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August 7, 2025

Organizing Committee
NBER PhD Student Workshop on Climate Finance
National Bureau of Economic Research
1050 Massachusetts Avenue
Cambridge, MA 02138

Dear Professors Flammer and Giglio,

I am writing to apply for the NBER PhD Student Workshop on Climate Finance, to be held on October 9, 2025. I am currently a PhD candidate in Finance at the Vienna Graduate School of Finance, and I expect to complete my doctoral studies in 2028. My primary research interests lie in climate finance and household finance.

The paper I am submitting, titled *"Green but Passive? Shareholder Activism in the Age of Greenwashing"*, investigates green shareholder activism. I begin by documenting that socially responsible (SRI) funds hold marginally more voting rights than traditional funds. Next, I analyze the extent to which SRI investors demand reform, as proxied by the number of filed SRI proposals. Surprisingly, most SRI proposals target environmental leaders rather than laggards — implying that pressure is exerted where it is least needed. Finally, I examine how spikes in greenwashing salience influence the market valuation of proposals, proxied by meeting-related voting premia constructed from options. I find that unexpected increases in greenwashing salience are associated with a reduction in voting premia by roughly half of their unconditional mean.

Beyond this project, I am currently working on a second paper examining investor bias against female fund managers, based on a large-scale laboratory experiment. This work speaks more broadly to how social preferences and perceptions shape capital allocation.

In future work, I aim to study the role of investor beliefs and biases in financing the climate transition — especially how cognitive and informational frictions influence the flow of capital into green sectors.

I would be honored to participate in the workshop, receive feedback on my ongoing work, and engage with leading scholars in the field of climate finance. My advisor, Professor Josef Zechner, is available to provide references.

Thank you for your time and for considering my application.

Sincerely,

Emilio Jalil Lohi

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Research Interests

Climate Finance, Household Finance

Education

Vienna Graduate School of Finance — Vienna, Austria
Ph.D. in Finance — 2023 – Present
Supervisors: Josef Zechner, Tobin Hanspal

Erasmus School of Economics — Rotterdam, The Netherlands
M.Sc. in Financial Economics — 2022 – 2023

Vienna University of Economics and Business — Vienna, Austria
B.Sc. in Business, Economics, and Social Sciences — 2019 – 2022

Working Papers

Green but Passive? Shareholder Activism in the Age of Greenwashing

Looking for a Man in Finance? An Experiment on Information Provision and Investor Bias Against Female Fund Managers
with Tanja Brieden, Thi Thuy Dung Phung, and Elena Sponga

Teaching Experience

Vienna University of Economics and Business — Summer 2025
Instructor, Risk Management (undergraduate)

Vienna University of Economics and Business — Fall 2024
Instructor, Corporate Finance (undergraduate)

Vienna University of Economics and Business — Summer 2022
TA, Corporate Finance & Risk Management

Awards and Fellowships

- PhD Scholarship, Vienna Graduate School of Finance
- Merit-based Scholarship Grant, academic years 2020-2021 and 2021 - 2022

Skills

Programming: Python, R, Stata, LaTeX
Languages: English (fluent), German (native), French (basic)

References

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Green but Passive? Shareholder Activism in the Age of Greenwashing

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Abstract

This paper investigates green shareholder activism. First, I shed light on socially responsible investors' potentially heterogeneous demand for voting rights. SRI funds hold marginally more voting rights than traditional funds. Second, I investigate investors' demand for reform as proxied by the number of shareholder proposals they file. Interestingly, most SRI proposals are submitted to industry leaders with respect to environmental performance, rather than in industry laggards. Hence, demand for reform is missing precisely where it would be needed the most. Firms' willingness to reform is also limited: Only 0.5% of SRI proposals also receive management support, as compared to over 2% for governance proposals. Finally, I investigate whether unexpected spikes in the salience of greenwashing influence the value investors put on shareholder proposals. Overall, my research sheds light on the specific nature of investors' social preferences.

Keywords: corporate governance, greenwashing, shareholder activism, shareholder proposals, social preferences, voting and trading, voting premium

JEL codes: D72, G34, Q54

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1. Introduction

> *"Our results suggest that to have impact, instead of divesting, socially conscious investors should invest and exercise their rights of control to change corporate policy."*(Berk & Van Binsbergen, 2025, p. 1)

Four years have passed since the first appearance of "The impact of impact investing" by Berk and van Binsbergen. Their recommendation is clear: Socially responsible investors should exercise their control rights.

Also apart from reasons relating to personal taste, shareholder activism is economically important. It has been shown that it can increase firm performance. For instance, Flammer (2015) provided the first causal evidence that the approval of close votes leads to positive abnormal returns (0.92%) and improves labor productivity and sales growth. Dimson et al. (2015) found positive abnormal returns after successful shareholder engagements as well, and documented improved accounting and governance performance.

In this paper, I start by investigating whether socially responsible funds hold greater voting rights, proxied by the control share, and how they exercise them. While SRI funds tended to hold almost one percent more voting rights than traditional funds prior to 2015, holdings have been roughly the same ever since.

Then I examine in which type of firms investors typically demand reform: In already reformed, green firms or in those brown firms that would need shareholder activism the most? I obtain management- and shareholder proposal data on over 1,000 U.S. firms for the period of 2003 to 2023. Quarterly data on firm fundamenals, such as firm sizes and market-to-book ratios, comes from Compustat and firms' environmental performance is taken from the MSCI IVA database. Fixed-effects panel regression reveal that unconditionally, socially responsible firms also receive more SRI proposals. However, conditioning on firm size makes the coefficient insignificant. Notwithstanding, the fact remains that SRI proposals largely target already rather sustainable firms rather than industry laggards. Further investigation of the dataset yields a surprising insight: While over two percent of governance-related shareholder proposals also receive a recommendation by the management, only 0.5% of SRI proposals get recommended. Hence, both the demand for socially responsible reform and the willingness for reform by firms' management are rather muted.

Next, I examine the impact of greenwashing on investor beliefs. Does an unexpected increase in the salience of greenwashing decrease the perceived likelihood of shareholder proposal implementation? While shareholder proposals are not binding, a firm's management is in principle still incentivized to be aligned with shareholder interests (Jensen & Meckling, 1976). Using the model of Levit et al. (2023), I theoretically show that the likelihood of proposals implementation should be a key driver of the voting premium. Then, I construct a firm-level panel of quarterly meeting-related voting premia by invoking put call parity and constructing with options a synthetic share without voting rights. Data on European call and put option prices comes from OptionMetrics' volatility surface. To test the impact of greenwashing, I regress the meeting-related spike in voting premia on an index of unexpected greenwashing shocks in panel regressions with controls. Quarterly data on greenwashing salience is taken from Gourier and Mathurin (2024), who construct a news-based index of greenwashing salience by applying natural language processing to Wall Street Journal articles. I find that a one-standard-deviation unexpected increase in greenwashing is associated with a 5.5-basis-point decline in average meeting-related voting premia. Given a mean voting premium of eleven basis points, the effect is economically meaningful. Hence, greenwashing has a detrimental impact on investor beliefs about the likelihood of proposal implementation and consequently on the market value of voting rights.

Related literature

This paper contributes to three strands of the literature.

First, my paper is related to social preferences in finance, which have been neglected for a long time (Dangl et al., 2023). Heinkel et al. (2001) were the first, and for quite some time the last, to model the effect of social preferences on a firm's cost of capital. They show that green investment strategies could lower green firms' cost of capital. Recently, many empirical studies have documented the important role of social preferences. For instance, Riedl and Smeets (2017) and Bauer et al. (2021) document that green investors are willing to accept underperformance by green funds and are willing to pay higher fees for them. One of the most cited papers in this context is Hartzmark and Sussman (2019), which shows considerable inflows to green funds after making investors aware about their greenness. My contribution to this strand of literature is to show that prior to 2015 the voting right holdings of socially responsible funds were slightly higher than for traditional

funds. However, more recent evidence does not indicate that SRI funds have greater demand for control rights.

Second, this article is related to the literature on equilibrium models of voting and trading. Previous studies include Parlasca and Voss (2024), Levit and Malenko (2011), Levit et al. (2023), and Levit et al. (2024).

Third, my paper contributes to the mostly empirical literature on the market value of voting rights (Brav & Mathews, 2011; Gurun & Karakaş, 2022; Kalay & Pant, 2009; Kalay et al., 2014; Kind & Poltera, 2013, 2017; Zingales, 1995). Specifically, I highlight the important role of belief-formation in the pricing of voting rights and that exogenous shocks to the likelihood of proposal implementation decrease voting premia.

The rest of this paper is organized as follows. Section 2 presents a slight extension of the one-period voting and trading model of Levit et al. (2023) to show that the likelihood of proposal implementation directly translates to voting premia. Section 3 outlines key variable definitions and the empirical methodology. In section 4, I present the data and in section 5, I report the results. Section 6 concludes.

2. Model

One goal of this paper is to examine whether greenwashing affects the perceived likelihood that proposals are implemented. Using the model of Levit et al. (2023) I show that introducing the expected likelihood of implementation amplifies the voting premium.

Setting

In the model of Levit et al. (2023), each firm j is owned by two types of investors: a blockholder b, who holds an initial stake α, and a continuum of small, dispersed shareholders s, who collectively own the remaining $1-\alpha$ shares. The dispersed shareholders are indexed by $z \in [0,1]$, and each investor z holds $e_j(z)$ shares in firm j, such that the total holdings of all small shareholders satisfy

$$\int_0^1 e_j(z)\, dz = 1 - \alpha.$$

There is a value creating proposal which is voted on. Acceptance is indicated by d, where $d = 1$ indicates that the proposal has been accepted, and $d = 0$ indicates that it has been rejected. τ denotes the majority requirement.

I extend Levit et al. (2023) by introducing the liklihood of implementation l_j. The value of a share for investor i in firm j is given by

$$v_{ij} = c_j + (\theta_j + p_{ij})\, l_j\, d_j \tag{1}$$

where c_j is a firm's cash flow, θ_j the state-dependent common proposal value, p_{ij} the investor-specific private value, l_j the commonly agreed on likelihood of proposal implementation, and d_j the dummy indicating whether the proposal was accepted or not.

The value of a share for the blockholder is therefore given by

$$v_{bj}(\theta_j, p_{bj}, d_j) = c_j + (\theta_j + p_{bj})\, l_j\, d_j \tag{2}$$

and the value of a share for a shareholder by

$$v_{sj}(\theta_j, p_{sj}, d_j) = c_j + (\theta_j + p_{sj})\, l_j\, d_j \tag{3}$$

First the blockholder trades y_j shares, second each shareholder trades x_j shares, and third, the public signal q_j on the state θ_j is observed. For simplicity, q_j is the posterior expectation of state θ_j and is normally distributed with density f. $H(q_j^*) \equiv Pr(q_j > q_j^*)$, so $H(q_j^*)$ is the probability that the posterior state-expectation q is greater than some value q_j^*. Finally, voting takes place.

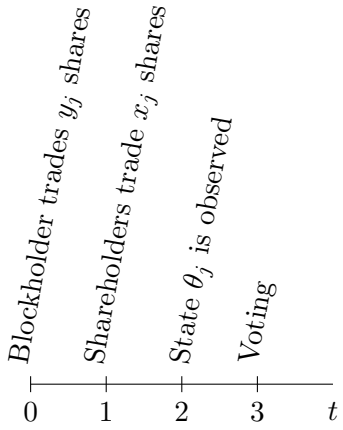


Figure 1: Timeline

Shareholder trading

Following Levit et al. (2023) I solve the model via backward induction.

Optimal shareholder demand x_j given the blockholder's trade y_j

A shareholder's utility from buying x_j shares is given by

$$u_{sj}(\theta_j, p_{sj}, d_j, x_j; \gamma) = x_j v_{sj}(\theta_j, p_{sj}, d_j) - \frac{\gamma}{2} x_j^2 \tag{4}$$

Let $v_{sj}(p_{sj}, q_e^*)$ denote the share's valuation by a shareholder with preference p_{sj} prior to the realization of q_j.

$$v_{sj}(p_{sj}, q_e^*) \equiv \mathbb{E}[v_{sj}(\theta_j, p_{sj}, 1_{q_j > q_e^*})] \tag{5}$$

$$= c_j + (\mathbb{E}[\theta_j | q_j > q_e^*] + p_{sj})\ l_j\ H(q_e^*) \tag{6}$$

Shareholders are price takers, so for any price p_j a shareholder maximizes his expected utility, i.e. he solves:

$$\max_{x_j} \{(e_j + x_j)v_{sj}(p_{sj}, q_e^*) - x_j p_j - \frac{\gamma}{2}x_j^2\} \tag{7}$$

Taking the first order condition yields his optimal demand:

$$x_j = \frac{1}{\gamma}(v_{sj}(p_{sj}, q_e^*) - p_j) \tag{8}$$

Given the blockholder's order y_j, the market clears iff

$$\int x_j(p_{sj}, q_e^*, p_j)\psi(p_{sj})dp_{sj} + y_j = 0 \tag{9}$$

where $\psi(p_{sj})$ is the density of the individual proposal value distribution.

Substituting (7) into (8) and evaluating the integral:

$$\int \frac{1}{\gamma}(v_{sj}(p_{sj}, q_e^*) - p_j)\psi(p_{sj})dp_{sj} + y_j = 0 \Rightarrow \frac{1}{\gamma}\left(\mathbb{E}[v_{sj}(p_{sj}, q_e^*)] - p_j\right) + y_j = 0 \tag{10}$$

Re-arranging with respect to the price p_j gives the market clearing price p_j^*:

$$p_j^*(y_j, q_e^*) = \gamma y_j + \mathbb{E}[v_{sj}(p_{sj}, q_e^*)] \tag{11}$$

Shareholders' demand as a function of the blockholder trade y_j can thus be written as

$$x_j(p_{sj}, y_j, q_e^*) = \frac{1}{\gamma}(p_{sj} - \mathbb{E}[p_{sj}])\ l_j\ H(q_e^*) - y_j \tag{12}$$

Post-trade ownership structure

After the trading stage, the blockholder owns $\alpha + y_j$ shares and shareholders collectively own $1 - \alpha - y_j$ shares. Therefore, the proportion of shares owned by shareholders with proposal value p_{sj} is given by:

$$\varphi(p_{sj}; y_j, q_e^*) = \psi(p_{sj})\frac{1 - \alpha + x_j(p_{sj}, y_j, q_e^*)}{1 - \alpha - y_j} \tag{13}$$

Since $\varphi(p_{sj}; y_j, q_e^*)$ is a density function, i.e. $\int \varphi(p_{sj}; y_j, q_e^*)dp_{sj} = 1$, the post-trade

preference distribution is given by the CDF $\Phi(p'; y_j, q_e^*)$

$$\Phi(p'; y_j, q_e^*) = \int_{p_{sj} \leq p'} \varphi(p_{sj}; y_j, q_e^*) dp_{sj} \tag{14}$$

Voting Behavior

Investors vote as if they were pivotal, so a shareholder votes in favor if $p_{sj} + q_j > 0$. i.e. if $p_{sj} > -q_j$. This is illustrated in figure 2.

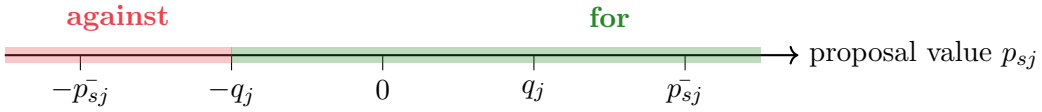


Figure 2: Individual decision rule

The number of votes by shareholders in favor upon signal realization q is given by:

$$s_j(q_j; y_j, q_e*) = \overbrace{(1 - \alpha - y_j)}^{\text{collective holdings of shareholders}} \cdot \underbrace{(1 - \Phi(-q_j; y_j, q_e^*))}_{\text{proportion of shareholders for whom } p_{sj} > -q_j} \tag{15}$$

Characterization of the Voting Outcome

I characterize the voting outcome by invoking the median voter theorem. The median voter is the agent whose vote always corresponds to the actual outcome (which is the case when he or she is pivotal). If one knows the preference of the median voter one knows the signal necessary for approval. Ceteris paribus, the higher the average private shareholder valuation p_{sj}, the higher the number s of shareholders' in favor and the greater the impact on the identity of the median voter. The impact of the blockholder's voting behavior depends on his bias, as well as his pivotality. Figure 3 illustrates two cases of shareholder support, which determines whether the blockholder is pivotal or not.

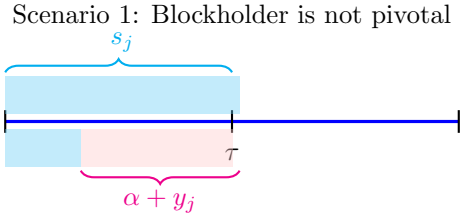


Figure 3: Illustration of blockholder pivotality

Since shareholder support is determined by the state's signal realization, I can define

signal bounds between which the blockholder becomes pivotal. Define

$$\underline{q}_j \equiv s_j^{-1}(\tau - \alpha - y_j; y_j, q_e^*) \tag{16}$$

$$\bar{q}_j \equiv s_j^{-1}(\tau; y_j, q_e^*) \tag{17}$$

The blockholder is pivotal, if and only if $q_j \in [\underline{q}_j, \bar{q}_j)$.

Synthesizing the above insights leads to a characterization of the median voter identity by three distinct cases of blockholder bias.

First, $p_{bj} \geq -\underline{q}_j$, which means that the blockholder is strongly in favor of the proposal. In particular, such that he will vote in favor of the proposal as soon as q_j exceeds $-\underline{q_j}$, which implies also voting in favor in his entire pivotality region, $\underline{q_j} < q_j < \bar{q}_j$. The median voter bias is $p_{MVj} = -\underline{q}_j$.

Second, $p_{bj} \leq -\bar{q}_j$, which means that the blockholder is strongly against the proposal. The signal realization would need to be greater than $\bar{q}_j$, to induce him being in favor. However, then, by definition of $\bar{q}_j$, already so many shareholders would be in favor that the blockholder would not be pivotal anymore. The boundary between approval and rejection is at $\bar{q}_j$. Therefore, the median voter bias is $p_{MVj} = -\bar{q}_j$.

Third, $-\bar{q}_j < p_{bj} < -\underline{q}_j$, which means the blockholder is rather neutral toward the proposal. There are signal realization values on his pivotality region where he will vote for the proposal, because the positive signal outweighs his negative bias. But then there are also signal realization values where the signal cannot outweigh his negative bias and he will vote against. Hence, the boundary between approval and rejection lies in the blockholder pivotality region. Hence, he is the median voter and his bias is simply $p_{MVj} = p_{bj}$.

Equilibrium

In the derivation of optimal shareholder demand x_j, I made the assumption, in line with the timeline, that shareholders form an expectation of the decision rule in their stock valuation prior to signal realization. In equilibrium, this expectation q_e^* must correspond to the actual decision rule, i.e. the private value of the median voter p_{MVj}. Otherwise, agents would not act according to their preferences. If γ is large enough, the decision rule $q_j^*(y)$ is unique and there exists a y_j above which the blockholder becomes the median voter. A formal proof of the uniqueness of the equilibrium can be found in Levit et al. (2023).

Blockholder Trading

Now that we know the shareholders' reaction to a blockholder trade y_j and its impact on the voting outcome, we can derive the optimal blockholder trade y_j^*. The blockholder chooses his trade y_j to maximize his profit Π_j:

$$\Pi_j(y_j) = \underbrace{(\alpha + y_j)v_{bj}(p_{bj}, q^*(y_j))}_{\text{post-trade holdings value}} - \underbrace{y_j p_j^*(y_j)}_{\text{cost of additional shares}} - \underbrace{\frac{\eta}{2}y_j^2}_{\text{transaction costs}} \tag{18}$$

Substituting for the share value and equilibrium price yields:

$$\begin{aligned}\Pi_j(y_j, p_{bj}) = \alpha(c_j) + \alpha\mathbb{E}[\theta_j | q_j > q_j^*(y_j)]\ l_j\ H(q_j^*(y)) + ((\alpha + y_j)p_{bj} - y_j\mathbb{E}[p_{sj}])\ l_j\ H(q_j^*(y)) \\ - (\gamma + \frac{1}{2}\eta)y_j^2 \end{aligned} \tag{19}$$

$$\frac{d\Pi_j(y_j)}{dy_j} = \frac{\partial\Pi_j(y_j)}{\partial y_j} + \frac{\partial\Pi_j(y_j)}{\partial(-q_j^*)}\frac{\partial(-q_j^*)}{\partial y_j} \tag{20}$$

$$= (p_{bj} - \mathbb{E}[p_{sj}])\ l_j\ H(q_j^*) - (2\gamma + \eta)y_j \tag{21}$$

$$+ [\alpha(q_j * (y_j) + p_{bj}) + y_j(p_{bj} - \mathbb{E}[p_{sj}])]\ l_j\ f(q_j^*)\frac{\partial(-q_j^*)}{\partial y_j}$$

Taking the first order condition:

$$\begin{aligned}&(p_{bj} - \mathbb{E}[p_{sj}])\ l_j\ H(q_j^*) - (2\gamma + \eta)y_j \\ &\quad + [\alpha(q_j * (y_j) + p_{bj}) + y_j(p_{bj} - \mathbb{E}[p_{sj}])]\ l_j\ f(q_j^*)\frac{\partial(-q_j^*)}{\partial y_j} = 0\end{aligned} \tag{22}$$

Re-arranging yields:

$$\begin{aligned}(2\gamma + \eta)y_j = (p_{bj} - \mathbb{E}[p_{sj}])\ l_j\ H(q_j^*) \\ + \underbrace{[\alpha(q_j^*(y_j) + p_{bj}) + y_j(p_{bj} - \mathbb{E}[p_{sj}])]\ l_j\ f(q_j^*)\frac{\partial(-q_j^*)}{\partial y_j}}_{\text{marginal payoff from moving pivotality (MPP)}}\end{aligned} \tag{23}$$

Therefore, the optimal blockholder trade y_j^* is given by

$$y_j^* = \frac{1}{2\gamma + \eta}(p_{bj} - \mathbb{E}[p_{sj}])\ l_j\ H(q_j^*) + \frac{1}{2\gamma + \eta} MPP(y_j^*) \tag{24}$$

Taking the blockholder trade as given, a shareholder optimally demands

$$x_j^* = \frac{(p_{sj} - \mathbb{E}[p_{sj}])\ l_j\ H(q_j^*)}{\gamma} - y_j^* \tag{25}$$

$$= \frac{l_j\ H(q_j^*)}{\gamma}(p_{sj} - \bar{p}_{inv}) - \frac{MPP(y_j^*)}{2\gamma + \eta} \tag{26}$$

Substituting into the equilibrium price, yields

$$p_j^* = \gamma y_j^* + \mathbb{E}[v_{sj}(p_{sj}, q_j^*)] \tag{27}$$

$$(\dots) \tag{28}$$

$$= \bar{v}_{inv} + \frac{\gamma}{2\gamma + \eta} MPP(y_j^*) \tag{29}$$

The Voting Premium

The voting premium is defined as the price difference between endogenous and exogenous decision rule modeling. Hence,

$$\text{Endogenous price: } p_j^{endo} = \bar{v}_{inv} + \frac{\gamma}{2\gamma + \eta} MPP(y_j^*) \tag{30}$$

$$\text{Exogenous price: } p_j^{exo} = \bar{v}_{inv} + \frac{\gamma}{2\gamma + \eta} \underbrace{MPP(y_j^*)}_{0} = \bar{v}_{inv} \tag{31}$$

$$\text{Voting premium: } VP_j = p_j^{endo} - p_j^{exo} \tag{32}$$

$$= \bar{v}_{inv} + \frac{\gamma}{2\gamma + \eta} MPP(y_j^*) - \bar{v}_{inv} \tag{33}$$

$$= \frac{\gamma}{2\gamma + \eta} MPP(y_j^*) \tag{34}$$

$$VP_j = \frac{\gamma}{2\gamma + \eta}[\alpha(q_j^*(y_j) + p_{bj}) + y_j(p_{bj} - \mathbb{E}[p_{sj}])]\ l_j\ f(q_j^*) \frac{\partial(-q_j^*)}{\partial y_j} \tag{35}$$

The higher the likelihood of proposal implementation l_j the larger the voting premium.

3. Methodology

Control Share of SRI Funds

To test whether socially-responsible funds have more taste for voting rights than traditional funds, I compute fund-level control shares. The control share is defined as the voting-rights weighted sum of fund holdings. In particular, the control share of fund i at time t is given by the following expression, where j indexes securities:

$$\text{Control Share}_{it} = \frac{\sum_{j=1}^{J} \text{Dollar Holding}_{itj} \cdot \text{Votes per Share}_{jt}}{\sum_{j=1}^{J} \text{Dollar Holding}_{itj}} \tag{36}$$

I conduct panel regressions of the form

$$\text{Control Share}_{it} = \alpha_t + \beta \, \mathbf{1}_i^{\text{SRI fund}} + \epsilon_{it} \tag{37}$$

where α_t are time-fixed effects, and where $\mathbf{1}_i^{\text{SRI fund}}$ is a dummy, which is equal to one if a fund is classified as an SRI fund.

Firm Heterogeneity in the Number of SRI Proposals

To assess which type of firm along the environmental score spectrum attracts the most SRI proposals, I conduct panel regressions of the yearly number of SRI proposals on firms' environmental classification, with firm- and time-fixed effects and controls. The general regression equation takes on the form

$$\#\text{ SRI proposals}_{it} = \beta \text{ env. decile}_{it} + \gamma X_{it} + \alpha_i + \alpha_t + \epsilon_{it} \tag{38}$$

where i denotes firms, t years, env. decile the respective decile of a firm's MSCI environmental score, and X a set of control variables.

Impact of Greenwashing on Voting Premia

Following Kalay et al. (2014), I construct voting premia (VP) as the difference between the actual price S and the price of a synthetical stock without voting rights, relative to the stock price.

$$VP = \frac{S - \hat{S}}{S} \tag{39}$$

The synthetical stock price $\hat{S}$ is created by invoking put-call parity:

$$\hat{S} = C - P + PV(K) \tag{40}$$

where C is the price of a European call option, P the price of a European put option, and $PV(K)$ the present value of the option's strike price.

Further, I define ΔVP as the change in the voting premium around a meeting event. In particular, I take the difference between the average voting premium of the ten days before the record date of a meeting, $\bar{VP}_A$, and the average voting premium of ten days before the midpoint of the meeting and the one prior, $\bar{VP}_B$. The timeline is illustrated in figure 4.

$$\Delta VP = \bar{VP}_A - \bar{VP}_B \tag{41}$$

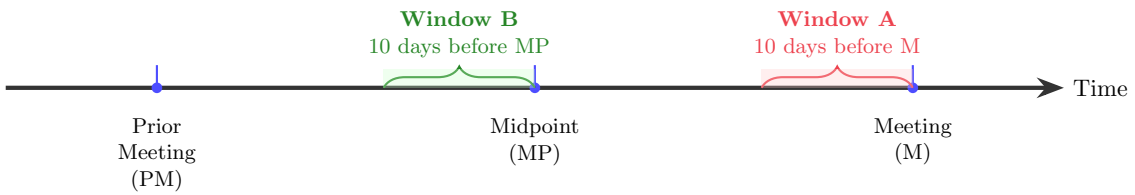


Figure 4: Timeline

Following Gourier and Mathurin (2024) I employed an autoregressive model of order one (AR(1)) to identify and extract innovations in their greenwashing index.

The AR(1) model was specified as:

$$y_t = \alpha + \beta y_{t-1} + i_t \tag{42}$$

where y_t represents the greenwashing index at time t, α is the intercept parameter, β is the autoregressive coefficient capturing the persistence of the series, and i_t represents the innovation term.

To assess the impact of these unexpected shocks to greenwashing salience on the likelihood of proposal implementation, as proxied by voting premium changes around meetings, I employ fixed-effects panel regressions. The general specification is as follows:

$$\Delta VP_{it} = \beta_0 i_t + \beta_1 i_{t-1} + \beta_2 i_{t-2} + \gamma X_{it} + \alpha_i + \epsilon_{it} \tag{43}$$

Firms are indexed by i, year-quarters by t, i_t, i_{t-1},i_{t-2} are the greenwashing salience innovations and its two lags, respectively, X_{it} is a set of control variables, α_i are the fixed effects and ϵ_{it} is the error term.

4. Data

I have three main datasets of interest. First, I have a yearly dataset of the number of SRI and governance proposals, firm fundamentals, and ESG scores, to test for a significant difference between the number of filed proposals in environmental leaders and environmental laggards. Second, I constructed a quarterly panel of firm voting premia with greenwashing salience shocks and control variables (firm fundamentals, the past number of shareholder proposals and past managemnet support for them). Third, I have a quarterly panel of fund-level control shares. Below are the summary statistics. Details on the variable construction and on the data cleaning procedure can be found in the appendix.

Table 1: Summary Statistics of the Yearly Panel

Variable	N	Mean	Median	Std Dev	Min	Max
Governance Proposals	18,972	0.285	0.000	0.755	0.000	16.000
SRI Proposals	18,972	0.175	0.000	0.649	0.000	13.000
Log(Total Assets)	15,644	8.645	8.690	1.924	-0.289	15.279
ROA	15,628	0.010	0.010	0.025	-0.138	0.089
Leverage	15,635	0.627	0.625	0.249	0.096	1.419
Market-to-Book	14,682	4.328	2.389	6.232	0.418	41.292
Liquidity	15,644	0.138	0.077	0.158	0.001	0.784
R&D Intensity	8,351	0.114	0.036	0.344	0.000	3.342
CapEx Intensity	15,620	0.024	0.016	0.027	0.000	0.173
Dividend Payout	14,471	0.521	0.354	1.354	-11.024	14.084
Sales Growth	15,471	0.094	0.059	0.250	-0.629	1.768
Firm Age	6,958	16.707	15.833	9.990	0.000	76.833
Environmental Score	10,275	4.960	4.850	2.190	0.000	10.000
Social Score	10,271	4.482	4.433	1.561	0.000	10.000
Governance Score	10,270	5.459	5.442	1.695	0.000	10.000
Environmental Decile	10,275	5.383	5.167	2.806	1.000	10.000
Social Decile	10,271	5.110	5.000	2.717	1.000	10.000
Governance Decile	10,270	5.424	5.417	2.513	1.000	10.000

Notes: Sample period: 2006-2023. Total observations: 18,972 firm-year pairs.

Table 2: Summary Statistics of the Quarterly Panel

Variable	N	Mean	Median	Std Dev	Min	Max
Delta Voting Premium	23,370	10.719	-0.027	99.261	-62.833	3527.196
Greenwashing Innovation	23,169	-0.037	0.042	0.389	-1.055	1.038
Log(Total Assets)	26,140	8.892	8.893	1.876	2.043	15.190
ROA	26,135	0.011	0.010	0.025	-0.138	0.089
Leverage	26,140	0.627	0.627	0.241	0.096	1.419
Market-to-Book	25,014	4.172	2.420	5.963	0.418	41.292
Liquidity	26,140	0.131	0.073	0.155	0.001	0.784
R&D Intensity	13,350	0.103	0.038	0.308	0.000	3.342
CapEx Intensity	26,017	0.013	0.007	0.019	0.000	0.173
Dividend Payout	24,209	0.623	0.392	2.461	-11.024	14.084
Sales Growth	26,068	0.101	0.060	0.292	-0.629	1.768
Firm Age	11,251	16.926	16.000	10.139	0.000	77.000
Environmental Decile	16,118	5.515	5.000	2.884	1.000	10.000
Social Decile	15,665	5.033	5.000	2.817	1.000	10.000
Governance Decile	15,665	5.298	5.000	2.638	1.000	10.000
Gov. Proposals (5yr)	23,270	1.867	1.000	3.296	0.000	32.000
SRI Proposals (5yr)	23,270	1.101	0.000	2.858	0.000	46.000
Mgmt Support Gov. (%)	11,794	0.025	0.000	0.142	0.000	1.000
Mgmt Support SRI (%)	7,068	0.008	0.000	0.078	0.000	1.000
Greenwashing Index	24,236	2.236	1.700	1.383	0.800	5.900
Environmental Score	16,118	5.074	4.900	2.227	0.000	10.000
Social Score	15,665	4.547	4.570	1.581	0.000	10.000
Governance Score	15,665	5.382	5.300	1.676	0.000	10.000
Fund Control Share	614,585	0.965	0.982	0.122	0.000	10.000

Notes: Sample period: 2003-2023. Total observations: 27,526 firm-quarter pairs.

Table 3: Control Share Summary Statistics by Fund Categories

Category	N	Mean	Median	Std Dev	Min	Max
By SRI Classification:						
non-sri	604,852	0.965	0.982	0.123	0.000	10.000
sri	9,733	0.970	1.000	0.089	0.000	3.770
By Investment Objective:						
General (Equity)	215,099	0.975	1.000	0.142	0.000	10.000
Multi-Cap	86,588	0.967	0.984	0.115	0.000	10.000
Large/Mega Cap	65,842	0.975	0.976	0.079	0.000	10.000
Growth	55,996	0.971	0.986	0.092	0.000	4.207
Micro/Mini/Small Cap	54,490	0.907	0.927	0.143	0.000	10.000
Quantitative/Index	48,387	0.968	0.981	0.079	0.000	2.942
Value	37,240	0.959	0.976	0.127	0.000	10.000
Mid Cap	29,237	0.958	0.956	0.091	0.000	1.985
Fund of Funds	8,774	0.949	0.991	0.165	0.000	3.205
Socially Resp. General	8,706	0.969	0.994	0.091	0.000	3.770
Convertibles	1,925	0.975	1.000	0.106	0.000	1.674
Hedged	888	0.980	0.992	0.091	0.000	1.680
Socially Resp. Energy	535	0.973	1.000	0.086	0.323	1.561
Leveraged	386	0.927	1.000	0.235	0.000	1.671
Socially Resp. Shariah/Faith	330	0.993	1.000	0.023	0.795	1.123
Socially Resp. Corp Governance	162	0.983	0.984	0.069	0.858	1.242

Notes: Summary statistics for fund control share by SRI classification and investment objective specialization.

5. Results

Higher Control Share of SRI Funds

As figure 5 shows, SRI funds tend to have a slightly higher control share than non-SRI funds, especially prior to 2015. Subsample regression analysis confirms this intuition. Table 4 presents the results of panel-regressions of funds' control shares on an SRI dummy and time-fixed effects. In the pre-2015 subsample, being classified as an SRI fund is associated with a 96 basis point higher control share, with significance at the 5-percent level. Post-2015 significance vanishes but over the full sample a significant difference (at the 10-percent level) of 58 basis points remains.

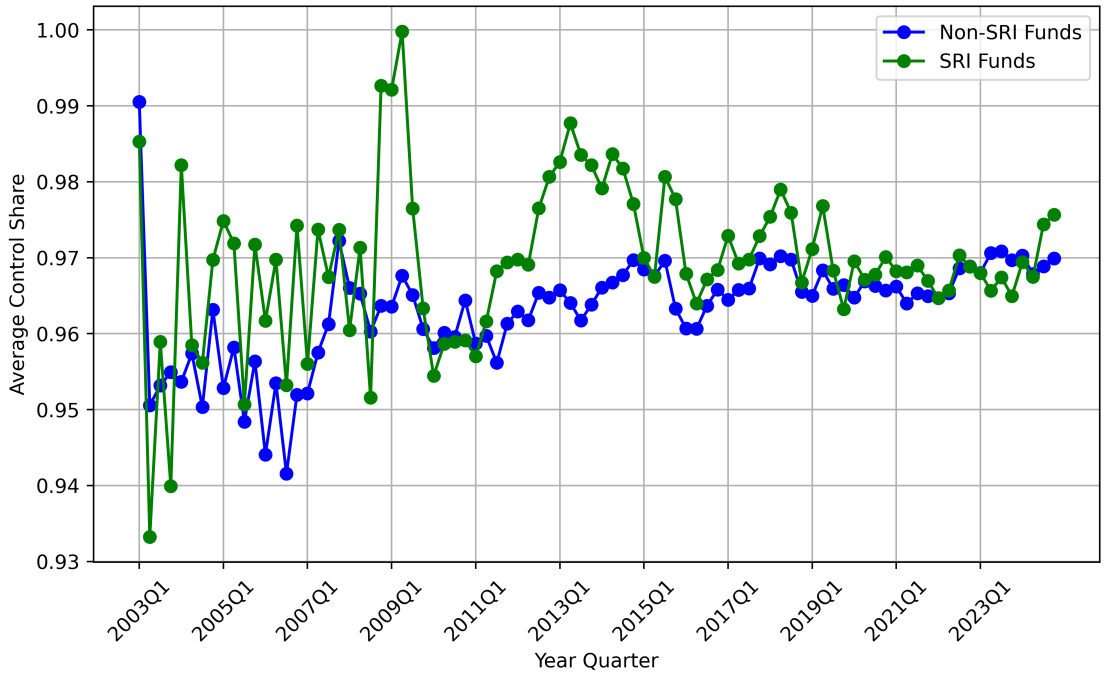


Figure 5: Time Series of Average Quarterly Control Share by SRI Class

Number of SRI Proposals

Figure 6 visualizes the average yearly number of SRI proposals for each decile of environmental scores. The greener a firm, the more SRI proposals are filed. The higher number of proposals is mainly driven by a considerable rise in SRI proposals in the greenest firms after approximately 2020, as can be seen in figure 7. Table 5 shows that, unconditionally, being environmentally friendlier is associated with having a higher number of yearly SRI proposals. However, upon including covariates in the regressions, the effect disappears.

Table 4: Panel Regression Results: Control Share and SRI Classification - All Samples

	Full Sample		Pre-2015		Post-2015	
	No FE	Time FE	No FE	Time FE	No FE	Time FE
SRI Indicator	0.0057*	0.0058*	0.0099**	0.0096**	0.0023	0.0023
	(0.0029)	(0.0030)	(0.0048)	(0.0048)	(0.0032)	(0.0032)
Time Fixed Effects	No	Yes	No	Yes	No	Yes
Observations	614,585	614,585	249,982	249,982	332,677	332,677
R-squared	0.000	0.000	0.000	0.000	0.000	0.000
Sample Period	Full Period	Full Period	2010-2014	2010-2014	2016-2023	2016-2023

Notes: Dependent variable is control share (percentage of fund assets in control positions). SRI Indicator equals 1 for socially responsible investing funds, 0 otherwise. Standard errors clustered at the fund level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Column eight of table 5 reports point estimates of the panel regression specification with firm- and time-fixed effects and controls. A one standard deviation increase in size is associated with an increase in the number of yearly SRI proposals of 0.456 (significant at the 10-percent level). Given mean yearly SRI proposals of 0.175 the size effect is also economically significant. Column eight further reveals that sales growth is significantly negatively related to the number of SRI proposals, at the 1-percent level. A one-standard-deviation increase in sales growth translates to a decrease in the number of yearly SRI proposals of 0.036. Hence, the size effect clearly dominates.

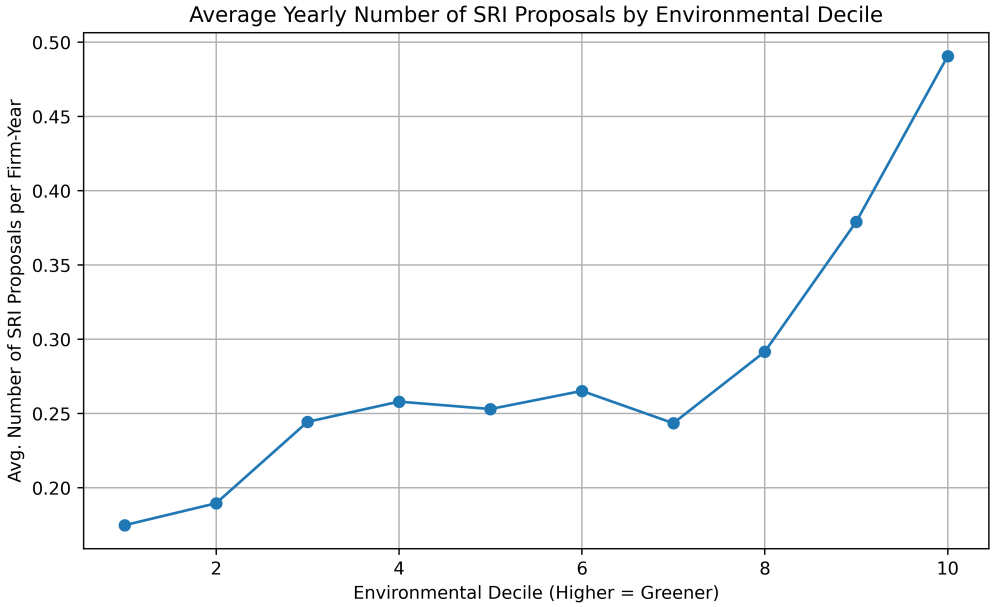


Figure 6: Average Yearly SRI Proposals by Environmental Classification

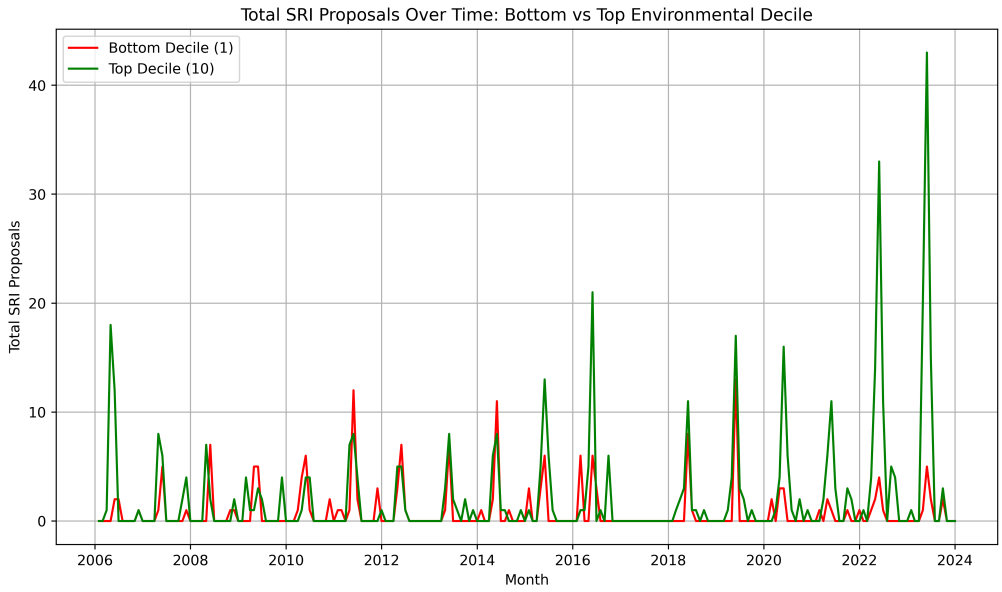


Figure 7: Total Monthly SRI Proposals Over Time: Bottom vs. Top Environmental Score Decile

In figure 8, I plot the fraction of management support by proposal type. The share of management recommendations for governance-related proposals is almost four times as high as for SRI proposals.

Voting Premia

The results of the regression of ΔVP on greenwashing shocks, their lags, and controls are reported in table 7. Specifications one to four exclude the two lagged greenwashing salience innovations. Without covariates, there is a negative relation between greenwashing innovations and meeting-related changes in the voting premium, significant at the 10-percent level. Including control variables in the regression, further increase the magnitude and significance of the point estimate. For instance, column four (firm-fixed effects and controls) reports a coefficient of -14.063. A one-standard-deviation unexpected increase in greenwashing salience is associated with a 5.471 basis point decrease [2] in ΔVP. Including two lags of greenwashing salience innovations slightly decrease the magnitude of the effect. Considering column eight, a one-standard-deviation increase in unexpected greenwashing reduces the voting premium change by 4.202 basis points. However, the estimate remains significant at the 1-percent level. Overall, my results support the hypothesis that greenwashing reduces investors' trust in management's willingness to implement proposals.

[2] $(0.389 \cdot -14.9634)$

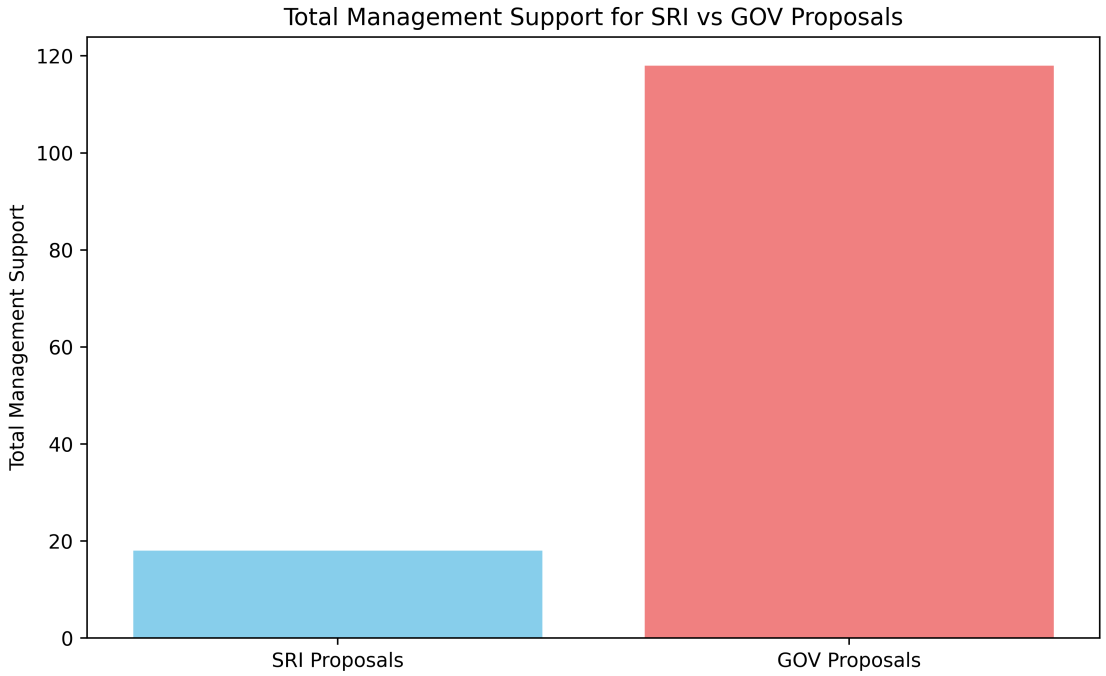


Figure 8: Total Management Support by Proposal Type

Table 5: Panel Regression Results: Environmental Decile and SRI Proposals

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Environmental Decile	0.0259***	-0.0010	0.0260***	-0.0032	-0.0063	-0.0098	-0.0072	-0.0086
	(0.0056)	(0.0060)	(0.0056)	(0.0072)	(0.0072)	(0.0125)	(0.0074)	(0.0141)
Log Assets	–	–	–	–	0.1697***	0.2289*	0.1719***	0.2372*
	–	–	–	–	(0.0418)	(0.1191)	(0.0425)	(0.1302)
ROA	–	–	–	–	0.8475	0.8726	1.0251	0.7528
	–	–	–	–	(0.6438)	(0.7354)	(0.6517)	(0.7497)
Leverage	–	–	–	–	-0.4172**	-0.2466*	-0.4222**	-0.2404
	–	–	–	–	(0.1839)	(0.1413)	(0.1864)	(0.1483)
Market-to-Book	–	–	–	–	0.0147***	0.0063**	0.0146***	0.0073**
	–	–	–	–	(0.0042)	(0.0032)	(0.0041)	(0.0035)
Liquidity	–	–	–	–	0.3462***	-0.2965	0.3691***	-0.2079
	–	–	–	–	(0.1228)	(0.2764)	(0.1268)	(0.2819)
Sales Growth	–	–	–	–	-0.0906***	-0.1360***	-0.0884**	-0.1220***
	–	–	–	–	(0.0327)	(0.0409)	(0.0363)	(0.0464)
Firm Age	–	–	–	–	-0.0003	-0.0001	-0.0014	-0.1121
	–	–	–	–	(0.0020)	(0.0062)	(0.0023)	(0.2049)
Firm Fixed Effects	No	Yes	No	Yes	No	Yes	No	Yes
Time Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
Controls	No	No	No	No	Yes	Yes	Yes	Yes
Observations	10,275	10,275	10,275	10,275	3,970	3,970	3,970	3,970
R-squared	0.008	0.000	0.008	0.000	0.117	0.051	0.116	0.031

Notes: Dependent variable is the number of SRI proposals. Environmental Decile ranges from 1 (lowest environmental performance) to 10 (highest environmental performance). Controls include log assets, ROA, leverage, market-to-book ratio, liquidity, sales growth, and firm age. Standard errors clustered at the firm level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

Table 6: Correlation Matrix

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)
(1) Gov. Prop.	1.000																	
(2) SRI Prop.	0.337	1.000																
(3) Log(Assets)	0.318	0.325	1.000															
(4) ROA	0.039	0.081	0.144	1.000														
(5) Leverage	0.064	0.038	0.305	-0.149	1.000													
(6) MTB	0.024	0.051	-0.074	0.127	0.224	1.000												
(7) Liquidity	-0.028	-0.032	-0.349	-0.117	-0.319	0.192	1.000											
(8) R&D Int.	-0.033	-0.035	-0.239	-0.545	-0.093	0.124	0.510	1.000										
(9) CapEx Int.	0.009	0.069	-0.071	0.047	-0.101	0.030	-0.100	-0.030	1.000									
(10) Div. Payout	0.024	0.018	0.092	0.075	0.017	-0.059	-0.144	-0.084	0.131	1.000								
(11) Sales Growth	-0.053	-0.037	-0.096	0.039	-0.094	0.113	0.165	0.164	0.054	-0.004	1.000							
(12) Firm Age	0.100	0.083	0.259	0.147	0.020	-0.057	-0.153	-0.130	-0.084	0.075	-0.170	1.000						
(13) ENV	0.136	0.097	0.272	0.043	0.019	0.118	0.067	0.007	-0.124	0.020	-0.009	0.079	1.000					
(14) SOC	0.043	0.024	0.100	0.064	-0.064	0.012	-0.009	-0.000	0.056	0.020	-0.001	0.095	0.151	1.000				
(15) GOV	-0.054	-0.051	0.007	0.075	0.033	-0.008	-0.063	-0.051	0.018	0.015	-0.030	0.043	0.010	0.088	1.000			
(16) ENV Decile	0.144	0.089	0.248	0.045	0.011	0.109	0.077	0.012	-0.115	0.020	-0.015	0.040	0.962	0.166	0.030	1.000		
(17) Soc Decile	0.028	0.012	0.058	0.056	-0.067	0.029	0.005	0.011	0.049	0.016	-0.006	0.114	0.162	0.939	0.092	0.185	1.000	
(18) Gov Decile	-0.035	-0.064	0.011	0.086	0.044	-0.003	-0.073	-0.063	0.013	0.009	-0.030	0.048	0.020	0.121	0.899	0.047	0.124	1.000

Notes: This table shows pairwise correlations between the main variables.

Table 7: Panel Regression Results: Greenwashing Innovation and Voting Premium

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Greenwashing Shock	-3.7106*	-14.1150**	-6.4384***	-14.0634***	-4.4453*	-11.8348**	-7.0440***	-10.8030***
	(2.1538)	(5.9230)	(1.9541)	(4.9220)	(2.4195)	(5.4036)	(2.2701)	(3.6127)
Greenwashing Shock (t-1)	–	–	–	–	1.6963	-2.7096	0.2619	-1.7358
	–	–	–	–	(1.7548)	(3.6326)	(1.6793)	(3.0117)
Greenwashing Shock (t-2)	–	–	–	–	3.9780**	-0.1244	1.4962	0.4584
	–	–	–	–	(1.8596)	(3.4918)	(1.6112)	(4.0052)
Log Assets	–	-3.7214**	–	-4.1737	–	-3.3427**	–	-1.9472
	–	(1.4788)	–	(3.3426)	–	(1.4851)	–	(3.2760)
ROA	–	-102.7438	–	-52.4731	–	-120.9809	–	-147.1080
	–	(98.6838)	–	(135.5476)	–	(90.8451)	–	(95.8121)
Environmental Score	–	0.2411	–	0.0906	–	-0.0672	–	-0.3654
	–	(0.9483)	–	(0.7167)	–	(0.9661)	–	(0.7545)
Governance Score	–	0.2077	–	0.0041	–	0.1898	–	-0.0379
	–	(0.7890)	–	(0.7986)	–	(0.7789)	–	(0.7333)
Market-to-Book	–	-0.2750	–	-0.5294***	–	-0.2269	–	-0.3756**
	–	(0.2390)	–	(0.1880)	–	(0.2374)	–	(0.1722)
Liquidity	–	-16.8415	–	11.4670	–	-11.3220	–	31.9043
	–	(12.4733)	–	(25.8482)	–	(11.2188)	–	(23.5968)
R&D Intensity	–	20.4566	–	17.4549	–	12.0300	–	-7.2318
	–	(14.0049)	–	(23.9204)	–	(12.4791)	–	(7.0749)
Capex Intensity	–	-72.7857	–	112.9065	–	-70.5666	–	141.5038
	–	(73.7408)	–	(120.1096)	–	(80.2211)	–	(130.0283)
Sales Growth	–	9.5877	–	2.1843	–	8.6961	–	1.3110
	–	(8.2675)	–	(8.1197)	–	(9.0876)	–	(8.0633)
Firm Age	–	-0.1822	–	0.8751*	–	-0.1896	–	0.5883
	–	(0.1877)	–	(0.5227)	–	(0.1967)	–	(0.4733)
Firm Fixed Effects	No	No	Yes	Yes	No	No	Yes	Yes
Controls	No	Yes	No	Yes	No	Yes	No	Yes
Observations	20,763	2,731	20,763	2,731	18,806	2,603	18,806	2,603
R-squared	0.000	0.033	0.001	0.012	0.001	0.024	0.001	0.010

Notes: Dependent variable is deltaVP (change in voting premium). Greenwashing Shock represents greenwashing index innovations. Controls include log assets, ROA, environmental score, governance score, market-to-book ratio, liquidity, R&D intensity, capex intensity, sales growth, and firm age. Standard errors clustered at the firm level are reported in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

6. Conclusion

In conclusion, this paper highlights three aspects of shareholder activism.

Regarding the demand for voting rights, socially responsible funds held marginally but statistically significantly more voting rights than traditional funds. For the subsample of 2003 to 2015 the difference is almost 100 basis points. Since 2015, however, the control share of SRI and non-SRI funds has roughly been the same. It remains of interest to further investigate the drivers of this trend. Particularly the supply-side of voting rights, in the form of firms' decision for a dual class share structure would be interesting to consider for future research.

As far as the investor-side demand for corporate reforms in the form of shareholder proposals is concerned, my results show that firms with a high environmental score attract much more proposals than firms with a low score. However, introducing covariates shows that this effect is largely driven by firm size. Hence, if socially responsible activist investors want to take the recommendation of Berk and Van Binsbergen (2025) seriously, they should more specifically target industry laggards.

Finally, the impact of greenwashing on the perceived likelihood of proposal implementation finds empirical support. A one-standard-deviation increase in unexpected greenwashing salience is associated with a decrease in meeting-related voting premia of about 5.5 basis points, corresponding in magnitude to half of its unconditional mean.

Overall, my research sheds light on the interplay between socially responsible investing and control rights.

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