma \text{ ESG disclosure score}} \right) \dots\dots\dots (2.2)$$

$$\text{Normalized ESG score} = \left(\frac{\text{ESG score} - \mu \text{ ESG score}}{\sigma \text{ ESG score}} \right) \dots\dots\dots (2.3)$$

Firm value is measured using PBV and ROA. PBV is calculated as market price per share at the end of the year divided by book value per share at the end

of the year while ROA is calculated as net income at year t divided by the total assets at the end of year t . The only control variable in this study is total assets, and the natural logarithm of total assets is used as a proxy of size. Larger companies tend to have more resources to invest in sustainability and public relations (PR), which can significantly distort their firm value and chance of greenwashing.

Research Procedures

After collecting all the data, there are several steps that will be taken before arriving at regression results and discussion. First, the greenwashing scores are calculated for all the samples to determine which sectors are suspected of greenwashing behaviour, and which sectors are not. Second, descriptive statistics will be employed to find out whether greenwashing is detected at the sectoral level. Any inconsistencies between the average and median of greenwashing scores across the sectors serve as an indicator of greenwashing behaviour. Since the greenwashing score is standardized based on sector and year, in each sector, there will always be companies that are suspected of greenwashing behaviour and those who are not. For robustness, we follow Dorfleitner and Utz (2024); negative values of the greenwashing score will be left-censored at zero to showcase only the greenwashing behaviour. Third, to compare the means of suspected greenwashing companies with those who are considered green companies, the student's t -test will be done. To find out whether we can assume equal variances or not before conducting the student's t -test, an F -test of equality of variances will be done. After we run the student's t -test, the first hypothesis can be concluded.

The second and third hypotheses will be tested only if the first hypothesis is proven. Panel data regression will be used to test the second and third hypotheses. There are three panel data models which are common effect model, fixed effect model, and random effect model. Chow test and Hausman test are usually done to test which model is best. However, considering heterogeneity across Indonesian listed firms and sectors, the common intercept assumption of common effect model is less likely to hold. Accordingly, Chow test will be skipped, and only the Hausman test will be done to determine the appropriate model between fixed effect model and random effect model. Equation 2.4 and 2.5 show the regression models of this study, keep in mind that the models will be tested on two different groups.

$$PBV_{i,t} = \alpha + \beta_1 GW_{i,t} + \beta_2 Size_{i,t} \dots\dots\dots (2.4)$$

$$ROA_{i,t} = \alpha + \beta_1 GW_{i,t} + \beta_2 Size_{i,t} \dots\dots\dots (2.5)$$

3. Result and Discussion

Descriptive Statistics

Table 1 provides the descriptive statistics for greenwashing scores (GW) and PBV. If greenwashing is apparent in the sectors, the average of greenwashing score should be more than 0. Thus, sectors that are suspected of greenwashing are those with positive mean or those with inconsistencies in the mean and median of greenwashing scores. On the contrary, negative values of greenwashing do not mean negative greenwashing behaviour. Rather, it implies that sectors with mean near zero, followed by negative or near-zero median values, show no indication of apparent greenwashing behaviour.

Because there is no universally accepted method for classifying sectors according to their likelihood of greenwashing, this study adopts a two-criteria classification approach. First, sectors exhibiting positive mean greenwashing scores or inconsistencies between the mean and the median are classified as sectors suspected of greenwashing behaviour. Second, sectors that contribute to high emissions such as energy and consumer non-cyclicals will also be included as sectors suspected of greenwashing behaviour because their substantial environmental externalities justify closer scrutiny despite not meeting the first criterion. Consumer non-cyclicals are associated with high emissions because agriculture is one of their subsectors. Additionally, with TuK launching an exclusion list for the palm oil industry in Indonesia, this sector warrants further investigation.

Table 1. Descriptive Statistics of Research Variables

Sectors	GW			PBV			ROA (%)		
	Average	Median	Stdev	Average	Median	Stdev	Average	Median	Stdev
Basic Materials	0.029	0.006	0.556	2.224	1.258	2.571	2.531	0.083	4.600
Consumer Cyclicals	0.000	0.139	0.837	7.780	1.439	23.765	4.027	3.040	4.178
Consumer Non-Cyclical	0.053	0.121	0.900	3.797	1.516	7.236	3.535	0.214	6.596
Energy	0.007	- 0.002	0.714	5.716	1.329	13.029	5.486	0.295	10.259
Financials	- 0.000	- 0.035	0.767	1.851	0.968	1.691	0.614	0.035	2.852
Healthcare	0.000	- 0.052	0.435	3.852	4.114	2.150	4.089	0.119	8.307
Industrials	0.000	- 0.212	0.764	2.344	1.151	2.979	1.404	0.140	2.631
Infrastructures	0.000	- 0.085	0.671	1.442	0.976	1.375	0.490	0.029	2.999
Properties & Real Estate	0.000	0.171	1.200	1.225	0.484	2.560	2.239	0.038	6.531
Technology	-	- 0.097	0.513	10.179	1.039	19.117	1.654	0.118	2.908
Transportation	- 0.125	- 0.278	0.620	1.751	0.811	1.650	2.207	0.215	3.106

Source: Bloomberg, Author's calculation, 2026

Note: GW represents greenwashing score, PBV represents price-to-book value ratio, ROA represents return on asset ratio

Based on Table 1, suspected greenwashing behaviour is apparent across five sectors: basic materials, consumer cyclical, consumer non-cyclical, energy, and properties and real estate. The remaining sectors show no indication of apparent greenwashing behaviour. Since the objective of this study is to identify the intensity of suspected greenwashing, the greenwashing score in all the sectors will then be left-censored, transforming the companies with the negative scores within each sector to zero value. Thus, the normality assumption in the greenwashing scores cannot be upheld.

In terms of PBV, across eleven sectors between 2022 and 2024, technology and consumer cyclical are the two sectors with the highest PBV on average. Despite that, the gap between the average and median of the two sectors shows an indication of outliers in the sectors. It also means that investors only regard specific stocks in the sectors. On the other hand, properties and real estate, along with infrastructures, are the ones with the lowest PBV on average. Similar to the greenwashing score, most of the PBV in all the sectors are skewed to the right, showing that normality assumptions do not hold. However, since the data panel does not require the data to be normal, the data is left as it is.

It is interesting to see that the sectors with the highest PBV do not necessarily have the highest ROA. In terms of profitability, energy and healthcare were the two sectors with the highest ROA, while financials and infrastructures were the lowest ones. Nonetheless, in the energy sector, high

standard deviation also indicates that the sector consists of very diverse companies.

Mean Difference Test

After the greenwashing scores are transformed, mean difference test is performed to test whether greenwashing score in the sectors suspected of greenwashing behaviour is significantly higher than the greenwashing score in the remaining sectors. To do the student's t-test, we must perform the F-test two sample for variances to find out whether we can or cannot assume equal variance across both samples. Table 2 and Table 3 show the result of F-test and t-test. Based on the F-test, the variance of greenwashing score in the sectors suspected of greenwashing behaviour is different than the variance of greenwashing score in the sectors without apparent greenwashing behaviour.

Table 2. The Result of F-test Two Sample for Variances

	<i>GW_sectors</i>	<i>NGW_sectors</i>
Mean	0.341	0.262
Variance	0.228	0.180
Observations	286	189
df	285	188
F	1.269	
P(F<=f) one-tail	0.039	
F Critical one-tail	1.248	

Source : Excel, 2026

Note : GW_sectors represent sectors suspected of greenwashing behaviour and NGW_sectors represent sectors without apparent greenwashing behaviour

Table 3. The Result of t-test Comparing Greenwashing Sectors with Non-Greenwashing Sectors

	<i>GW_sectors</i>	<i>NGW_sectors</i>
Mean	0.341	0.262
Variance	0.228	0.180
Observations	286.000	189.000
Hypothesized Mean Difference	-	
df	434.000	
t Stat	1.898	
P(T<=t) one-tail	0.029	
t Critical one-tail	1.648	
P(T<=t) two-tail	0.058	
t Critical two-tail	1.965	

Source : Excel, 2026

Note : *GW_sectors* represent sectors suspected of greenwashing behaviour and *NGW_sectors* represent sectors without apparent greenwashing behaviour

Based on Table 3, the p-value of mean difference test is 0.029, which is lower than the significance level of 5%. Thus, we can conclude that the average of greenwashing scores in the sectors suspected of greenwashing behaviour is significantly higher than greenwashing scores in the sectors without apparent greenwashing behaviour. In other words, the first hypothesis is accepted, hence moving on to the second and third hypotheses to study whether greenwashing behaviour affects firm value.

Regression Results for Model 1 (PBV)

The regression model will be done for two different groups. Hausman test will be done twice, once to the first group with sectors suspected of greenwashing behaviour, and the other one to the second group with sectors without apparent greenwashing behaviour. Table 4 comprises the result of Hausman test. Based on Table 4, the p-value for each of the groups is not significant. Because of that, Random Effect Model is preferred.

Table 4. Hausman Test for The Two Groups (Model 1)

Hausman Test	Suspected Greenwashing Group (Group 1)	Non-greenwashing Group (Group 2)
p-value	0.3755	0.2914

Source: Eviews, 2026

Next, we will test for the multicollinearity in the two groups using Variance Inflation Factor (VIF). Table 5 showcases the value of the Centered VIF. Multicollinearity is detected if there are values above 10. If multicollinearity is present, the precision of estimated coefficient will be reduced. Based on the values in Table 5, there is no multicollinearity in the regression model for each of the group.

Table 5. Multicollinearity Test Results

Variables dependent: PBV	Centered VIF	
	Suspected Greenwashing Group (Group 1)	Non-greenwashing Group (Group 2)
Greenwashing score (GW)	1.004	1.001
Size (ln Total Assets)	1.004	1.001

Source: Eviews, 2026

The White period covariance estimator is applied to the random error regression model. As a result, since this method already assumes robust standard errors, heteroscedasticity and autocorrelation tests are skipped.

Regression results are provided in Table 6. F-test will be checked first to see the overall validity and significance of the regression model in each group. After F-test, t-test will follow to find whether greenwashing score has a statistically significant relationship with the PBV.

Table 6. Regression Result Model 1

	Suspected Greenwashing Group (Group 1)	Non-greenwashing Group (Group 2)
Constant	8.489* (4.431)	10.6171 (7.8912)
Greenwashing score	-2.1305** (0.9664)	-0.4120 (0.3366)
Size	-0.1198 (0.1249)	-0.2483 (0.2356)
N	286	189
R ²	0.00059	0.0121
F-stat (prob)	0.4308	0.323

Source: Eviews, 2026

Note: ***, **, * indicate significance at 1%, 5%, and 10% level

Based on Table 6, F-tests for the group of sectors suspected of greenwashing behaviour and the group of sectors without apparent greenwashing behaviour are not statistically significant. Thus, the regression model is not reliable and not meaningful despite the greenwashing score

showing a negative relationship with the PBV. The second and third hypotheses are rejected in the context of PBV as the firm value. Next, Model 2 regression will be assessed.

Regression Results for Model 2 (ROA)

The Hausman test for Model 2 is presented in Table 7. Based on Table 7, the Hausman test is statistically significant for Group 1 and not significant for Group 2. Thus, fixed effect model will be used to test the effect of greenwashing on the firm value in the sectors suspected of greenwashing behaviour, whereas random effect model will be used to test the effect of greenwashing on the firm value in the sectors with no greenwashing evidence.

Table 7. Hausman Test for The Two Groups (Model 2)

Hausman Test	Suspected Greenwashing Group (Group 1)	Non-greenwashing Group (Group 2)
p-value	0.0024	0.262

Source: Eviews, 2026

The result for multicollinearity will be the same as in Table 5, which means no multicollinearity is detected. As in Model 1, robust standard errors will be applied in the fixed effect and random effect, hence heteroscedasticity and autocorrelation test are skipped. Regression result is presented in the Table 8.

Table 8. Regression Result Model 2

	Suspected Greenwashing Group (Group 1)	Non-greenwashing Group (Group 2)
Constant	35.9199*** (13.426)	7.5386 (6.4042)
Greenwashing score	-0.7837 (3.1269)	1.7454** (0.7632)
Size	-1.0663** (0.4369)	-0.2149 (0.1965)
N	286	189
R ²	0.6784	0.0317
F-stat (prob)	0.000***	0.0499**

Source: Eviews, 2026

Note: ***, **, * indicate significance at 1%, 5%, and 10% level

Unlike Model 1, the F-tests for Model 2 are significant in both the group of sectors suspected of greenwashing behaviour and the group of sectors without apparent greenwashing behaviour. Thus, the regression models are

valid and reliable. Looking at the t-test, greenwashing scores are not significant in the first group, but the greenwashing scores are statistically significant for the second group. The second hypothesis is still rejected in the context of using ROA as the firm value, but the third hypothesis is accepted. Regarding the coefficient of determination, fixed effect models absorb all time-invariant data into unique intercepts, artificially inflating the explanatory power, but it is more complicated for random effect model (Bell et al., 2019). For that reason, we are not comparing the R² in the two groups.

Discussion

This study separates the sectors into two groups: the first group is the ones with suspected greenwashing behaviour while the second one is the opposite. The first finding of this study is that greenwashing behaviour is apparent in five sectors: basic materials, consumer cyclicals, consumer non-cyclicals, energy, and property and real estate. The remaining sectors: financials, industrials, infrastructures, healthcare, technology, and transportation are not showing any signs of greenwashing behaviour. From the two groups, it seems that the group with greater environmental externalities such as consumer cyclicals, energy, and property and real estate show higher level of greenwashing behaviour. Nonetheless, it does not mean that there is no greenwashing in the sectors that are not showing any indications of greenwashing. By the formula, there will be companies that are suspected of greenwashing behaviour and those who are not in every sector. However, the result of the first hypothesis suggests that investors face greater difficulty differentiating ESG disclosure from genuine ESG practices in sectors without apparent indication of greenwashing. Thus, it is important to find out whether greenwashing behaviour affects firm value differently between the two groups, the ones that are under the spotlight of greenwashing, and the ones that are the opposite.

The results of our second and third hypotheses suggest that higher profitability can be achieved by doing greenwashing only when the industry itself appears to be a clean one. Moreover, investors might expect greenwashing is present in sectors with ESG issues. Since investors focus their attention on the sectors with ESG issues, managers will have less opportunity to do greenwashing. Thus, greenwashing does not have any effect on company's profitability. Despite the coefficient being negative, the insignificant result of the second hypothesis suggests that the markets do not

punish companies even in the sectors with suspected greenwashing behaviour. However, they do not reward it either. Additionally, different characteristics of the five sectors in this group might add complexity to the result, thus showing no relationship between greenwashing and firm value.

On the contrary, the industry with less apparent greenwashing behaviour might still be able to reap the benefits of greenwashing and incorporate them to increase their firm value. However, the positive effect of greenwashing on the firm value is still not robust. Greenwashing does not have any effect on the PBV, but it has a positive effect on the ROA. While PBV reflects market expectations and is often used due to its simplicity, ROA reflects the company's profitability, which was used in the fundamental analysis. The third result suggests that investors still have difficulty identifying greenwashing behaviour in sectors that appeared to be green. Since retail investors dominate the market, information asymmetry in the market is still high, resulting in ineffective investor monitoring. Without effective monitoring from investors, managers still have the opportunity to reduce some costs and improve their profitability by doing greenwashing. However, the positive effect might still be short-term and does not produce convincing signals to attract the investors.

4. Conclusion

This study investigates the effect of greenwashing on the firm value across different sectors in Indonesia. All sectors are investigated and then divided into two groups: sectors suspected of greenwashing behaviour and sectors without apparent greenwashing behaviour. The findings reveal that greenwashing behaviour is concentrated in several sectors with relatively greater ESG externalities, namely basic materials, consumer cyclicals, consumer non-cyclicals, energy, and property and real estate. The mean-difference test confirms that these sectors exhibit significantly higher greenwashing scores than the remaining sectors. Thus, the first hypothesis is accepted.

The regression results further demonstrate that the impact of greenwashing is not uniform between the two groups. Greenwashing does not significantly affect firm value in sectors suspected of greenwashing behaviour. Thus, the second hypothesis cannot be accepted. In contrast, greenwashing is positively associated with ROA in sectors without apparent greenwashing

behaviour, although the positive relationship is not significant when firm value is measured using PBV. The third hypothesis is accepted in the context of ROA, but not in the context of PBV.

The study contributes to the greenwashing literature by showing that sectoral characteristics lead to distinct relationships between greenwashing and firm value. Rather than affecting all industries uniformly, the consequences of greenwashing depend on the environmental legitimacy of the sectors and the degree of information asymmetry faced by investors.

The findings of the study provide several practical implications. First, regulators such as OJK should strengthen ESG reporting standards and verification mechanisms across all sectors, particularly those without apparent greenwashing behaviour, as these sectors may still benefit from symbolic ESG disclosure. Second, investors should evaluate ESG disclosure alongside ESG performance and not rely solely on the ESG disclosure score or sector reputation when evaluating the quality of ESG practices. Third, corporate managers should recognise that although greenwashing may generate temporary financial benefits, the effect is not robust across different measures of firm value.

This study is subject to several limitations. First, the analysis covers only a limited period (2022–2024) following the implementation of mandatory sustainability reporting, limiting the ability to observe long-term market responses. Second, greenwashing is measured using the gap between the Bloomberg ESG disclosure score and ESG score, which may not fully capture all dimensions of greenwashing behaviour. Third, this study is still limited in dividing the sectors only into two groups because of data limitations. Heterogeneity of each sector might have implications for the relationship between greenwashing and firm value. Fourth, the regression model only takes into account firm size as a control variable. Accordingly, future research may incorporate a longer period, employ alternative measurements of greenwashing, consider more groups to capture the relationship between greenwashing and firm value more appropriately, and add more control variables.

5. References

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