Demystifying Cheap Sustainability Talks: Theory and Evidence

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Abstract

We show that even when firms' sustainability claims are costless and non-verifiable, they can still retain (partial) credibility. Non-babbling equilibria arise in a standard cheap-talk model when investors face uncertainty about both cash flows and the sustainability attribute. In such equilibria, sustainability claims are *endogenously* negatively correlated with cash flows and positively correlated with the sustainability attribute, even if the two are ex ante independent. The negative cash-flow implication of a claim serves as an endogenous cost, enabling credible communication. We characterize how disclosure behavior and credibility vary with the level of cash-flow uncertainty and provide novel empirical evidence supporting this mechanism. Our results shed new light on firms' communication of sustainability information in the absence of regulatory interventions.

Keywords: cheap talks, sustainability information, disclosure credibility, ESG disclosures

JEL Classification: G32, D83

1 Introduction

There has been widespread concern about the credibility of firms' sustainability claims. The largely voluntary and difficult-to-verify nature of sustainability information enables firms to easily "greenwash"—opportunistically overclaiming their sustainability performance—at little cost. For example, Cohen et al. (2025) document pervasive misstatement of carbon emissions by U.S. public firms, and Jiang et al. (2025) find muted market reaction when firms fail to meet their claimed carbon-reduction targets.[1] Given the paramount importance of reliable sustainability information in capital allocation and, potentially, the broader transition to a sustainable economy, understanding the credibility of such "cheap" sustainability claims is critical. A fundamental question, therefore, is whether firms can communicate sustainability information credibly when the cost of greenwashing is negligible.

A simple cheap-talk model predicts a negative answer: if value-maximizing firms can costlessly claim sustainability, the prospect of more favorable valuations from sustainability-oriented (hereafter sustainable) investors induces all firms to pool on that claim. Anticipating this pooling, rational investors ignore the messages, yielding the classical babbling (no-communication) equilibrium.

In this paper, we highlight that the rationale above is incomplete, as it fails to jointly consider cash flow uncertainty, which is hard to assume away in practice. When cash-flow uncertainty is incorporated, perhaps surprisingly, even entirely costless sustainability claims can be informative: in non-babbling equilibria, such claims are *endogenously* negatively correlated with future cash flows, thereby carrying both *cash flow* and *sustainability* information. Consequently, firms do not always greenwash, lending credibility to such claims. We also provide empirical evidence supporting this mechanism.

To develop intuition, we analyze a static cheap-talk game in Section 3. A share-price-maximizing firm observes its future cash flow and a non-pecuniary attribute (e.g., a sustainability level) and then chooses whether to make a costless, non-verifiable sustainability claim. Two groups of competitive, risk-neutral investors trade on the firm's message. Traditional investors care only about financial payoffs, whereas sustainable investors, in addition to financial payoffs, have extra demand for the firm's shares when the posterior sustainability level is sufficiently

[1] Many market participants acknowledge and are concerned about these facts. For example, a large hedge fund investor noted: "The reality is talk is cheap." and "We can all talk and say we're all green. But then when [companies] have to make the investments, they can't justify them without regulation and taxation." Full article is available at https://www.ft.com/content/c9fee776-1471-442c-aae8-8d78fe60faeb, accessed November 2025.

high. To rule out mechanical correlations, we assume that the cash flow and the sustainability attribute are independent.

Although the firm has no intrinsic preference for sustainability, non-babbling equilibria can arise in which messages are informative. The mechanism is as follows: conditional on the sustainability value being sufficiently high, the firm makes sustainability claims more frequently when cash flow is lower. This disclosure (i.e., claiming sustainability) asymmetry makes a sustainability claim a positive signal about the non-pecuniary attribute but a negative signal about cash flow. The resulting negative correlation endogenously generates a cost of sustainability claims, enabling credible communication. In equilibrium, the valuation premium tied to higher expected sustainability level exactly offsets the valuation discount from lower expected cash flow, rendering the disclosure policy incentive-compatible and eliminating profitable deviations.

We then turn to empirical implications. A direct implication of the preceding insight is: (a) cheap sustainability talks are negatively correlated with subsequent cash flows. Given the central role of financial uncertainty in sustaining informative cheap sustainability talks, we particularly characterize how equilibrium outcomes vary with financial uncertainty. In the firm-preferred equilibrium, defined as the equilibrium that maximizes the ex-ante expected share price, the model predicts that as financial uncertainty increases, (b) the firm becomes more likely to make sustainability claims; (c) the induced negative revision to cash-flow beliefs is attenuated; and (d) the claims become more informative about the non-pecuniary attribute.

The intuition is as follows. The valuation discount from cash-flow beliefs is proportional to the product of financial uncertainty (σ_v) and the dispersion in posterior cash-flow beliefs between firms with and without sustainability claims (D_v), where D_v is normalized to unit σ_v and summarizes the disclosure asymmetry. As financial uncertainty (σ_v) increases, the incentive-compatibility constraint requires the product $\sigma_v D_v$ to remain constant so that the discount exactly offsets the premium, the latter is not affected by σ_v; thus D_v must fall, and this yields prediction (c). Because expected price increases with sustainable investors' extra demand, which in turn increases with the unconditional probability of sustainability talks, the firm reduces the belief dispersion by raising the unconditional disclosure probability while adjusting the disclosure asymmetry, leading to prediction (b). A higher disclosure probability entails a lower threshold for sustainability attribute, which depresses the average sustainability level in the non-disclosing pool. Simultaneously, the firm must maintain a high expected sustainability value conditional on disclosure to continue attracting sustainable investors. The widening gap between these conditional expectations makes disclosure more informative about sustainability attribute, leading to prediction (d).

We provide novel empirical evidence supporting the mechanism proposed in our theoretical framework. We focus on U.S. public firms, for which sustainability disclosures are subject to no regulatory enforcement as of 2025. We use transcripts of firms' presentations in earnings calls and a bag-of-word approach to identify sustainability-related talks of firms in each quarter. We start by showing that, in the cross-section, more sustainability talks correlate with lower future annual earnings and sales growth. Moreover, we show that the lower earnings growth were not ex-ante expected by using analyst forecasts as a proxy for market participants' expectation. We find that sustainability talks are more associated with negative realized earnings relative to ex-ante expected earnings. In terms of economic magnitude, one standard deviation increase in levels of sustainability talks is associated with around 10% lower earnings growth and 1.5% lower sales growth over a 2-year horizon. In all the regressions we control for size, return on asset (ROA), Tobin's Q, firm leverage, and capital expenditures as control variables, as well as industry fixed effects, and our results remain highly robust. These results are in accord with prediction (a) and provide direct support to our key mechanism that, in the non-babbling equilibrium, sustainability talks contain negative information about firms' future cash flows.

Next, we test how the cash flow information content of sustainability disclosure varies across different levels of financial uncertainty, which is the novel empirical prediction (c) generated from our model. Following prior literature that uses dispersion in professional forecasts as a meausure of uncertainty (e.g., Bachmann et al., 2013), we use analyst forecast dispersion (scaled by level of forecasts) as a proxy of cash flow uncertainty faced by market participants. We divide the sample into subsamples based on quintiles of forecast dispersion. In each subsample, we run a regression of normalized forecast error, defined as $(EPS - EPS\ Forecasts)/sd(EPS\ Forecasts)$, on sustainability talks. The coefficient captures how the cash flow information (proportional to financial uncertainty) that one unit of sustainability talks contains. We find that the magnitude of the negative coefficients in the regressions decreases in forecast dispersion. In other words, as cash flow uncertainty increases, one unit increase in sustainability talks is associated with smaller cash flow information. This evidence provides direct empirical support to our model's prediction (c). When cash flow uncertainty is higher, smaller negative cash flow information (proportional to cash flow uncertainty) can already break even with the gain from sustainability value in a non-babbling equilibrium.

We then test how the intensity of sustainability talks correlate with cash flow uncertainty. We find that higher analyst forecast dispersion is associated with more sustainability talks. The level of sustainability talks monotonically increases with quintiles of forecast dispersion. The highest dispersion quintile group have 8.5% standard deviation more sustainability talks than the lowest dispersion group. This evidence provides evidence support to our model's prediction (b). Firms prefer to do more sustainability talks as doing so allow them to obtain the valuation premium from sustainable investors, subject to the constraint of break-even condition with cash flow information. Higher financial uncertainty relaxes such constraint, and as a result increases firms' sustainability talks.

Finally, we test how the credibility (sustainability information content) of sustainability talks vary by different levels of financial uncertainty. Unlike firm cash flow which has a clear realization, there is no clear realization of sustainability value of firms. Therefore, we use the holding change of sustainable investors as a proxy for change in belief of sustainability value of firms. Specifically, we follow Dyck et al. (2019) and Ilhan et al. (2023) and define share of sustainable investors as the institutional investors from high environmental norm countries. We find that the sustainability talks are more associated with change in sustainable investor holdings when financial uncertainty is larger. For the highest forecast dispersion quintile subsample, a one standard deviation increase in sustainability talks is associated with 0.476% (or 0.045 standard deviation) increase in sustainable investors' holdings. By contrast, for lowest forecast dispersion quintile subsample, a one standard deviation increase in sustainability talks is associated with 0.123% (statistically insignificant, t=1.2) increase in share of sustainable investors. This result provides empirical support to our model's prediction (d) that cash flow uncertainty increases the credibility of sustainability talks. When cash flow uncertainty is higher, firms tend to do make more sustainability talks, which makes the sustainability information gap between disclosure and non-disclosure larger, and thus sustainability talks more informative and credible.

Taken together, we provide empirical support to multiple novel empirical predictions generated from our model. We provide a seemingly surprising link between the credibility of firms' sustainability claims and the cash flow uncertainty faced by firms, and we provide a model to rationalize these empirical patterns within a simple framework. Interestingly, larger cash flow uncertainty facilitates sustainability information transmission with lower negative cash flow information content. This empirical pattern is difficult to be reconciled in an alternative theoretical framework.

Our results have important implications for ongoing debates among regulators and market participants seeking to enhance the credibility of ESG information. The conventional wisdom holds that when greenwashing is costless and disclosures are non-verifiable, information transmission necessarily fails and may mislead investors. We show, however, that even in the absence of regulatory intervention, effective communication can still arise endogenously through the mechanism we identify. Therefore, when designing new disclosure rules, it is important to consider how these regulations interact with the existing equilibrium of voluntary disclosures and the underlying information environment they aim to improve.

2 Literature

Our theoretical framework contributes to the growing theoretical literature on ESG investment and associated impacts (Broccardo et al., 2022; De Angelis et al., 2023; Edmans et al., 2022; Geelen et al., 2024; Landier and Lovo, 2025; Piccolo et al., 2022; Oehmke and Opp, 2025; Gupta et al., 2022), and is particularly related to the recent emerging literature on the flow of ESG information in financial markets. Previous research has studied the role of investor composition (Goldstein et al., 2022) and third-party ratings (Azarmsa and Shapiro, 2023; Lovo and Olivier, 2025; Chen and Sun, 2024) in shaping ESG information production and aggregation. Focusing on mandatory disclosure of firms, several studies have analyzed optimal disclosure requirements in both static (e.g., Xue 2025) and dynamic environments (Gupta and Starmans, 2025). Inderst and Opp (2025) analyzes the necessity and limitations of mandatory taxonomy in addressing greenwashing and environmental externalities. With the assumption that manipulation (or communication) is costly, several papers study the incentives and implications of greenwashing on product competition (Wu et al., 2020), share prices and their feedback effect on firm investments (Friedman et al. 2021; Chen and Schneemeier 2025; Chen 2023), and how ex-post penalty by investors mitigates greenwashing (Cartellier et al., 2025). A common implication of these studies is that when the manipulation cost is small, voluntary communication is not credible and leads to inefficient outcomes, calling for regulatory interventions. A notable exception is Aghamolla and An (2023), who show that voluntary verifiable disclosure can lead to more favorable investment outcomes for shareholders in a setting in which firm managers are imperfectly informed. In particular, assuming sustainability is negatively correlated with cash flow, they show that firms are more likely to invest in sustainable projects when managers are more uncertain about projects' financial payoffs.[2] In contrast to prior research, we allow the firm's sustainability disclosure to be costless and non-verifiable (i.e., talk is cheap). Even without assuming cash flows

[2]This prediction of Aghamolla and An (2023) focuses on the precision of the manager's own signal, while prediction (b) in our model focuses on investors' uncertainty about the cash flow.

and sustainability are interdependent ex ante, we show that sustainability claims *endogenously* imply negative cash flow news in a non-babbling equilibrium. Results on credible communication derived in the limiting case with zero manipulation cost and purely share-price-maximizing firms shed new light on the discussion of optimal mandatory disclosure requirements.

Our paper is also related to the literature on cheap talk (Crawford and Sobel, 1982) in financial markets. Using cheap talk models, previous research explains the coarse signal structure in credit ratings (Goel and Thakor, 2015) and stock recommendations (Morgan and Stocken, 2003). Absent the commitment power on signal quality, information can be conveyed if the sender cares the social welfare (Goel and Thakor, 2015; Morgan and Stocken, 2003), or the sender benefits from reputation built through ex-post verification (Stocken, 2000). Abstracting from these effects, the key mechanism of our model relies on the endogenous correlation between different dimensions of uncertainties. This insight is reminiscent Chakraborty and Harbaugh (2010) and Lipnowski and Ravid (2020), who show that beliefs in multi-dimensional cheap talk are generally downplayed in some dimensions while inflated in others. Building on this intuition, our paper derives empirical predictions on the implications and credibility of cheap sustainability talks and provides direct empirical evidence supporting this mechanism.

Our paper is related to the growing literature documenting various forms of firms' greenwashing. Cohen et al. (2025) provide evidence of systematic misstatement and restatement of U.S. public firms' Scope-1—i.e., the most direct—carbon emissions. Jiang et al. (2025) show that a substantial share of firms fail (or quietly abandon) their stated climate targets, yet such failures elicit little response from financial markets or the media. Bolton and Kacperczyk (2025) examine firms' decarbonization commitments and find that most companies fall behind their stated emissions-reduction plans. Duchin et al. (2024) document that firms claim to be sustainable by selling polluting assets to affiliates while leaving pollution unchanged. On the social dimension, Baker et al. (2024) provide evidence of "diversity-washing." Collectively, these studies suggest that greenwashing often carries limited consequences, making such "talk" cheap. We contribute to this literature by showing that—even when such talk is cheap—sustainability messages can still convey (some) credible information.

Our paper is also connected to the empirical literature on the determinants and consequences of sustainability disclosures. Lin et al. (2024) document a global rise in voluntary ESG disclosures in firms' annual reports. Robinson et al. (2025) show that environmental litigation prompts peer firms to increase their own environmental disclosures in conference calls. Ilhan et al. (2023) and Cohen et al. (2023) highlight the role of institutional investors in driving voluntary climate disclosures. On the mandatory side, using cross-country regulatory variation, Krueger et al. (2024) find that mandatory ESG disclosures improve market liquidity, while Gibbons (2024) show that such disclosures attract ESG-oriented investors and shape firms' investment and financing decisions. We complement this literature by showing that voluntary sustainability disclosures can also be credible and attract sustainable investors, and they become more credible when firms face higher cash flow uncertainty. More broadly, we contribute to this literature by identifying new incentives for making (or refraining from making) sustainability disclosures and by documenting a novel link between disclosure credibility and cash flow uncertainty, supported by a theoretical framework.

3 Model

This section develops the core mechanisms and derives testable predictions. Section 3.1 presents the model. Sections 3.2 and 3.3 analyze equilibria and comparative statics. Readers primarily interested in empirical implications may skip to Section 3.4 for hypotheses.

3.1 Set-up

We consider a static cheap talk game between a firm and a continuum of competitive, risk-neutral investors. At the end of the period, each share of the firm's stock yields a cash flow v and a non-pecuniary payoff θ. The cash flow is $v \in \{-\sigma_v, \sigma_v\}$ with equal probability 1/2, and the non-pecuniary payoff θ is supported on $\Theta = [-M, M]$ with cumulative distribution function F and a continuous density. The distribution of θ is symmetric and mean-zero[3]: $F(\theta) = 1 - F(-\theta)$, and $\mathbb{E}[\theta] = 0$. We assume v and θ are independent, thereby abstracting from effects driven by any mechanical correlation between the financial and non-pecuniary components. The net supply of the firm's share is normalized to 0. A risk-free asset is in elastic supply with its net financial return and non-pecuniary attribute both normalized to 0.

The game has three stages. The timeline is shown in Figure 1.

At stage 1, the firm observes the state (v, θ) and, with the objective to maximize its share price, sends a costless, non-verifiable message $m \in \{g, \varnothing\}$ to investors: g denotes a voluntary sustainability disclosure and $\varnothing$ denotes silence.[4]

[3]The symmetry assumption can be relaxed without changing the main insights.

[4]The meaning of the two messages are not pinned down by the model. One may also interpret the two messages as being "green" or "brown". For the ease of exposition, we adopt the disclosure-silence interpretation.

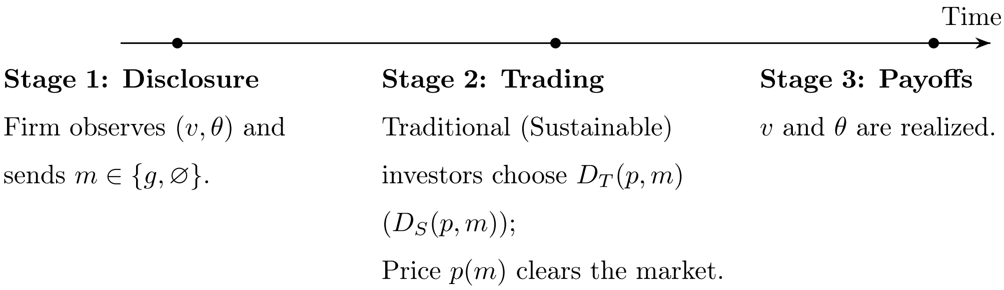

Figure 1: Timeline.

Notably, we abstract from financial disclosures and focus on cheap sustainability talk. Accordingly, investors' prior over v should be interpreted as the posterior they hold after processing all financial disclosures that lie outside the model, whether verifiable or not. In practice, this includes information from mandatory filings (e.g., 10-K, 10-Q) and voluntary communications (e.g., earnings calls). This approach isolates the incremental contribution of sustainability claims to investors' beliefs.

To streamline the discussion, we assume that the firm privately follows a state-contingent threshold rule:

$$m = \begin{cases} g, & \begin{array}{l} \text{if } v = \sigma_v \text{ and } \theta \geq \lambda_+, \\ \text{or } v = -\sigma_v \text{ and } \theta \geq \lambda_-, \end{array} \\ \varnothing, & \text{otherwise.} \end{cases} \tag{1}$$

That is, the firm sends the message g if and only if θ is above a state-dependent threshold, which depends on its cash flow value v. The strategy is thus summarized by thresholds (λ_+, λ_-), or equivalently by disclosure probabilities,

$$\pi_+ \equiv \mathbb{P}(\theta \geq \lambda_+) = 1 - F(\lambda_+), \qquad \pi_- \equiv \mathbb{P}(\theta \geq \lambda_-) = 1 - F(\lambda_-). \tag{2}$$

At stage 2, given message m, a unit mass of investors choose their demands, facing quadratic trading costs $\frac{1}{2}\epsilon D^2$ with $\epsilon > 0$. More specifically, a fraction $1 - \gamma$ are *traditional* investors, who value only v, and choose demand schedule $D_T(p, m)$ to maximize their expected utility,

$$\max_{D_T} \mathbb{E}[U_T \mid m] = D_T\big(\mathbb{E}[v \mid m] - p\big) \; - \; \frac{1}{2}\epsilon D_T^2, \tag{3}$$

The quadratic cost ensures finite demand. As shown later, the exact value of ϵ is immaterial as long as $\epsilon > 0$.

The rest fraction γ are *sustainable* investors, who value both v and θ, and choose $D_S(p, m)$ to maximize their expected utility,

$$\max_{D_S} \mathbb{E}[U_S \mid m] = D_S(\mathbb{E}[v \mid m] - p + u \cdot \mathbf{1}\{\mathbb{E}[\theta \mid m] \geq x\}) - \frac{1}{2}\epsilon D_S^2, \tag{4}$$

where $\mathbf{1}\{\cdot\}$ is the indicator function and $u > 0$ is the per-share non-pecuniary utility if the expected sustainability meets a minimum standard $x \in (0, M)$. This extra utility term, in addition to the financial return $\mathbb{E}[v \mid m]-p$, captures the common practice that many sustainable investors tilt their portfolios to firms meeting certain standards. It can also be interpreted as a "warm-glow" (taste) benefit from holding stocks perceived as sufficiently sustainable.

At stage 3, v and θ are realized. We look for perfect Bayesian equilibria in which

(i) The firm's disclosure strategy (1) with (λ_+, λ_-) is incentive-compatible, i.e., message m maximizes the share price given (v, θ).

(ii) Investors hold rational beliefs about the firm's strategy and update their beliefs with Bayes' rule. $D_T(p, m)$ and $D_S(p, m)$ solves (3) and (4), i.e., maximize the expected utility of traditional investors and sustainable investors, respectively, given p and message m.

(iii) $p(m)$ clears the security market for all $m \in \{g, \varnothing\}$, i.e.,

$$(1-\gamma)D_T(p, m) + \gamma D_S(p, m) = 0 \tag{5}$$

Requirement (ii) is the individual rationality constraint for investors. Requirement (iii) is the market clearing constraint. Requirement (i), more specifically, requires $p(g) \geq p(\varnothing)$ if and only if in the following two cases: $v = \sigma_v$ and $\theta \geq \lambda_+$; or $v = -\sigma_v$ and $\theta \geq \lambda_-$.

3.2 The equilibria

As in standard cheap-talk games, *babbling equilibria* exist in which investors ignore the firm's message for all m. We restrict our attention to *non-babbling* equilibria and begin by characterizing the equilibrium price $p(m)$.

Lemma 1. *Let $\theta_+ := \mathbb{E}[\theta \mid \theta \geq \lambda_+]$, and $\theta_- := \mathbb{E}[\theta \mid \theta \geq \lambda_-]$. If*

$$\mathbb{E}[\theta \mid g] = \frac{\pi_+\theta_+ + \pi_-\theta_-}{\pi_+ + \pi_-} \geq x, \tag{6}$$

then the equilibrium prices are

$$p(g) = \mathbb{E}[v \mid g] + u\gamma, \tag{7}$$

$$p(\varnothing) = \mathbb{E}[v \mid \varnothing]. \tag{8}$$

Here θ_+ and θ_- are the conditional expectations of θ when the firm discloses g while $v = \sigma_v$ and $v = -\sigma_v$, respectively. As expected, we have $\mathbb{E}[\theta \mid g] \geq \mathbb{E}[\theta \mid \varnothing]$, that is, sustainability disclosure increases investors' expectation about the non-pecuniary attribute. To see this point, note that by the law of total expectation, we have $\mathbb{E}[\theta] = \mathbb{P}(g)\mathbb{E}[\theta \mid g] + \mathbb{P}(\varnothing)\mathbb{E}[\theta \mid \varnothing] = 0$, hence $\mathbb{E}[\theta \mid g] = -\frac{\mathbb{P}(g)}{\mathbb{P}(\varnothing)}\mathbb{E}[\theta \mid \varnothing]$, which can be satisfied only if $\mathbb{E}[\theta \mid g] > 0 > \mathbb{E}[\theta \mid \varnothing]$. As noted before, the trading cost coefficient ϵ does not show up in the expressions of price, validating the previous claim that its exact value is immaterial.

As the prices depend on the state (v, θ) only indirectly through the firm's message, the incentive compatibility condition implies that the firm must be indifferent in sending either signal in a non-babbling equilibrium,

$$p(g) = p(\varnothing).$$

Using (7), (8), and Bayes' rule, this condition is equivalent to

$$\underbrace{2\sigma_v\Big(\mathbb{P}(v = \sigma_v|g) - \mathbb{P}(v = \sigma_v|\varnothing)\Big)}_{\text{Cash flow information effect}} + \underbrace{u\gamma}_{\text{Sustainability information effect}} = 0, \tag{9}$$

with the posterior belief dispersion on v given by

$$D_v = \mathbb{P}(v = \sigma_v|g) - \mathbb{P}(v = \sigma_v|\varnothing) = \frac{\pi_+ - \pi_-}{(\pi_+ + \pi_-)\,(2 - (\pi_+ + \pi_-))}. \tag{10}$$

As $u\gamma > 0$, disclosure has a positive effect on valuation due to a higher expectation of θ. The equilibrium condition asserts that the disclosure must have a negative effect on valuation due to a lower cash flow expectation, i.e., $\mathbb{P}(v = \sigma_v|g) < \mathbb{P}(v = \sigma_v|\varnothing)$. This observation that $D_v < 0$ implies that $\pi_+ < \pi_-$, i.e., the firm discloses more often when $v = -\sigma_v$ than when $v = \sigma_v$. In other words, disclosure g is a positive signal about θ but a negative signal about v. The two opposite effects allow the firm to increase investors' expectation on θ at the cost of depressing its cash flow valuation, endogenously generating a cost of disclosure. In equilibrium, the two effects balance each other and make the firm indifferent between disclosure and remaining silent. Therefore, even though the firm's objective is solely to increase its share price, the trade-off enables the firm to send informative signals. The following result summarizes this intuition.

Proposition 1. *There exists $\sigma_{min} > 0$ such that non-babbling equilibria exist if and only if $\sigma_v \geq \sigma_{min}$. In these equilibria, $\pi_- > \pi_+$, $\mathbb{E}[v|g] < \mathbb{E}[v|\varnothing]$ and $\mathbb{E}[\theta|g] > \mathbb{E}[\theta|\varnothing]$.*

The first statement emphasizes the role of financial uncertainty σ_v. Without substantial financial uncertainty, informative communication is impossible in our model. This is because the equilibrium condition puts a constraint on disclosure probabilities, which can be satisfied only when σ_v is sufficiently large. Intuitively, the belief dispersion D_v is bounded below by -1.

If σ_v is too small, the positive effect of disclosure ($u\gamma$) is larger than the maximum negative effect on cash flow ($-2\sigma_v$), then the firm cannot credibly remain silent, leading to a babbling equilibrium.

Given two free parameters (π_+, π_-) but only one equality constraint (9), there are multiple equilibria featuring different disclosure strategies. In all of them, the ex post share price is a constant and independent of the firm's message. However, its level does depend on the firm's strategy. To see this point, notice that the firm's ex ante expected share price before sending the message is

$$\mathbb{E}[p] = \frac{1}{2}(\pi_+ + \pi_-)p(g) + \big(1 - \frac{1}{2}(\pi_+ + \pi_-)\big)p(\varnothing) = \frac{u\gamma}{2}(\pi_+ + \pi_-). \tag{11}$$

The law of iterated expectation and the incentive-cimpatibility constraint implies that $\mathbb{E}[p] = p(g) = p(\varnothing)$. Hence the firm strictly prefers equilibria that deliver a higher expected price. In a babbling equilibrium, we have $\mathbb{E}[p] = 0$ because no information is conveyed and prices only reflect investors' prior. Allowing cheap sustainability talk therefore strictly benefits the firm whenever it sustains an equilibrium with $(\pi_+ + \pi_-) > 0$, which yields a strictly higher price than the no-communication benchmark.

3.3 The firm-preferred equilibrium

In what follows, given competitive investors, we focus on the *firm-preferred* equilibrium, i.e., the equilibrium that maximizes the ex-ante expected share price, and derive testable comparative statics. We thus impose the additional requirement,

(iv) The firm's strategy maximizes the expected share price $\mathbb{E}[p]$.

As shown in (11), to maximize the expected price, the strategy maximizes the total disclosure probability, $\pi_+ + \pi_-$, subject to the equilibrium constraint (9) and the minimum requirement constraint (6).

Proposition 2. *Suppose $\sigma_v > \sigma_{min}$. Denote (π_+^*, π_-^*) as the pair of disclosure probabilities that maximizes the expected share price $\mathbb{E}[p]$. Then one of the following cases holds:*

(i) (Interior solution): $\pi_+^* = \pi_+^{**}, \pi_-^* = \pi_-^{**}$, and (6) binds, where (π_+^{**}, π_-^{**}) is such that $0 < \pi_+^{**} < \pi_-^{**} < 1$ and is defined in the appendix.

(ii) (Boundary solution): $\pi_+^* = \frac{1}{k} - 1$, $\pi_-^* = 1$ and (6) is slack.

In particular, only the interior solution can be obtained if $\sigma_v > u\gamma$ or if $x > \bar{x}$ for some $\bar{x} \in (0, M)$.

To understand this result, first ignore the minimum requirement constraint (6). Using the equilibrium condition (9), the highest feasible disclosure probability and thus the highest expected price is attained at the boundary, $\pi_+ = \frac{1}{k} - 1$ and $\pi_- = 1$. To see this point, we rewrite (9) in terms of the difference (Δ) and the sum (Σ) of disclosure probabilities

$$\Delta = k\Sigma\,(2 - \Sigma)\,, \quad \text{where } k = \frac{u\gamma}{2\sigma_v},\ \Delta = \pi_- - \pi_+,\ \text{and } \Sigma = \pi_- + \pi_+. \tag{12}$$

By the fact that $0 \leq \pi_+ < \pi_- \leq 1$, we have $\Delta \in (0, \Sigma]$ and $\Sigma \in (0, 2)$. The feasibility constraints $\pi_+ = (\Sigma - \Delta)/2 \geq 0$, $\pi_- = (\Sigma + \Delta)/2 \leq 1$, and (12) imply that

$$2 - \frac{1}{k} \leq \Sigma \leq \frac{1}{k}. \tag{13}$$

Moreover, $\Sigma = \frac{1}{k}$ if and only if $\pi_+ = \frac{1}{k} - 1$ and $\pi_- = 1$. It is clear that if $\sigma_v > u\gamma$, then $\pi_+ = \frac{1}{k} - 1 > 1$, which is infeasible.

Now we reinstate the minimum requirement constraint (6). If $\mathbb{E}[\theta|g] \geq \bar{x}$ is satisfied, then this boundary solution is optimal. However, if $\mathbb{E}[\theta|g] < \bar{x}$ at the boundary, then the firm cannot disclose that frequently. To meet the minimum requirement, the firm moves off the boundary solution along the equilibrium locus (12) to the interior pair[5] (π_+^{**}, π_-^{**}) such that (6) binds, i.e., $\mathbb{E}[\theta|g] = x$. Any slack ($\mathbb{E}[\theta|g] > x$) is suboptimal: the firm can increase the total disclosure probability (Σ) while keeping belief dispersion D_v unchanged, which raises the expected price.[6] The last statement in Proposition 2 is intuitive: when x exceeds the boundary value of $\mathbb{E}[\theta \mid g]$, the boundary solution becomes infeasible.

We now are ready to derive comparative statics. Denote D_v the equilibrium difference in posterior expectations on θ,

$$D_\theta^* = \mathbb{E}[\theta|g] - \mathbb{E}[\theta|\varnothing], \tag{14}$$

and recall that D_v^* is the equilibrium belief dispersion on v defined in (10). Focusing on the interior solution, we have the following result.

Proposition 3. *Suppose $x > \bar{x}$ or $\sigma_v > u\gamma$. In the firm-preferred equilibrium, as σ_v increases,*

[5]If multiple interior pairs satisfy $\mathbb{E}[\theta \mid g] = x$ and (12), choose (π_+^{**}, π_-^{**}) with the largest Σ.

[6]To see this is possible, let $f(\Sigma) = \Sigma(2 - \Sigma)$, $R(u) = f(\Sigma + u)/f(\Sigma)$, and $\pi_+' = \pi_+ + \big(u - \Delta[R(u) - 1]\big)/2$, $\pi_-' = \pi_- + \big(u + \Delta[R(u) - 1]\big)/2$. For $u > 0$ small enough, π_+' and π_-' fall in $(0, 1)$, and we have $\Sigma' = \Sigma + u > \Sigma$ and $\Delta' = \Delta R(u)$. It is straightforward to check that $D_v' = -\Delta'/f(\Sigma + u) = -\Delta/f(\Sigma) = D_v$.

(i) $\left.\dfrac{d\Sigma^*}{d\sigma_v}\right|_{\Sigma^*(k)} \geq 0$*, i.e., the unconditional disclosure probability* $(\Sigma^*/2)$ *increases*

(ii) $\left.\dfrac{\partial D_v^*}{\partial \sigma_v}\right|_{\Sigma^*(k)} \geq 0$*, i.e., the magnitude of cash flow belief dispersion is smaller;*

(iii) $\left.\dfrac{dD_\theta^*}{d\sigma_v}\right|_{\Sigma^*(k)} \geq 0$*, i.e., the difference in expectations of* θ *becomes larger.*

The intuition for these results is the following. As evident from (9), $D_v = -\frac{u\gamma}{2\sigma_v} < 0$ in equilibrium. Thus D_v approaches to zero as σ_v increases. Intuitively, this is because as σ_v increases, the marginal impact of posterior belief dispersion on expected cash flow increases. As σ_v does not affect the expectations on θ (v and θ are independent), the equilibrium condition requires that the firm's message induces a smaller impact on beliefs in v, and therefore disclosure becomes a less informative signal about cash flow, leading to the result in part (ii). To achieve a smaller magnitude in the belief dispersion D_v, the firm optimally increases Σ^* (and potentially decreases Δ), which leads to the result in part (i).[7] For part (iii), as the firm discloses more often by using lower thresholds on θ, silence becomes a more negative signal on θ, which lowers $\mathbb{E}[\theta|\varnothing]$. As $\mathbb{E}[\theta|g]$ is unaffected (fixed at the threshold x), the difference hence increases with σ_v.

3.4 Empirical hypotheses

Proposition 1 shows that credible communication is possible because sustainable claims serve as a positive signal of the firm's sustainability level and a negative signal of its cash flow, generating an endogenous cost for such claims. Therefore, the model predicts a negative correlation between sustainability claims and a firm's future cash flow.

Prediction 1. *Sustainability claims are negatively correlated with firms' future cash flows.*

Moreover, variation in financial uncertainty has distinct effects on equilibrium outcomes, generating predictions unique to our model. Proposition 3 shows that investors' cash flow belief dispersion between firms with and without sustainability claims is closer to zero as financial uncertainty increases.

Prediction 2. *Cash flow belief dispersion between a disclosing firm and a non-disclosing firm is closer to zero as financial uncertainty increases.*

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[7] To see this is possible, pick any small $u > 0$ such that $\Sigma' = \Sigma + u < 2$. Let $f(\Sigma) = \Sigma(2-\Sigma)$, $R(u) = f(\Sigma+u)/f(\Sigma)$, $c := \frac{1}{2}\min\left\{1, \frac{\Sigma'}{R(u)\Delta}, \frac{2-\Sigma'}{R(u)\Delta}\right\} \in (0,1)$, and $\Delta' := cR(u)\Delta$. As $\Delta' < \min\{\Sigma', 2-\Sigma'\}$, we have π'_+ and π'_- fall in $(0,1)$. Moreover, $|D'_v| = \Delta'/f(\Sigma') = c\Delta/f(\Sigma) = c|D_v| < |D_v|$.

As explained above, this is because higher cash flow uncertainty requires smaller belief dispersion, so that the valuation discount from lower cash flows offsets the valuation premium from higher sustainability attributes.

Prediction 3. *Firms with higher financial uncertainty are more likely to make sustainability disclosures.*

The firm optimally implements a smaller cash flow belief dispersion when the unconditional disclosure probability is higher, leading to this prediction.

Prediction 4. *Belief updates about the sustainability attribute are larger for firms with greater financial uncertainty.*

A larger probability of making sustainability claims implies lower thresholds, which in turn lowers the average sustainability level of firms without such claims further. As a result, the dispersion in the expected sustainability level between the firms with and without claims increases with financial uncertainty.

4 Data and Measures

4.1 Measurements

We now take the model to the data. To test our empirical predictions, we would need to measure (i) firms' sustainability talks Σ, defined in (12); (ii) financial uncertainty σ_v; (iii) the cash flow information contained in green talks D_v, defined in (10); and (iv) the sustainability information contained in green talks D_θ, defined in (14). We describe in details below.

4.1.1 Measuring sustainability talks

We use firms' earnings calls transcripts to capture green talks by firms. We follow the methodology by Lin et al. (2024) and Robinson et al. (2025) to construct our measure of sustainability talks. Specifically, Lin et al. (2024) provide lists of phrases for each topic for different ESG categories—including climate change, natural resource, pollution & waste, ecosystem, human capital, products & customers, other stakeholders, and general ESG—which captures firms' disclosures on these ESG matters. Robinson et al. (2025) applies it to analyze firms conference calls transcripts. Following these papers, we first parse earnings calls into sentences. We then search for each phrase under each category in each sentence, and identify any sentence that contains at least one key phrase under each category as certain topic related. We measure firms' disclosure on each topic as the proportion of number of words in topic-related sentences divided by total number of words in each earnings calls. We note that we only focus on firms' presentations and exclude the Q&A sessions in earnings calls, as the presentation itself captures more firms' proactive disclosures. Finally, we combine the four environment-related categories—climate change, natural resource, pollution & waste, and ecosystem—into one combined measure of sustainability talks. To do so, we first demean the measure for each category to adjust for the length of phrase lists and frequency of appearance. Then we take the average of the four as our final measure of firms' sustainability talks.

We note that we do not intend to argue that all the disclosures in earnings calls are non-verifiable or non-reliable, as there has been a large set of research showing that information communications in earnings calls deliver useful information about companies' bottom lines (e.g., Hassan et al., 2019). Our underlying assumption when using earnings calls as data source is that, given the high-noise and hard-to-verify nature in sustainability disclosure, it is "cheap" for firms to advertise themselves as green firms in their presentations, and try to gain support from the sustainable investors. Sautner et al. (2023) and Li et al. (2024) use earnings calls to measure exposure to climate change, and show that the earnings calls contain useful information in terms of material risks and opportunities related to climate change. We note two differences from these two studies. Both the papers use transcripts for presentation and Q&A sessions of earnings calls, while we only use the transcripts for the presentations. This is because the questions asked by analysts in the calls could be driven by many others factors (e.g., market participants' attention on environmental issues), and the presentation itself captures better the *strategic* disclosure of sustainability, which better matches our theoretical framework. Moreover, while these two papers focus on climate change, we also include additional topics, including natural resources, pollution & waste, and ecosystems. These additional topics have less standardized metrics compared to climate change, making them more susceptible to greenwashing.

4.1.2 Measuring cash flow uncertainty

Following prior literature (e.g., Bachmann et al., 2013), we use the dispersion of analysts' EPS forecasts as a proxy for the uncertainty of firms' cash flows. Intuitively, it captures the degree of uncertainty faced by the market participants regarding the earnings, and therefore serve as a good measure for the parameter σ_v in our model. Specifically, we use the standard deviation of analyst forecasts scaled by mean of forecast to adjust for different levels of forecasts. We use

EPS forecasts of next fiscal year (fpi=2 in IBES).

4.1.3 Measuring cash flow information in sustainability talks

To measure the cash flow information in sustainability talks of firms, we use the difference between realized EPS and foretasted EPS (before sustainability talks), scaled by the standard deviation of forecasts. This measures captures whether the realization of EPS is more of a negative "surprise" or a positive one. In other words, we will examine our hypothesis that the there is more negative realization when firms have more sustainability talks. Importantly, we scale forecast difference by the standard deviation of forecasts. This exactly matches what we want to measure on the cash flow information as a proportion of financial uncertainty. The total cash flow information (difference between g and $\varnothing$) is $2\sigma_v\big(\mathbb{P}(v=\sigma_v|g)-\mathbb{P}(v=\sigma_v|\varnothing)\big)$, and what we measure through scaling by the standard deviation of forecasts is only $\mathbb{P}(v=\sigma_v|g)-\mathbb{P}(v=\sigma_v|\varnothing)$.

4.1.4 Measuring sustainability information in sustainability talks

Unlike for cash flow, there is no clear measure for the "realized" sustainability value of firms. Therefore, to measure the sustainability information in sustainability talks of firms, we take a agnostic approach and use sustainable investors' holding change to proxy the change in *expected* sustainability value of firms. The underlying assumption is that when the sustainability disclosures are more credible, sustainable investors will react more strongly and increase the holding of this firm. Specifically, we follow Dyck et al. (2019) and Ilhan et al. (2023) and define share of sustainable investors as the institutional investors from high environmental-norm countries. We rank all the countries based on their Environmental Protection Index, constructed by Yale, and define the high-norm countries as those above median. In our main analysis, we examine a holding change over a 2-year period to reflect the slow adjustment of institutional investors' holdings in response to ESG-related information (e.g., Berg et al., 2023). We also conduct analysis for various horizons—1-quarter to 2-year—to understand the dynamics of holding changes.

4.2 Sample Construction and Summary Statistics

In our empirical analysis, we focus on U.S. public firms, for which there is no regulatory enforcement on sustainability disclosures as of 2025. We collect U.S. firms' quarterly earnings calls transcripts from Capital IQ, which spans from 2008 to 2023. We use analysts' EPS forecasts from I/B/E/S. We rely on CRSP-Compustat for firm fundamentals. We use Factset for investor holdings, which spans from 2008 to 2022. We match all these databases using CUSIPs of firms.

Table 1 about here.

In most of the analysis in our paper, we will use a firm-quarter panel, to stay at the same frequency as the firms' earnings calls. Our main sample includes 4457 unique firms. Panel A of Table 1 provides the summary statistics of the main sample. By construction the mean of sustainability talks of firms have a mean of 1. The standard deviation of it is 1.29, and there is a large dispersion on firms' sustainability talks. The number of observations of realized earnings are smaller than the main sample because some of the forecasts were not yet realized, and forecast of 3-year ahead EPS is not as populated. All the control variables (size, Tobin's Q, ROA, leverage, CapEx/Asset) are for previous year.

In some analysis, we also aggregate the sample to a firm-year panel to examine how firms' sustainability talks correlates with firms' annualized earnings growth and sales growth. We take the average of sustainability talks across quarters within a firm-year as firms' annual sustainability talks in a given year. The earnings and sales growth also have a large dispersion across firms. Panel C provides the summary statistics for the sample examining changes of portfolio holdings. Change of sustainable investor (SI) holdings (over a 2-year period) has a mean of 2% and standard deviation of around 10.5%. To remove the impact of outliers, all the variables are winsorized at 1% and 99%.

5 Empirics

5.1 Correlation between sustainability talks and firms' future cash flows

We start by testing whether sustainability talks negatively correlate with future cash flows. We first test whether firms' realized cash flows, proxied by earnings growth and sales growth correlate with firms' sustainability talks. We aggregate the $SusTalk$ measure to firm-year level by taking the average across quarters within a year. Then we run the following regression

$$\Delta Y_{i,[t-1,t+s]} = \alpha + \beta SusTalk_{i,t} + \gamma_{ind,t} + Controls + \epsilon_{i,t}, \tag{15}$$

where $\Delta Y_{i,[t-1,t+s]}$ and s = 0,1,2, indicates the earnings and sales growth from year $t-1$ to year $t+s$ of firm i, defined as $\frac{Earnings_{t+s}-Earnings_{t-1}}{abs(Earnings_{t-1})}$, and $\frac{Sales_{t+s}-Sales_{t-1}}{Sales_{t-1}}$, respectively. $SusTalk_{i,t}$ is firm i's sustainability disclosures in year t, constructed based on firms' earnings calls transcripts. $\gamma_{ind,t}$ indicates industry (6-digit GICS codes) $\times$ year fixed effects. Control variables include firm size (natural log market capitalization), Tobin's Q, return on asset, leverage, ratio of capital expenditure over asset, in year $t-1$. We cluster standard errors by firm.

Table 2 about here.

Table 2 presents the results. Column 1-3 present the results for 1-3 year earnings growth rate, and column 4-6 present the results for 1-3 year sales growth rate. The coefficients are significantly negative across all columns at different significant levels. The results suggest that sustainability talks negatively correlate with future earnings and sales growth. In terms of economic magnitude, one standard deviation increase of sustainability talks (1.15) is associated with 5.64%, 10.58%, 10.70% lower earnings growth over 1-year, 2-year, 3-year horizon respectively, and with 0.57%, 1.50%, 2.19% lower sales growth over 1-year, 2-year, 3-year horizon respectively. Taking 2-year horizon as an example, this corresponds to 0.026 and 0.030 of standard deviation of earnings and sales growth respectively.

Next, we would like to confirm that this negative cash flow growth was not ex-ante expected before sustainability talks. In other words, we want to show that firms' sustainability talks are associated with negative realized earnings, relative to the ex-ante expected value. We use analyst earnings forecasts as proxies for expected cash flows by market participants to illustrate this association.

Specifically, we run the following regression:

$$\frac{EPS - F_{t-1}EPS}{sd(F_{t-1}EPS)} = \alpha + \beta SusTalk_{i,t} + \gamma_{ind,t} + Controls + \epsilon_{i,t}, \tag{16}$$

The dependent variable is the difference between realized EPS and mean of analysts' EPS forecasts at the end of quarter $t-1$, scaled by the standard deviation of EPS forecasts. We use 1- to 3-year ahead EPS forecasts (fpi = 1,2,3 as defined in IBES). $SusTalk_{i,t}$ is firm i's sustainability talks in quarter t, constructed based on the earnings calls transcripts. $\gamma_{ind,t}$ indicates industry (6-digit GICS codes) $\times$ year-quarter fixed effects. Control variables are the same as in Equation 15. We double cluster the standard error by firm and by year-quarter.

Table 3 about here.

Table 3 presents the results for the regressions. Columns 1-2, 3-4, 5-6 show results for 1-, 2-, 3-year ahead forecasts respectively. Odd numbers show regressions with only size as control variable, and even numbers also control for other observable firm fundamentals, which yield similar results. The coefficients of interest are significantly negative across different specifications and horizons. This suggests that the sustainability disclosure contains cash flow information that was not ex-ante expected. In terms of economic magnitude, one standard deviation increase in sustainability talks (1.29) is associated with 0.015, 0.022, 0.019 standard deviation of decrease realized earnings, relative to expected value, over 1-year, 2-year and 3-year horizons, respectively.

Taken together, the results provide direct support the key mechanism in our model and empirical prediction 1 that sustainability talks contain negative information about firms' future cash flows. Firms which talk more about sustainability in their earnings calls have lower earnings and sales growth, which were not ex-ante expected.

5.2 Cash flow information of sustainability talks under diff. financial uncertainty

We move to test our next empirical prediction that the cash flow information in sustainability talks decreases with cash flow uncertainty. We define financial uncertainty as the analyst forecast dispersion, scaled by mean of forecasts to adjust for levels of EPS. We divide the sample into subsamples based on the quintiles of forecast dispersion. We then run a regression as in Equation 18 in each subsample. Note that the dependent variable, $\frac{EPS - F_{t-1}EPS}{sd(F_{t-1}EPS)}$, matches the definition of D_v in our model, which is cash flow information as a proportion of cash flow uncertainty σ_v. For this analysis we also focus on EPS forecasts for next fiscal year, as EPS for the current fiscal year is already partly realized.

Table 4 about here.

Table 4 presents the results. Odd number columns show regressions with only size as control variable, and even number columns also control for other observable firm fundamentals, which yield similar results. From the left to the right it presents regressions for lowest to highest forecast dispersion subsamples. For the least financial uncertainty subsample (column 1-2), one standard increase in sustainability talks is associated with 0.348 (1.29 $\times$ 0.270) unit—equivalent to 4.7% (0.348/7.34) standard deviation—of negative cash flow information (as a proportion of forecast dispersion). The magnitude of this coefficient of interest generally decreases as forecast dispersion increases across subsamples. For the highest forecast dispersion group, one standard deviation increase in sustainability talks is associated with 0.092 (1.29 × 0.071, t-stat = -1.5) unit—equivalent to 1.3% (0.092/7.34) standard deviation—of negative cash flow information (as a proportion of forecast dispersion).

This evidence provides direct support to our empirical prediction 2. In a non-babbling equilibrium, the negative cash flow information has to break even with positive sustainability information. Given the same level of positive sustainability information, a higher financial uncertainty implies that, sustainability talks only need to carry negative information about a smaller proportion of financial uncertainty, which is captured by our empirical results.

5.3 Financial uncertainty and sustainability talks

We then move to test how the intensity of sustainability talks are correlated with financial uncertainty. We run a cross-section regression of firms' sustainability talks on analysts' EPS forecast dispersion of firms. Specifically, we run the following regression

$$SusTalk_{i,t} = \alpha + \beta ForecastDispersion_{i,t-1} + \gamma_{ind,t} + Controls + \epsilon_{i,t}, \tag{17}$$

where $SusTalk_{i,t}$ is the firms' sustainability talks of firm i in quarter t, contructed based on earnings calls transcripts. $ForecastDispersion_{i,t-1}$ is the standard deviation of analyst forecasts in quarter $t-1$, scaled by mean of forecasts. $\gamma_{ind,t}$ indicates industry × quarter fixed effects. Control variables are same as previous analysis.

Table 5 about here.

Table 5 presents the results for this analysis. Column 1-2 uses a continuous variable for forecast dispersion, which represents the percentile of analyst forecast dispersion. The significantly positive coefficients suggest that sustainability talks of firms increase with the ex-ante forecast dispersion of firms. Column 3 and 4 replace the continuous variable with dummies indicating quintiles of forecast dispersion. Firms' sustainability talks monotonically increases from lowest dispersion quintile (omitted as baseline) to the highest dispersion quintile. In terms of economic magnitude, the highest dispersion quintile have 8.5% (0.11/1.29) of standard deviation more sustainability talks than lowest dispersion group.

This result provides support to our empirical prediction 3. In the firm-preferred equilibrium, firms would want to do more of sustainability talks—in which situation they could get the additional valuation premium from sustainable investors—subject to the constraint of non-babbling equilibrium condition. When there is higher financial uncertainty, firms are less constraint in maximizing the sustainability talk probability. Therefore, sustainability talks increase with cash flow uncertainty.

5.4 Sustainability information of sustainability talks under diff. financial uncertainty

We move to test our next empirical prediction that the sustainability information in sustainability talks increases with cash flow uncertainty. As there is no direct measure for "realized" sustainability value, we use the change of holdings of Sustainable Investors (SI) as a proxy for belief updates of sustainability value of firms. In other words, we test how sustainability talks change the holdings of sustainable investors under different levels of financial uncertainty. Similar to the analysis in Section 5.2, we divide the full sample into subsamples based on quintiles of analysts' forecast dispersion. The for each subsample we run the following regression

$$\Delta SI\, Holding_{i,[t-1,t+s]} = \alpha + \beta SusTalk_{i,t} + \zeta Controls + \gamma_{ind,t} + \epsilon_{i,t}, \tag{18}$$

where $\Delta SI\, Holding_{i,[t-1,t+s]}$ is the change of share of holdings of sustainable investors, defined as investors from high environmental norm countries, from end of quarter $t-1$ to end of quarter $t+s$. $SusTalk_{i,t}$ is firm i's sustainability talks in quarter t, constructed based on the earnings calls transcripts. $\gamma_{ind,t}$ indicates industry $\times$ year-quarter fixed effects. Besides control variables used in previous analysis, we also control for the stock return of over the same period to control for holding changes related to stock returns. In the main analysis we focus on holding change over $[t-1, t+7]$, i.e. holding change over a 2-year period. This is because institutional investors tend to rebalance portfolios for ESG reasons slowly. For example, Berg et al. (2023) show that it takes up to 2 years for investors to rebalance holdings after ESG rating changes. We also plot the estimates for all s=0,1,2,...,7 and confirm the slow holding change empirically.

Table 6 about here.

Table 6 presents the results. Odd number columns show regressions with only size and return as control variables, and even number columns also control for other observable firm fundamentals, which yield similar results. From the left to the right it presents regressions for lowest to highest forecast dispersion subsamples. For lowest forecast dispersion group, a one standard deviation increase in sustainability talks is associated with 0.123% (0.107 $\times$ 1.15, t=1.2) increase in sustainable investor holdings. By comparison, for highest forecast dispersion group, a one standard deviation increase of sustainability talks is associated with 0.476% (0.414×1.15, t=1.9) increase in sustainable investor holdings, which corresponds to 4.5% (0.476/10.56) of standard deviation. The magnitude of the coefficients of interests generally increase from lowest dispersion to the highest dispersion groups. Figure 2 plots the estimates for lowest and highest dispersion groups over different horizons. The dynamic plots suggest that sustainable investor holding slowly increases up to 8 quarters after sustainability talks. And sustainability talks change holding more for highest dispersion groups than the lowest dispersion groups.

Figure 2 about here.

This evidence provides support to our empirical prediction 4. As discussed before, higher financial uncertainty allows firms to increase the probability of sustainability talks. As a result, such a higher probability implies a more polarized situation when firms choose to keep silent, in which case there is a larger gap in expected sustainability value between sustainability talk and silence.

6 Conclusions

This paper provides a new perspective on the credibility of sustainability talks of firms, when such sustainability claims are costless and non-verifiable. We demonstrate, within a simple cheap-talk framework, that cash flow uncertainty changes firms' strategic disclosure incentives and enables credible information transmission. Under the presence of cash flow uncertainty, sustainability claims convey both sustainability information and cash-flow information, and the negative inference about future cash flows serve as an endogenous cost, which gives rise to non-babbling equilibria. Our model also generates novel empirical predictions on how sustainability talks and the contained cash flow and sustainability information vary as a function of cash flow uncertainty, which we find direct empirical support.

Together, our findings challenge the conventional view that voluntary sustainability disclosure is uninformative in the absence of verification or regulation. Even when talk is cheap, credible communication can emerge endogenously when investors' sustainability preferences interact with firms' financial uncertainty. This insight has broader implications for debates over the design of regulation regarding ESG disclosures. Policies that change the information environment—by altering firms' financial uncertainty, investor composition, or disclosure incentives—can unintentionally complement or undermine the natural informational equilibrium the market already sustains. More broadly, our study underscores the importance of understanding the *status quo* of ESG communication, and opens new avenues for research on how financial information interacts with the credibility and real effects of corporate ESG communication.

References

Aghamolla, Cyrus and Byeong-Je An, "Mandatory vs. voluntary ESG disclosure, efficiency, and real effects," *Nanyang Business School Research Paper*, 2023, (22-41).

Angelis, Tiziano De, Peter Tankov, and Olivier David Zerbib, "Climate impact investing," *Management Science*, 2023, *69* (12), 7669–7692.

Azarmsa, Ehsan and Joel D Shapiro, "The market for ESG ratings," *Available at SSRN 4236912*, 2023.

Bachmann, Rüdiger, Steffen Elstner, and Eric R Sims, "Uncertainty and economic activity: Evidence from business survey data," *American Economic Journal: Macroeconomics*, 2013, *5* (2), 217–249.

Baker, Andrew C, David F Larcker, Charles G McClure, Durgesh Saraph, and Edward M Watts, "Diversity washing," *Journal of Accounting Research*, 2024, *62* (5), 1661–1709.

Ball, Ian, "Bauer's Maximum Principle for Quasiconvex Functions," *arXiv preprint arXiv:2305.04893*, 2023.

Bauer, Heinz, "Minimalstellen von funktionen und extremalpunkte," *Archiv der Mathematik*, 1958, *9* (4), 389–393.

Berg, Florian, Florian Heeb, and Julian F Kölbel, "The economic impact of ESG ratings," *Working Paper, MIT Sloan School of Management*, 2023.

Bolton, Patrick and Marcin Kacperczyk, "Firm commitments," *Management Science*, 2025.

Broccardo, Eleonora, Oliver Hart, and Luigi Zingales, "Exit versus voice," *Journal of Political Economy*, 2022, *130* (12), 3101–3145.

Cartellier, Fanny, Peter Tankov, and Olivier David Zerbib, "Can investors curb greenwashing?," *Journal of Economic Dynamics and Control*, 2025, p. 105195.

Chakraborty, Archishman and Rick Harbaugh, "Persuasion by cheap talk," *American Economic Review*, 2010, *100* (5), 2361–2382.

Chen, Hui and Jan Schneemeier, "Responsible Investors and Stock Market Feedback," *The Accounting Review*, 10 2025, pp. 1–32.

_ **and Jian Sun**, "Market for manipulable information," 2024.

Chen, Huiyao, "Talk or walk the talk? the real impact of esg investing," *The Real Impact of ESG Investing (May 19, 2023)*, 2023.

Cohen, Lauren, Ethan Rouen, and Kunal Sachdeva, "Widespread Misstatements of Emissions by Major US Corporations," 2025.

Cohen, Shira, Igor Kadach, and Gaizka Ormazabal, "Institutional investors, climate disclosure, and carbon emissions," *Journal of Accounting and Economics*, 2023, *76* (2-3), 101640.

Crawford, Vincent P and Joel Sobel, "Strategic information transmission," *Econometrica: Journal of the Econometric Society*, 1982, pp. 1431–1451.

Duchin, Ran, Janet Gao, and Qiping Xu, "Sustainability or greenwashing: Evidence from the asset market for industrial pollution," *Journal of Finance Forthcoming*, 2024.

Dyck, Alexander, Karl V Lins, Lukas Roth, and Hannes F Wagner, "Do institutional investors drive corporate social responsibility? International evidence," *Journal of financial economics*, 2019, *131* (3), 693–714.

Edmans, Alex, Doron Levit, and Jan Schneemeier, *Socially responsible divestment*, Centre for Economic Policy Research, 2022.

Friedman, Henry L, Mirko Stanislav Heinle, and Irina Luneva, "A theoretical framework for ESG reporting to investors," *Available at SSRN 3932689*, 2021.

Geelen, Thomas, Jakub Hajda, and Jan Starmans, "Sustainable organizations," *European Corporate Governance Institute–Finance Working Paper*, 2024, (994).

Gibbons, Brian, "The financially material effects of mandatory nonfinancial disclosure," *Journal of Accounting Research*, 2024, *62* (5), 1711–1754.

Goel, Anand M and Anjan V Thakor, "Information reliability and welfare: A theory of coarse credit ratings," *Journal of Financial Economics*, 2015, *115* (3), 541–557.

Goldstein, Itay, Alexandr Kopytov, Lin Shen, and Haotian Xiang, "On ESG investing: Heterogeneous preferences, information, and asset prices," Technical Report, National Bureau of Economic Research 2022.

Gupta, Deeksha, Alexandr Kopytov, and Jan Starmans, "The pace of change: Socially responsible investing in private markets," *Available at SSRN*, 2022.

_ **and Jan Starmans**, "Dynamic green disclosure requirements," *European Corporate Governance Institute–Finance Working Paper*, 2025, (1058).

Hassan, Tarek A, Stephan Hollander, Laurence Van Lent, and Ahmed Tahoun, "Firm-level political risk: Measurement and effects," *The quarterly journal of economics*, 2019, *134* (4), 2135–2202.

Ilhan, Emirhan, Philipp Krueger, Zacharias Sautner, and Laura T Starks, "Climate risk disclosure and institutional investors," *The Review of Financial Studies*, 2023, *36* (7), 2617–2650.

Inderst, Roman and Marcus M Opp, "Sustainable finance versus environmental policy: Does greenwashing justify a taxonomy for sustainable investments?," *Journal of financial economics*, 2025, *163*, 103954.

Jiang, Xiaoyan, Shawn Kim, and Shirley Lu, "Limited accountability and awareness of corporate emissions target outcomes," *Nature Climate Change*, 2025, *15* (3), 279–286.

Krueger, Philipp, Zacharias Sautner, Dragon Yongjun Tang, and Rui Zhong, "The effects of mandatory ESG disclosure around the world," *Journal of Accounting Research*, 2024, *62* (5), 1795–1847.

Landier, Augustin and Stefano Lovo, "Socially responsible finance: How to optimize impact," *The Review of Financial Studies*, 2025, *38* (4), 1211–1258.

Li, Qing, Hongyu Shan, Yuehua Tang, and Vincent Yao, "Corporate climate risk: Measurements and responses," *The Review of Financial Studies*, 2024, *37* (6), 1778–1830.

Lin, Yan, Rui Shen, Jasmine Wang, and Y Julia Yu, "Global evolution of environmental and social disclosure in annual reports," *Journal of Accounting Research*, 2024, *62* (5), 1941–1988.

Lipnowski, Elliot and Doron Ravid, "Cheap talk with transparent motives," *Econometrica*, 2020, *88* (4), 1631–1660.

Lovo, Stefano and Jacques Olivier, "Who should pay for ESG ratings?," *Available at SSRN*, 2025.

Morgan, John and Phillip C Stocken, "An analysis of stock recommendations," *RAND Journal of economics*, 2003, pp. 183–203.

Ng, Kung-Fu, "A maximum principle," *Journal of the Australian Mathematical Society*, 1979, *28* (1), 23–26.

Oehmke, Martin and Marcus M Opp, "A theory of socially responsible investment," *Review of Economic Studies*, 2025, *92* (2), 1193–1225.

Piccolo, Alessio, Jan Schneemeier, and Michele Bisceglia, "Externalities of responsible investments," *Available at SSRN 4183855*, 2022.

Robinson, Scott A, A Nicole Skinner, and Jasmine Wang, "Does litigation risk shape environmental disclosure decisions? Evidence from peers' environmental disclosure lawsuits," *The Accounting Review*, 2025, *100* (3), 445–475.

Sautner, Zacharias, Laurence Van Lent, Grigory Vilkov, and Ruishen Zhang, "Firm-level climate change exposure," *The Journal of Finance*, 2023, *78* (3), 1449–1498.

Stocken, Phillip C, "Credibility of voluntary disclosure," *The RAND Journal of Economics*, 2000, pp. 359–374.

Wu, Yue, Kaifu Zhang, and Jinhong Xie, "Bad greenwashing, good greenwashing: Corporate social responsibility and information transparency," *Management Science*, 2020, *66* (7), 3095–3112.

Xue, Hao, "ESG disclosure, market forces, and investment efficiency," *The Accounting Review*, 2025, *100* (5), 439–467.

Figures

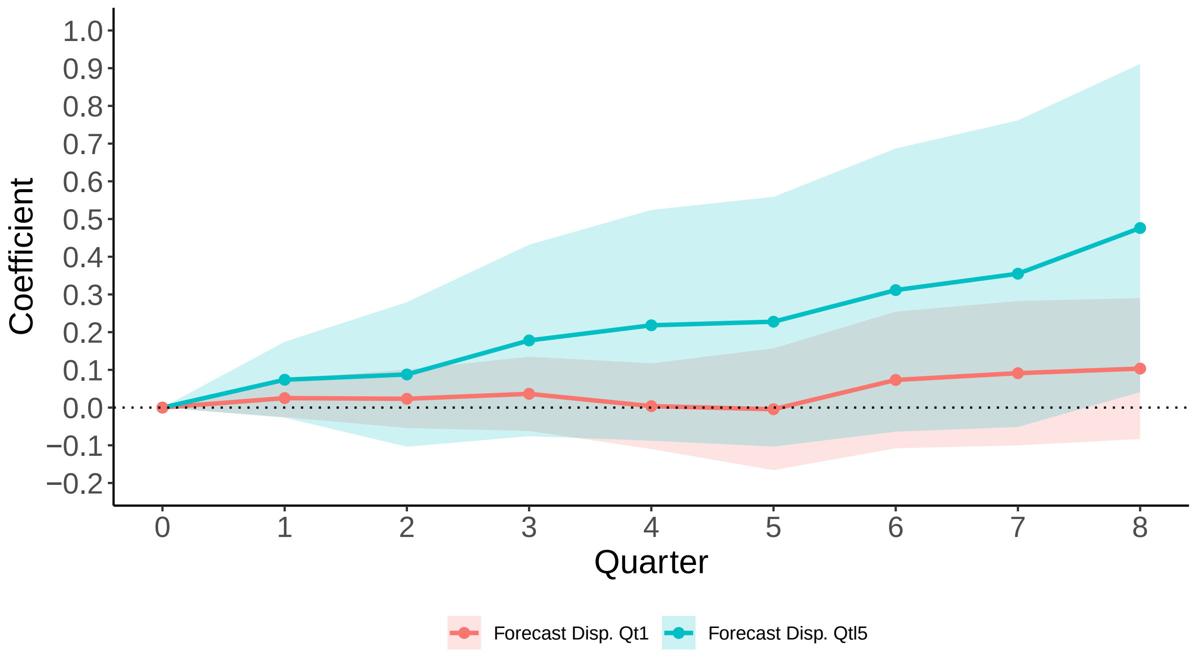

Figure 2: **Sustainability Talks and Change of sustainable investor holding over different horizons:** This figure plots the dynamics of changes in sustainable investor holdings in response to firms' sustainability talks over various horizons. On the x-axis is the number of quarters as intervals of holding changes. Specifically, it plots the coefficients β^ss from the following regression

$\Delta SI\ Holding_{i,[t-1,t+s]} = \alpha + \beta^s SusTalk_{i,t} + \zeta size + \lambda return_{i,[t-1,t+s]}\gamma_{ind,t} + \epsilon_{i,t}$,

where s=0,1,2,...,7 indicates 1-quarter, 2-quarter, until 8-quarter interval holding changes. where $\Delta SI\ Holding_{i,[t-1,t+s]}$ is the change of share of holdings of sustainable investors, defined as investors from high environmental norm countries, from end of quarter $t-1$ to end of quarter $t+s$. $SusTalk_{i,t}$ is firm i's sustainability talks in quarter t, constructed based on the earnings calls transcripts. The blue line plots the coefficients for the subsample of highest analyst forecast dispersion. The red line plots the coefficients for the subsample of lowest analyst forecast dispersion. The shaded areas indicate 95% confidence interval. The standard error is doubled clustered by firm and by year-quarter.

Tables

Panel A: Firm-quarter panel

	Obs	Mean	Sd	5%	25%	50%	75%	95%
SusTalk	109,924	1.00	1.29	0.00	0.24	0.59	1.25	3.38
(EPS-FEPS)/sd(FEPS), 1Y	99,135	0.23	6.31	-9.20	-1.62	0.39	2.48	9.00
(EPS-FEPS)/sd(FEPS), 2Y	94,762	-1.23	7.34	-13.15	-3.56	-0.62	1.92	8.88
(EPS-FEPS)/sd(FEPS), 3Y	57,840	-1.44	8.61	-14.50	-3.82	-0.87	1.72	9.80
Forecast Disp	102,142	0.26	0.64	0.02	0.04	0.08	0.20	1.00
size	109,924	7.31	1.78	4.47	6.07	7.23	8.43	10.48
Tobin's Q	109,924	0.59	0.50	0.08	0.25	0.47	0.78	1.50
ROA	109,924	0.00	0.15	-0.30	-0.01	0.03	0.07	0.16
leverage	109,924	0.38	0.26	0.04	0.17	0.33	0.56	0.87
CapEx/Asset	109,924	0.04	0.05	0.00	0.01	0.02	0.05	0.13

Panel B: Firm-year panel

	Obs	Mean	Sd	5%	25%	50%	75%	95%
SusTalk	26,759	0.99	1.15	0.08	0.31	0.62	1.22	3.19
Earnings Growth [t-1, t]	26,759	0.14	3.32	-3.05	-0.36	0.08	0.55	3.50
Earnings Growth [t-1, t+1]	22,864	0.39	4.00	-3.23	-0.42	0.16	0.84	4.64
Earnings Growth [t-1, t+2]	19,695	0.51	4.09	-3.43	-0.39	0.24	1.01	5.13
Sales Growth [t-1, t]	26,533	0.11	0.31	-0.24	-0.02	0.07	0.18	0.58
Sales Growth [t-1, t+1]	22,716	0.23	0.56	-0.30	-0.02	0.12	0.32	1.04
Sales Growth [t-1, t+2]	19,589	0.34	0.72	-0.31	0.00	0.18	0.45	1.39
size	26,759	7.41	1.78	4.62	6.16	7.31	8.53	10.58
Tobin's Q	26,759	0.58	0.48	0.08	0.25	0.46	0.77	1.45
ROA	26,759	0.01	0.14	-0.27	-0.00	0.03	0.07	0.16
leverage	26,759	0.38	0.26	0.04	0.16	0.33	0.55	0.87
CapEx/Asset	26,759	0.04	0.05	0.00	0.01	0.02	0.05	0.13

Panel C: Firm-quarter panel with holding changes

	Obs	Mean	Sd	5%	25%	50%	75%	95%
Δ % SI Holding	45,768	2.00	10.56	-14.76	-3.09	1.41	6.54	20.81
SusTalk	45,768	0.92	1.15	0.00	0.22	0.55	1.17	3.02
Forecast Disp	45,768	0.26	0.64	0.02	0.04	0.08	0.19	1.00
size	45,768	7.29	1.57	4.87	6.21	7.20	8.24	10.05
Tobin's Q	45,768	0.56	0.46	0.08	0.25	0.45	0.74	1.39
ROA	45,768	0.01	0.14	-0.26	0.00	0.03	0.07	0.16
leverage	45,768	0.36	0.24	0.04	0.16	0.31	0.52	0.84
CapEx/Asset	45,768	0.04	0.05	0.00	0.01	0.03	0.05	0.13
Return	45,768	0.38	0.61	-0.53	0.04	0.34	0.66	1.42

Table 1: **Summary statistics**: This table presents the summary statistics of the main variables used in the paper. $SusTalk$ is the sustainability talks of a firm in a given quarter, constructed based on the quarterly earnings calls transcripts of firms. $Forecast\ Disp.$ is the dispersion of analyst forecasts for EPS of next fiscal year, defined as standard deviation of forecasts divided by mean of forecasts. $Size$ is the logarithm of market cap by end of last year. $TobinQ$ indicates Tobin's Q in of last year. ROA return on asset of last year. $Levarge$ indicates leverage of the firm of last year. $CapEx$ is the ratio of capital expenditure over asset of last year. $\Delta\%SIHolding$ is the change of sustainable investors (in %) from end of quarter $t-1$ to end of quarter $t+7$. $Return$ is the cumulative return from from end of quarter $t-1$ to end of quarter $t+7$.

	Earnings Growth			Sales Growth		
	-1 to 0	-1 to 1	-1 to 2	-1 to 0	-1 to 1	-1 to 2
	(1)	(2)	(3)	(4)	(5)	(6)
SusTalk	-0.049*	-0.092***	-0.093**	-0.005**	-0.013***	-0.019***
	(-1.870)	(-2.659)	(-2.424)	(-1.981)	(-2.885)	(-2.803)
Size	0.085***	0.077***	0.106***	-0.001	-0.009***	-0.022***
	(5.981)	(3.745)	(4.376)	(-0.852)	(-2.719)	(-4.121)
Tobin Q	-0.786***	-0.399***	-0.076	-0.064***	-0.104***	-0.147***
	(-10.032)	(-4.350)	(-0.707)	(-10.326)	(-7.493)	(-6.822)
ROA	-1.554***	-1.456***	-1.559***	-0.503***	-1.093***	-1.483***
	(-11.163)	(-7.448)	(-6.667)	(-14.689)	(-14.085)	(-12.252)
Leverage	0.475***	0.811***	0.966***	-0.205***	-0.497***	-0.711***
	(3.149)	(3.750)	(3.748)	(-13.745)	(-14.218)	(-12.912)
CapEx	-0.959	-0.313	-0.267	0.241***	0.569***	0.795***
	(-1.494)	(-0.341)	(-0.251)	(3.285)	(3.502)	(3.262)
Industry × Year FE	✓	✓	✓	✓	✓	✓
Observations	26,759	22,864	19,695	26,533	22,716	19,589
R^2	0.09	0.09	0.09	0.24	0.28	0.28

Table 2: **Sustainability Talks and Realized Earnings and Sales Growth:** This table presents the regression of realized earnings and sales growth on the sustainability talks of firms in a firm-year panel. In columns (1)-(3), the dependent variables are defined as $\frac{Earnings_{t+s}-Earnings_{t-1}}{abs(Earnings_{t-1})}$, where $s = 1, 2, 3$, indicating earnings growth of 1-, 2-, 3-year horizon. In columns (1)-(3), the dependent variables are defined as $\frac{Sales_{t+s}-Sales_{t-1}}{Sales_{t-1}}$, where $s = 1, 2, 3$, indicating sales growth of 1-, 2-, 3-year horizon. *SusTalk* is the sustainability talks of a firm in a given year, constructed based on the earnings calls transcripts of firms, averaged across quarters in a year. *Size* is the logarithm of market cap in year $t-1$. *TobinQ* indicates Tobin's Q in year $t-1$. *ROA* return on asset in year $t-1$. *Levarge* indicates leverage of the firm in year $t-1$. *CapEx* is the ratio of capital expenditure over asset in $t-1$. $Industry \times Year$ FE indicate industry (6-digit GICS code) interacted with year fixed effects. t-stat in the parentheses are based on standard error clustered by firms. * p<.10; ** p<.05; *** p<.01.

	(EPS - FEPS) / sd(FEPS)					
	1-Year		2-Year		3-Year	
	(1)	(2)	(3)	(4)	(5)	(6)
SusTalk	-0.070**	-0.074**	-0.122***	-0.125***	-0.128**	-0.126**
	(-2.261)	(-2.419)	(-3.217)	(-3.353)	(-2.261)	(-2.252)
Size	0.341***	0.265***	0.428***	0.435***	0.466***	0.479***
	(13.206)	(9.277)	(10.657)	(10.137)	(10.345)	(9.475)
Tobin Q		-0.414***		-0.146		0.021
		(-3.337)		(-0.984)		(0.100)
ROA		0.987**		-1.030*		-0.295
		(2.467)		(-1.925)		(-0.445)
Leverage		-0.666**		-0.536		0.610
		(-2.358)		(-1.295)		(1.050)
CapEx		-3.063***		-2.124		-2.414
		(-3.097)		(-1.625)		(-1.392)
Industry × YearQtr FE	✓	✓	✓	✓	✓	✓
Observations	99,135	99,135	94,762	94,762	57,840	57,840
R^2	0.12	0.13	0.19	0.19	0.19	0.19

Table 3: **Sustainability Talks, Realized and Expected EPS:** This table presents the regression of realized EPS relative to expected EPS on the sustainability talks of firms in a firm-quarter panel. The dependent variable is the defined as realized EPS minus mean of EPS forecasts, divided by the standard deviation of EPS forecasts. The EPS forecasts are based the consensus forecasts at the end of quarter $t-1$. Columns (1) and (2) presents results for EPS forecasts of current fiscal year. Columns (3) and (4) presents results for EPS forecasts of next fiscal year. Columns (5) and (6) presents results for EPS forecasts of the fiscal year after next. $SusTalk$ is the sustainability talks of a firm in a given quarter, constructed based on the quarterly earnings calls transcripts of firms. $Size$ is the logarithm of market cap by end of last year. $TobinQ$ indicates Tobin's Q in of last year. ROA return on asset of last year. $Levarge$ indicates leverage of the firm of last year. $CapEx$ is the ratio of capital expenditure over asset of last year. $Industry \times YearQtr$ FE indicate industry (6-digit GICS code) interacted with year-quarter fixed effects. t-stat in the parentheses are based on standard error double clustered by firm and by year-quarter. * p<.10; ** p<.05; *** p<.01.

	(EPS - FEPS) / sd(FEPS)									
	FDisp. Qtl1		FDisp. Qtl2		FDisp. Qtl3		FDisp. Qtl4		FDisp. Qtl5	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SusTalk	-0.269***	-0.270***	-0.197***	-0.188***	-0.111*	-0.116*	-0.044	-0.048	-0.076	-0.071
	(-2.872)	(-2.975)	(-3.002)	(-2.987)	(-1.814)	(-1.929)	(-0.810)	(-0.901)	(-1.588)	(-1.464)
Size	0.808***	0.692***	0.516***	0.463***	0.588***	0.561***	0.394***	0.446***	0.200***	0.247***
	(8.658)	(6.588)	(8.355)	(6.571)	(9.232)	(8.770)	(8.113)	(8.493)	(3.605)	(4.289)
ROA		-2.639		-0.746		-1.175		-1.523**		-0.876***
		(-0.886)		(-0.436)		(-0.952)		(-2.530)		(-2.937)
Leverage		-2.149		-0.674		-0.541		-0.341		0.056
		(-1.595)		(-0.821)		(-0.872)		(-0.768)		(0.124)
CapEx		-6.439		-11.291***		-5.403**		-3.735**		0.038
		(-1.048)		(-4.047)		(-2.023)		(-2.491)		(0.025)
Tobin Q		-1.865**		-0.844**		-0.727**		0.139		0.193
		(-2.632)		(-2.359)		(-2.456)		(0.788)		(1.400)
Industry × YearQtr FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	18,960	18,960	18,809	18,809	18,885	18,885	18,883	18,883	18,884	18,884
R^2	0.29	0.29	0.32	0.32	0.34	0.34	0.31	0.31	0.28	0.28

Table 4: **Sustainability Talks, Realized and Expected EPS under Different Forecast Dispersion:** This table presents the regression of realized EPS relative to expected EPS on the sustainability talks of firms in a firm-quarter panel for subsamples based on quintiles of forecast dispersion.The dependent variable is the defined as realized EPS minus mean of EPS forecasts, divided by the standard deviation of EPS forecasts. The EPS forecasts are based the consensus forecasts at the end of quarter $t-1$. All the forecasts are for EPS of next fiscal year. (1)-(2), (3)-(4), (5)-(6), (7)-(8), (9)-(10) are using subsamples based on quintiles of forecast dispersion, defined as standard deviation of EPS forecasts divided by mean of forecasts. Smaller column numbers indicate subsamples with lower forecast dispersion. $SusTalk$ is the sustainability talks of a firm in a given quarter, constructed based on the quarterly earnings calls transcripts of firms. $Size$ is the logarithm of market cap by end of last year. $TobinQ$ indicates Tobin's Q of last year. ROA return on asset of last year. $Levarge$ indicates leverage of the firm of last year. $CapEx$ is the ratio of capital expenditure over asset of last year. $Industry \times YearQtr$ FE indicate industry (6-digit GICS code) interacted with year-quarter fixed effects. t-stat in the parentheses are based on standard error double clustered by firm and by year-quarter. * p<.10; ** p<.05; *** p<.01.

	SusTalk			
	(1)	(2)	(3)	(4)
Percentile Forecast Disp.	0.001***	0.001***		
	(3.274)	(3.465)		
Quintile Forecast Disp.=2			0.033*	0.034**
			(1.972)	(2.029)
Quintile Forecast Disp.=3			0.068***	0.071***
			(2.927)	(3.076)
Quintile Forecast Disp.=4			0.094***	0.098***
			(3.494)	(3.630)
Quintile Forecast Disp.=5			0.104***	0.110***
			(3.230)	(3.377)
Size	0.040***	0.038***	0.040***	0.038***
	(4.699)	(4.195)	(4.685)	(4.205)
ROA		-0.027		-0.035
		(-0.443)		(-0.584)
Leverage		-0.140*		-0.141*
		(-1.769)		(-1.779)
CapEx		-0.248		-0.242
		(-0.622)		(-0.607)
Tobin Q		-0.002		-0.001
		(-0.087)		(-0.048)
Industry × YearQtr FE	✓	✓	✓	✓
Observations	101,935	101,935	101,935	101,935
R^2	0.40	0.40	0.40	0.40

Table 5: **Forecast Dispersion and Sustainability Talks:** This table presents the regression of sustainability talks on the forecast dispersion of firms. The dependent variable is the sustainability talks of a firm in a given quarter, constructed based on the quarterly earnings calls transcripts of firms. *Percentile Forecast Disp.* is a continuous variable indicating the percentile of forecast dispersion, defined as standard deviation of EPS forecasts divided by mean of forecasts in quarter $t-1$. *Quintile Forecast Disp.* are dummy variables indicating quintiles of forecast dispersion, defined as standard deviation of EPS forecasts divided by mean of forecasts in quarter $t-1$. The omitted category is the lowest dispersion group. *Size* is the logarithm of market cap by end of last year. $TobinQ$ indicates Tobin's Q of last year. ROA return on asset of last year. *Levarge* indicates leverage of the firm of last year. $CapEx$ is the ratio of capital expenditure over asset of last year. $Industry \times YearQtr$ FE indicate industry (6-digit GICS code) interacted with year-quarter fixed effects. t-stat in the parentheses are based on standard error double clustered by firm and by year-quarter. * p<.10; ** p<.05; *** p<.01.

	Δ % SI Holding									
	FDisp. Qtl1		FDisp. Qtl2		FDisp. Qtl3		FDisp. Qtl4		FDisp. Qtl5	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SusTalk	0.103	0.107	-0.201	-0.196	0.278	0.236	0.235	0.227	0.476**	0.414*
	(1.111)	(1.149)	(-1.510)	(-1.470)	(1.558)	(1.337)	(1.334)	(1.298)	(2.196)	(1.916)
Size	-0.416***	-0.424***	-0.416***	-0.501***	-0.354***	-0.428***	-0.699***	-0.756***	-0.652***	-0.880***
	(-4.309)	(-3.607)	(-3.826)	(-4.020)	(-3.269)	(-3.602)	(-4.339)	(-4.455)	(-3.293)	(-4.167)
Return	1.897***	1.898***	3.060***	3.085***	3.609***	3.659***	4.891***	4.910***	6.175***	6.288***
	(3.789)	(3.805)	(5.787)	(5.809)	(8.779)	(8.741)	(9.840)	(9.970)	(12.601)	(13.167)
ROA		-0.519		-0.569		-1.631		-1.598		-0.128
		(-0.166)		(-0.210)		(-0.824)		(-0.920)		(-0.089)
Leverage		0.156		0.718		-1.185		0.614		-2.924*
		(0.112)		(0.594)		(-1.093)		(0.486)		(-1.738)
CapEx		-4.332		1.288		11.247*		-2.184		-15.017**
		(-0.711)		(0.260)		(1.913)		(-0.365)		(-2.671)
Tobin Q		-0.147		-1.575**		-1.420**		-1.407**		-1.907***
		(-0.202)		(-2.356)		(-2.322)		(-2.407)		(-3.228)
Industry × YearQtr FE	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Observations	9,158	9,158	9,158	9,158	9,145	9,145	9,157	9,157	9,150	9,150
R^2	0.24	0.24	0.26	0.26	0.28	0.29	0.30	0.30	0.35	0.36

Table 6: **Sustainability Talks and holding changes of Sustainable Investors under Different Forecast Dispersion:** This table presents the regression of sustainable investors' holding change on the sustainability talks of firms in a firm-quarter panel for subsamples based on quintiles of forecast dispersion. The dependent variable is the change (in %) of sustainable investors holding from end of quarter $t-1$ to end of quarter $t-7$, where sustainable investors are defined as investors from high environmental norm countries.(1)-(2), (3)-(4), (5)-(6), (7)-(8), (9)-(10) are using subsamples based on quintiles of forecast dispersion, defined as standard deviation of EPS forecasts divided by mean of forecasts. Smaller column numbers indicate subsamples with lower forecast dispersion. $SusTalk$ is the sustainability talks of a firm in a given quarter, constructed based on the quarterly earnings calls transcripts of firms. $Return$ is the cumulative stock return from end of quarter $t-1$ to end of quarter $t-7$. $Size$ is the logarithm of market cap by end of last year. $TobinQ$ indicates Tobin's Q of last year. ROA return on asset of last year. $Levarge$ indicates leverage of the firm of last year. $CapEx$ is the ratio of capital expenditure over asset of last year. $Industry \times YearQtr$ FE indicate industry (6-digit GICS code) interacted with year-quarter fixed effects. t-stat in the parentheses are based on standard error double clustered by firm and by year-quarter. * p<.10; ** p<.05; *** p<.01.

A Proofs

A.1 Proof of Lemma 1

Proof. Solving (3) and (4) yields the demand of traditional investors, $D_T(p,m)$, and of sustainable investors, $D_s(p,m)$,

$$D_T(p,m) = \frac{1}{\epsilon}(E[v|m] - p),$$
$$D_S(p,m) = \frac{1}{\epsilon}(E[v|m] - p + u \cdot \mathbf{1}\{E[\theta|m] \geq x\})$$

The market-clearing condition (5) implies that the price of the firm's share is given by

$$p(m) = E[v|m] + u\gamma \cdot \mathbf{1}\{E[\theta|m] \geq x\}. \tag{19}$$

□

A.2 Some useful results

A.2.1 Re-parametrization

To proceed, we re-parametrize $\pi_+\theta_+$ and $\pi_-\theta_-$ with quantiles. Let $Q(u) = F^{-1}(u)$ denote the quantile function. Note that for $s = P(\theta \geq \lambda) = 1 - F(\lambda)$ and $\lambda = Q(1-s)$, by a change of variable $\theta = Q(u)$ for $u \in [0,1]$, we have

$$T(s) := E[\theta \cdot \mathbf{1}\{\theta \geq \lambda\}] = \int_{\lambda}^{M} \theta dF(\theta) = \int_{1-s}^{1} Q(u)du, \tag{20}$$

Hence we have $\pi_+\theta_+ = T(\pi_+)$ and $\pi_-\theta_- = T(\pi_-)$. It is obvious to see that $T(0) = E[\theta] = 0$ and $T(1) = 0$.

Using the reparameterization, equation (12), $\pi_+(\Sigma,\Delta) = (\Sigma - \Delta)/2$, and $\pi_-(\Sigma,\Delta) = (\Sigma + \Delta)/2$, we can rewrite the constraint (6) as

$$G(\Sigma,k) := S(\Sigma,k) - \Sigma x, \quad \text{where } S(\Sigma,k) = T(\pi_+(\Sigma,k)) + T(\pi_-(\Sigma,k)) \tag{21}$$

Lemma 2. *$G(\Sigma,k)$ is decreasing in k, given $\Sigma \in (0,2)$ fixed.*

Proof. As $\pi_+(\Sigma,\Delta) = (\Sigma - \Delta)/2 = (\Sigma - k\Sigma(2-\Sigma))/2$ and $\pi_-(\Sigma,\Delta) = (\Sigma + \Delta)/2 = (\Sigma + k\Sigma(2-\Sigma))/2$, differentiating with respect to k, we have

$$\frac{\partial \pi_+}{\partial k} = -\frac{1}{2}\Sigma(2-\Sigma), \quad \frac{\partial \pi_-}{\partial k} = \frac{1}{2}\Sigma(2-\Sigma)$$

By the chain rule,

$$\begin{aligned}\frac{\partial G}{\partial k} &= T'(\pi_+)\frac{\partial \pi_+}{\partial k} + T'(\pi_-)\frac{\partial \pi_-}{\partial k} \\ &= \frac{1}{2}\Sigma(2-\Sigma)[T'(\pi_-) - T'(\pi_+)] \\ &= \frac{1}{2}\Sigma(2-\Sigma)[Q(1-\pi_-) - Q(1-\pi_+)]\end{aligned}$$

Since $Q(u)$ is increasing in u and $\pi_- > \pi_+$, we have $Q(1-\pi_-) - Q(1-\pi_+) < 0$ and hence $\frac{\partial G}{\partial k} < 0$. □

A.3 Proof of Proposition 1

Proof. Let $\mathcal{K} = \{k > 0 : \exists\, \Sigma \in (0,2) \text{ such that } G(\Sigma, k) \geq 0\}$ denote the set of admissible k and $k_{max} = \sup \mathcal{K}$. Define

$$\sigma_{min} = \frac{u\gamma}{k_{max}},$$

we only need to show that $\mathcal{K}$ is not empty if $\sigma \geq \sigma_{min}$ and $\sigma_{min} > 0$.

By Lemma 2, $G(\Sigma, k)$ is decreasing in k, hence for fixed Σ, the set $\{k > 0 : G(\Sigma, k) \geq 0\}$ is either empty or an interval of the form $(0, k^*(\Sigma)]$. The set is closed on the right-hand side because $G(\Sigma, k)$ is continuous. Consequently, we have $k_{max} = \sup\limits_{\Sigma} k^*(\Sigma)$ and

$$\mathcal{K} = \bigcup_{\Sigma \in (0,2)} (0, k^*(\Sigma)] = (0, k_{max}]$$

In particular, if $k_{max} \in (0, +\infty)$, then $\sigma_v \geq \sigma_{min}$ implies that $k \leq k_{max}$, which in turn implies that there exists $\Sigma \in (0,2)$ such that $G(\Sigma, k) \geq 0$ is satisfied, i.e., an equilibrium exists. (13) implies that $k_{max} \leq 1$, hence we only need to show that $k_{max} > 0$. It is sufficient to show that $G(\Sigma, \delta k) > 0$ for some $\Sigma \in (0,2)$ for some $\delta k > 0$.

Note that $H(\Sigma) = \frac{G(\Sigma,0)}{\Sigma} = \frac{T(\Sigma/2)}{\Sigma/2} - x = E[\theta|\theta > t] - x$ for $\Sigma \in (0,2)$ and $t \in [-M, M]$. Thus $\sup_\Sigma H(\Sigma) = \sup_t E[\theta|\theta > t] - x = M - x$. Thus there exists $\Sigma_0 \in (0,2)$ such that $G(\Sigma_0, 0) = \Sigma_0(M - x) > 0$. Continuity of $G(\Sigma, k)$ in k implies that there exists a neighborhood of $k = 0$ such that $G(\Sigma_0, k) > 0$ for $k \in (0, \delta k)$. Therefore, we conclude that $k_{max} > 0$, which completes the proof as the other parts of the proposition have been proved in the main text. □

A.4 Proof of Proposition 2

Proof. As $\sigma_v \geq \sigma_{min}$, we know $k \leq k_{max} \leq 1$. Define the feasible set as $\mathcal{A}_k = \{\Sigma \in [0,2] : 2 - \frac{1}{k} \leq \Sigma \leq \frac{1}{k}\}$, the set of Σ that satisfies the minimum expectation requirement (21) as

$\mathcal{G}_k = \{\Sigma \in \mathcal{A}_k : G(\Sigma, k) \geq 0\}$.[8]

We can thus reformulate the optimization problem as

$$\max_{\Sigma} \Sigma \quad \text{subject to } \Sigma \in \mathcal{G}_k$$

Since $\sigma_v \geq \sigma_{min}$, by Proposition 1, $\mathcal{G}_k$ is not empty. Moreover, $\mathcal{G}_k$ is a closed and bounded set, and hence compact. As the objective function Σ is upper semi-continuous and convex, by Bauer's maximum principle (Bauer, 1958)[9], it attains its maximum at extreme points, in our case, at $\Sigma^*(k) = \sup \mathcal{G}_k$. The other extreme points are clearly dominated by $\Sigma^*(k)$ as the objective is to maximize Σ. If $\Sigma^*(k) < \frac{1}{k}$, then (21) must be binding, i.e., $G(\Sigma^*(k), k) = 0$. In this case, we have $\pi_+^* = \frac{1}{2}(\Sigma^*(k) - \Delta(\Sigma^*, k))$ and $\pi_+^- = \frac{1}{2}(\Sigma^*(k) + \Delta(\Sigma^*, k))$. Otherwise, we have $\Sigma^*(k) = \frac{1}{k}$, and hence $\pi_+^* = \frac{1}{k} - 1$ and $\pi_-^* = 1$.

We now prove the last part. The feasibility constraint that $\pi_+^* < \pi^- = 1$ requires $k > \frac{1}{2}$. Hence if $\sigma_v > u\gamma$, the boundary solution cannot be attained.

Let $\tilde{x}(k) = (1-k)E[\theta|\theta > \tilde{\lambda}]$, where $\tilde{\lambda} = Q(2 - \frac{1}{k})$. Recall that by the definition of the quantile function $Q(u)$, we have $P(\theta > \tilde{\lambda}) = 1 - (2 - \frac{1}{k}) = \frac{1}{k} - 1$. Define $\bar{x} = \sup_{k \in [1/2, 1]} \tilde{x}(k)$, As $1/2 < k < 1$, clearly $\bar{x} \in (0, M)$.

If the boundary solution is attained, then we have $\Sigma^* = \frac{1}{k}$, $\pi_+ = 1/k$ and $\pi_- = 1$. Then the constraint (21) becomes

$$\begin{aligned} G(1/k, 1/k) &= T(\frac{1}{k} - 1) + T(1) - \frac{x}{k} \\ &= (\frac{1}{k} - 1)E[\theta|\theta > \tilde{\lambda}] - \frac{x}{k} \\ &\leq \frac{1}{k}(\bar{x} - x), \end{aligned}$$

where in the second line we used the fact that $T(1) = 0$. Hence, if $x > \bar{x}$, then we have $G(1/k, 1/k) < 0$ and the boundary solution cannot be attained. $\square$

A.5 Proof of Proposition 3

Proof. We only need to consider the interior-solution case, i.e., $\Sigma^*(k) < \frac{1}{k}$.

[8] Note that we enlarged the domain of Σ from $(0, 2)$ to $[0, 2]$ by adding the end points. As we show that the optimal solution of the constrained optimization problem is never obtained on the two points. This modification of the domain does not change the solution of the problem.

[9] We use the original version of the maximum principle here, which does not require $\mathcal{G}_k$ to be convex as our objective function is itself convex, see Ball (2023). For an explicit statement of this result, see Ng (1979).

For the first part, as we proved above, we must have $G(\Sigma^*(k), k) = 0$ and $\Sigma^*(k)$ is the largest root on its domain $\mathcal{A}_k$. Implicit differentiation leads to

$$\left.\frac{d\Sigma^*(k)}{dk}\right|_{\Sigma^*(k)} = -\left.\frac{\frac{\partial G(\Sigma,k)}{\partial k}}{\frac{\partial G(\Sigma,k)}{\partial \Sigma}}\right|_{\Sigma^*(k)}$$

As $\Sigma^*(k) < \frac{1}{k}$, by the definition of Σ^* (as the supremum of $\mathcal{G}_k$), for every $h > 0$ small enough, we have $G(\Sigma^*(k) + h, k) < 0$, hence $G'_+(\Sigma^*) := \lim_{h \downarrow 0} \frac{G(\Sigma^*+h,k)-G(\Sigma^*,k)}{h} < 0$. As $G(\Sigma, k)$ is differentiable, we have $\frac{\partial G(\Sigma,k)}{\partial \Sigma} = G'_+(\Sigma^*) < 0$. By Lemma 2, we have $\frac{\partial G(\Sigma,k)}{\partial k} < 0$. Hence we have $\left.\frac{d\Sigma^*(k)}{dk}\right|_{\Sigma^*(k)} < 0$. Consequently, we have

$$\left.\frac{d\Sigma^*(k)}{d\sigma_v}\right|_{\Sigma^*(k)} = \left.\left(\frac{d\Sigma^*(k)}{dk}\frac{dk}{d\sigma_v}\right)\right|_{\Sigma^*(k)} > 0$$

For the second part, as $D_v = -\frac{u\gamma}{2\sigma_v} < 0$, it is immediate that

$$\left.\frac{\partial D_v}{\partial \sigma_v}\right|_{\Sigma^*(k)} \geq 0.$$

For the third part, in the interior-solution case, as $\mathbb{E}[\theta \mid \varnothing] = -\frac{\pi_+\theta_+ + \pi_-\theta_-}{(1-\pi_+)+(1-\pi_-)}$, we have

$$\left.D_\theta\right|_{\Sigma^*(k)} = \frac{2S(\Sigma^*(k), k)}{\Sigma^*(k)(2 - \Sigma^*(k))} = \frac{2x}{2 - \Sigma^*(k)}$$

where in the last equality, we used the fact that $G(\Sigma^*(k), k) = S(\Sigma^*(k), k) - \Sigma^*(k)x = 0$. As $\Sigma^*(k)$ increases with σ_v, we have

$$\left.\frac{\partial D_\theta}{\partial \sigma_v}\right|_{\Sigma^*(k)} \geq 0$$

□