Soft law, hard results: The impact of government climate action plans on investor attention

Wei Li

vivian.li@adelaide.edu.au

Chee Seng Cheong

chee.cheong@adelaide.edu.au

George Mihaylov

george.mihaylov@adelaide.edu.au

Ralf Zurbrugg

ralf.zurbrugg@adelaide.edu.au

Soft law, hard results: The impact of government climate action plans on investor attention

Abstract

We investigate how soft laws influence investor attention. Our analyses focus on the staggered adoption of state-level Climate Action Plans (CAPs) and the extent to which the introduction of CAPs draws the attention of investors to affected firms. Our results show a positive association – firms headquartered in states that adopt a CAP receive increased attention from investors. We identify voluntary disclosures as a key mechanism underpinning this result, with impacted firms making significantly more voluntary disclosures related to climate risk and associated corporate policies post state CAP adoption. Cross-sectional analyses demonstrate that this relationship is stronger for firms in manufacturing sectors and for highly visibility firms. Our findings indicate that firms take climate-related soft laws seriously and that this attitude translates to increased attention from investors, underscoring the value of non-legislative policy mechanisms for policymakers and other stakeholders.

Keywords: Climate Action Plan, Investor attention, Corporate climate-related disclosure

Introduction

This paper investigates the impact of soft laws on investors. Our objective is to examine the extent to which government-led Climate Action Plans (CAPs) influence investor behaviour and, in particular, the amount of attention that investors are willing to pay to firms that are impacted by the implementation of CAPs.

Environmental and climate change-related concerns dominate the public discourse (IPCC, 2014). At the level of individual firms, this is exemplified by an increasing demand for firms to consider the impacts of climate change, and the associated risks that they face, from both activist shareholders (Flammer, Toffel, & Viswanathan, 2021) and other institutional investors (Ilhan et al., 2023) who pay close attention to corporate strategic decision making. State governments are not far behind, regularly enacting policies to incentivise a range of climate-positive corporate behaviours and actions. While many of these interventions are based on the implementation of regulatory reforms (Reid & Toffel, 2009) and new legislation (Christensen, Hail, & Leuz, 2021), governments are also using soft laws to complement their statutory initiatives. CAPs are one of the most prominent examples of climate-related soft law, providing frameworks for measuring and reducing emissions, and a guide for firms looking to address their ecological footprint. Despite their widespread prevalence, the influence that CAPs exert on both firms and their investors remains relatively understudied.

The guidelines and frameworks expressed in CAPs are not enforceable and it is not illegal to ignore them (Nwete, 2007). At the level of individual firms, participation is voluntary and can be limited based on the incentives and participation costs that are implied (Coglianese & Nash, 2009). However, the literature demonstrates that the efficacy of CAPs is in part based on the social requirement that firms are accountable to a range of stakeholders beyond just their investors (Gjølberg, 2011; Van den Broek, 2021). Firms look to incorporate CAP objectives

into their medium and long-range planning because all stakeholders, including equity owners, increasingly expect socially responsible management (Cordeiro & Tewari, 2014; Flammer, Toffel, & Viswanathan, 2021; Dhaliwal et al., 2011).[1] Firms are likely aware that various stakeholders are paying attention to their climate-related risk management and corporate policies. This motivates us to ground our hypotheses in stakeholder theory (Freeman, 1984; Mitchell, Agle, & Wood, 1997; Friedman & Miles, 2002; Parmar et al., 2010).

Stakeholder theory promotes the interests of firms and society as joint, rather than conflicting, and firms, at their best, as sustainably creating value with, and for, all relevant stakeholders (Kujala, Lehtimäki, & Myllykangas, 2016). Given the ethical orientation of some investors, firms are increasingly needing to demonstrate care and planning related to the environment in order to meet stakeholder expectations (Clarkson et al., 2011). Firms seemingly cannot rely solely on the attention of profit-maximizing investors, since a range of other stakeholders, including ethical investors, will evaluate the value that firms provide beyond merely value in an economic sense (Harrison & Wicks, 2013). We therefore argue that, to the extent that firms are concerned with the expectations that all of their stakeholders ascribe to them, CAPs present an important opportunity to signal commitment to environmental issues to multiple market participants. If managers seize this opportunity, then we expect that the most likely place to observe the impact of CAPs would be in the way that they influence the propensity for voluntary corporate disclosures, and the degree to which they potentially exacerbate the underlying influence of CAP adoption on investor attention.

In line with our theoretical reasoning, our first hypothesis looks to establish evidence that investors indeed increase their attention towards firms affected by the adoption of a CAP in

[1] As an example of this, in 2013, the CEO of Babcock and Wilcox, a diversified energy provider, discussed the Presidential Climate Action Plan (The White House, 2013) on the firm's quarterly earnings call. He described the plan as an initial step in a protracted journey, involving multiple stakeholders, and potentially influencing the firm's long-term corporate strategy.

their state. We then argue that some firms understand this attention and take advantage of it such that they increase their voluntary climate change-related disclosures. We therefore also hypothesise that climate change-related disclosure moderates the positive relationship between CAPs and investor attention such that the relationship is more strongly positive for firms that voluntarily disclosure more information.

To test our hypothesis that investor attention rises after the adoption of CAPs, we use a difference-in-differences (DiD) approach. This method relies on exogenous variation from the staggered implementation of CAPs across various states to address endogeneity concerns. The staggered introduction of these soft laws serves as a pseudo-natural experiment, allowing us to analyse the impact of CAP adoption on the amount of investor attention affected firms attract. Our sample comprises 27,265 firm-year observations on US publicly traded firms from 2001 to 2021.

Our empirical analysis begins by examining whether the introduction of CAPs significantly impacts the capital market, specifically by checking for evidence of an influence on investor attention. We measure investor attention using two widely recognised proxies: trading volume and bid-ask spread (Barber & Odean, 2008; Peress & Schmidt, 2020). Our primary findings indicate a significant increase in investor attention for firms influenced by the adoption of CAPs. These results remain robust even after controlling for a comprehensive set of firm-level variables, as well as year and firm fixed-effects. Economically, our main finding is that state-level adoption of CAPs results in at least an 6.42% increase in investor attention for firms headquartered in adopting states, consistent across the two measures relative to their respective standard deviations. To address potential measurement error, we confirm that there are no pre-existing trends in our data, validating the parallel trends assumption. In addition, we also conduct permutation tests to show that our findings are not readily reproducible via a random reallocation of our data.

We then focus on exploring the mechanism behind the increase in investor attention following the adoption of CAPs. Our findings support the hypothesis that there is a rise in the disclosure of climate change-related information after states implement CAPs. We rely on Sautner's (2023) measure of attention paid to firms' climate change exposures by earnings call participants, and observe the moderating effect of increasing climate change discussions in earnings conference calls. These discussions increase investor attention by at least 3.4% following the adoption of CAPs, relative to the standard deviation of the measure.

In our cross-sectional analyses, we divide our sample into manufacturing firms and non-manufacturing firms, as well as high-visual and low-visual firms, and rerun the regression to assess variations based on the influence among different industry sectors and firm visibility groups. Specifically, we analyze how CAP adoption influences investor attention differently among firms in manufacturing industries and those with high asset turnover ratios. Our findings indicate that firms with significant energy consumption and greenhouse gas emissions, as well as those with greater resource availability and higher visibility among stakeholders, receive more investor attention.

Finally, we perform additional robustness tests. To address potential selection bias, specifically the concern that only firms with certain characteristics influenced by CAP adoption are included in the analysis, we use a Propensity Score Matching Difference-in-Differences (PSM-DiD) approach. Our results remain consistent even after considering this additional analysis.

This study makes several key contributions to the literature on the effect of soft law on capital market outcomes and to the broader understanding of stakeholder theory. First, it provides empirical evidence that soft laws, such as Climate Action Plans (CAPs), significantly increase investor attention towards affected firms. This finding adds to the existing literature, which predominantly focuses on hard laws and regulations, by demonstrating the influential

role of non-legislative policy mechanisms in shaping market behaviors. Second, our research shows that firms strategically increase their climate-related disclosures in response to CAPs, aligning their actions with stakeholder expectations and enhancing transparency. This insight supports the tenets of stakeholder theory by showing that firms can create value for a wide array of stakeholders through voluntary compliance with soft laws. For policymakers, our findings suggest that CAPs are effective tools not only for promoting environmental responsibility but also for enhancing market efficiency. Policymakers can leverage these insights to design and implement more effective climate policies that utilize market mechanisms to achieve environmental goals. Specifically, our study indicates that well-designed soft law instruments can drive firms to adopt sustainable practices and improve information disclosure, ultimately attracting investor interest and potentially leading to more efficient capital markets.

The rest of paper is presented as follows. The theoretical foundation and hypothesis formulation are outlined in Section 2. The data and mechanisms used to estimate the influence of CAPs on investor attention are described in Section 3. Section 4 presents our empirical analyses, while Section 5 summarizes the findings and presents avenues for future research.

Literature review and hypothesis development

Stakeholder theory postulates that firms have responsibilities to a broad array of stakeholders, beyond just their shareholders (Freeman, 1984), and that their interests are complementary, rather than conflicting, with societal objectives (Kujala, Lehtimäki, & Myllykangas, 2016). Firms that consider all stakeholders can also unlock additional potential for value creation and can gain certain competitive advantages (Harrison, Bosse, & Phillips, 2010). In an important example of this, Cordeiro & Tewari (2014) show that investors in firms

that are more highly ranked in terms of their ‘green’ rating generate larger future cash flows and experience higher stock price increases, in part due to more positive reactions from key stakeholders, including environmentally conscientious investors.

Investors have a plethora of information available to them during the investment decision-making process, but their attention spans remain markedly limited. According to Kahneman’s (1973) capacity theory of attention, limited attention is, in part, a direct consequence of the overwhelming volume of information available and the inherent limitations in our capacity to process this information. Capacity theory provides an important framework for understanding numerous anomalies observed in traditional financial theories. For instance, Hirshleifer, Subrahmanyam, & Titman (2006) highlight how this theory elucidates the phenomenon of investors making trading decisions based on criteria disconnected from fundamental valuations, a behaviour deemed irrational within traditional financial models. Furthermore, Barber & Odean (2008) find that investors tend to prioritize “obvious” information over “fuzzy” information since attention is selective and paid with effort. Selective focus is particularly evident in the context of stock market investments where, among a large number of options, investors often concentrate on a limited selection of stocks that capture their attention. This also motivates investors to seek comprehensive knowledge about the limited stocks that they do pay attention to, including their risk profiles.

Climate risks are being increasingly acknowledged as contributing to systemic risk within the global economic framework (Curcio, Gianfrancesco, & Vioto, 2023). For instance, Huang, Kerstein, & Wang (2018) employ the Global Climate Risk Index, which measures losses from extreme weather events, to demonstrate that firms located in countries facing elevated climate risks often experience lower performance and more volatile earnings. Ai & Gao (2023) have also identified a correlation between a firm's exposure to extreme climate events and an increase in firm risk, highlighting that this form of risk is inherently unpredictable and cannot

be diversified away. This highlights a growing recognition among investors that climate risk transcends mere environmental concerns, representing a societal issue with important economic implications.

Climate risk is not only associated with direct economic losses, but can also affect firm financial performance indirectly (Huang, Kerstein, & Wang, 2018; Konar & Cohen, 2001). As a result of this, an increasing number of firm stakeholders, including investors, are paying attention to environmental issues and their effects on firms (Flammer, Toffel, & Viswanathan, 2021). This motivates us to use stakeholder theory to develop the conceptual framework for our research. Jo, Kim, & Park (2015) use stakeholder theory to suggest a positive relationship between corporate environmental responsibility and firm financial performance, emphasizing the importance of considering all stakeholders in operational processes (Hillman & Keim, 2001; Krüger, 2015; Chava, 2014; Flammer, 2015). Among the wide array of stakeholders for each firm, there are subsets of stakeholders who care about the firm's environmental performance. While not all investors prioritize environmental issues, those who do will naturally seek out and pay attention to firms affected by CAP adoption. Managers aiming to please the largest possible proportion of their total stakeholders may choose to signal their proactive green attitude to the market by making voluntary disclosures about environmental issues, risks, and strategies. Conversely, firms that ignore climate-related risks appear to face substantial financial losses (Wasim, 2019), increasingly recognizing climate change as a material business concern (Weinhofer & Busch, 2013). This signalling can attract even more attention from environmentally conscious investors, thereby strengthening our primary relationship.

Stakeholders seek more than just economic value; they demand comprehensive utility that includes environmental and social benefits (Harrison & Wicks, 2013). Firms that meet these broader expectations are better able to retain stakeholder participation and support. This background influences firms to adopt environmentally friendly practices, driven by both

stakeholder pressure and internal motivation, to support and improve any competitive advantages that may exist (Clarkson et al., 2011; Dhaliwal et al., 2011). Furthermore, regulatory frameworks play a crucial role in shaping attitudes towards environmental sustainability. For instance, governments employ regulatory reforms, new legislation, and implement soft laws to achieve pollution reduction targets and other desired environmental outcomes (Reid & Toffel, 2009; Christensen, Hail, & Leuz, 2021).

Hard law refers to legally binding obligations that are precise and that delegate authority for interpreting and enacting the law (Abbott et al., 2003). Abbott et al. (2003) indicate that hard law instruments are credible since they can have direct legal effects in national jurisdictions. However, there are multiple problems with hard law. For instance, hard law entails significant costs during the enactment and enforcement processes (Shaffer & Pollack, 2010), and hard law agreements can be more difficult to adapt to changing circumstances (Trubek, Cottrell, & Nance, 2005). Moreover, Bodansky (1999) examines the legitimacy of international environmental governance, highlighting potential threats such as the lack of transparency and accountability, insufficient public participation, and the challenges posed by the democratic deficit in international institutions. These issues can reduce the effectiveness and credibility of international environmental law. Given the difficulty in enacting environmental laws, some researchers have argued in favour of the use of non-binding norms and principles to guide firms and individuals (Pauwelyn, Wessel, & Wouters, 2014; Coglianese, 2021). This has contributed to an increase in the use of soft laws to tackle environmental objectives.

Soft law consists of rules that do not have a binding status but, nonetheless, can influence firm behaviour and managerial decision-making via their advocacy (Gersen & Posner, 2008). While hard laws regulate corporate behaviour directly, soft laws encourage firms to reduce greenhouse gas emissions and enhance social adaptation to climate change as a responsibility

rather than an obligation (Gjølberg, 2011). Shum & Yam (2011) also argue that firms should operate in a manner that contributes to the broader goal of sustainable development. This includes firms taking into account the need to protect the environment within the legal and regulatory frameworks that guide their administrative practices, and thereby potentially also attracting the attention of environmentally conscientious investors. U.S. climate action plans (CAPs) are a key example of soft law that can significantly influence both corporate managers and investors. By encouraging sustainable practices and improving transparency, CAPs help align managerial decisions with environmental goals and attract investor attention towards a climate-smart economy (Pan et al., 2019; Pollak, Meyer, & Wilson, 2011). Importantly, state-level CAPs outline various objectives and actions, including in setting emission reduction targets, requiring investment in renewable energy projects, enhancing energy efficiency, and implementing carbon pricing mechanisms.

We argue that CAPs can be an effective and sustainable rights protection mechanism that influences firms' regulatory preferences in a way that aligns them more closely with broader societal and environmental concerns (Van den Broek, 2021). In support of this reasoning, Gjølberg (2011) also indicates that corporate self-interest and increased social and environmental regulation can indeed coincide. Hence, we expect that firms in states that have implemented CAPs will be more acutely aware of the need to proactively manage climate-related risks, and in turn will also be more likely to adopt positive environmental policies and pro-environmental strategic objectives. This, in turn, makes it more likely that such firms will attract increased investor attention, in particular from environmentally conscientious investors, but also including any investors anticipating the potentially improved financial performance that can coincide with investments in corporate environmental responsibility (Jo, Kim, & Park, 2015). This leads us to hypothesize that:

H1: The introduction of state level climate action plans increases investor attention in affected firms.

Beermann (2011) proposes that resilience thinking is crucial for identifying strategic risks and opportunities related to climate change, thereby aiding in the development of effective corporate climate adaptation strategies. As a result, the development of a comprehensive framework to evaluate the impact of climate change, and the transition to a low-carbon economy, on financial stability is emerging as a critical challenge for firms and their stakeholders (Campiglio et al., 2018). Since multiple stakeholder groups play critical roles in enhancing firm performance and promoting ethical decision-making in the context of climate change (Jones, Felps, & Bigley, 2007), one of the key mechanisms for engaging stakeholders is sustainability disclosures (Herremans, Nazari, & Mahmoudian, 2016).

Transparent corporate disclosures are not only important for organizations looking to communicate effectively with their shareholders (Freeman et al, 2010), but also convey ethics and transparency to a variety of other stakeholders (Deegan & Unerman, 2006). Benlemlih et al. (2018) find that environmental disclosure promotes corporate transparency, which can build a positive reputation and trust with stakeholders and mitigate operational risk. They claim that corporate disclosure can be viewed as an effective form of stakeholder communication, where firms provide information about their operations, financials, and other relevant aspects to stakeholders. Freeman et al. (2010) further indicate that being transparent about business operations is essential to gain and maintain the trust of stakeholders. Recently, both activist shareholders (Flammer, Toffel, & Viswanathan, 2021) and institutional investors (Ilhan et al., 2023) have been found to have increased demand for voluntary corporate disclosures related to environmental issues. Activist shareholders look for such disclosures because they seek to ensure that firms are managing environmental risks effectively and demonstrating a

commitment to sustainability. Similarly, institutional investors look for voluntary environmental disclosures because they believe these disclosures provide critical insights into a firm's long-term viability and the risk profile of their investments. Using stakeholder theory as a backdrop, and considering the heightened awareness of environmental and climate change issues, Dhaliwal et al. (2011) suggest that sustainability-related disclosures can reduce information asymmetry, finding that firms with superior disclosure experience a subsequent reduction in the cost of equity capital. Moreover, these firms attract dedicated institutional investors and analyst coverage, leading to more accurate and less dispersed analyst forecasts (Dhaliwal et al., 2011). Matsumura, Prakash & Vera-Muñoz (2022) provide insight into the positive effect of corporate carbon disclosure practices on firm value, suggesting that firms disclose their efforts to mitigate carbon emissions as a response to stakeholder pressure. Firms operating in states with government-led initiatives might pay more attention to environmental issues, and hence may also strategically choose to disclose more information related to environmental risks, improving their corporate image (Knox-Hayes & Levy, 2011).

In fact, external government regulation can positively promote corporate environmental responsibility which, in turn, can positively affect corporate financial performance (Li et al., 2017). Voluntary environmental disclosures signal corporate environmental responsibility and can significantly reduce financial risks and increase firm value by increasing information transparency, attracting environmentally conscientious investors, and improving the firm's reputation (Flammer, Toffel, & Viswanathan, 2021; Cai, Cui, & Jo, 2015). For instance, firms that voluntarily disclose climate change issues can achieve a higher valuation post-disclosure (Flammer, Toffel, & Viswanathan, 2021). To be specific, Flammer, Toffel, & Viswanathan (2021) note an increase in shareholder pressure for greater disclosure of climate change risk, reflected in the rising number of shareholder proposals that require firms to disclose their carbon emissions, set emissions reduction targets, and report on the progress towards these

goals. Corporate environmental responsibility also appears to be inversely related to overall firm risk due to insurance-like protection effect whereby stakeholders, including investors, perceive environmentally responsible firms as more sustainable and less likely to face regulatory fines, lawsuits, or reputational damage (Cai, Cui, & Jo, 2015). Research has also demonstrated that eco-friendly activities can enable firms to increase product differentiation (Albuquerque, Koskinen, & Zhang, 2019), and facilitate innovation that results in the successful development of new products (Zhou et al., 2019), allowing firms to benefit from higher profit margins.

Policymakers are attempting to address climate-related environmental challenges by using soft law and informal collaboration (Cassotta, 2019). Therefore, there is a growing interest among policymakers and environmentally conscientious investors regarding the efficacy of soft law, including for instance CAPs, in influencing corporate conduct towards climate change mitigation and related issues (Gjølberg, 2011; Van den Broek, 2021). This leads us to examine our second hypothesis. We expect that some managers will act strategically following the adoption of a CAP in their state, and hence argue that firms with higher levels of voluntary environmental disclosure will experience a stronger positive relationship between the adoption of state-level CAPs and investor attention. Therefore, our second hypothesis is as follows:

H2: Voluntary climate change-related disclosure moderates the positive relationship between CAPs and investor attention such that the relationship is more strongly positive for firms that voluntary disclosure more climate change-related information.

----------INSERT FIGURE 1 HERE----------

Methods

Data and sample

Our base sample consists of firms headquartered in the United States with voluntary environmental disclosure information available for the period 2001–2021. We obtain our data from several sources. We carefully study CAPs published by each state, with a particular focus on the year of their first publication. This allows us to establish a timeline for state-level climate policy initiatives. Furthermore, we obtain trading volume and bid-ask price information from the CRSP database to measure investor attention towards the firm. Voluntary corporate climate-related disclosures are obtained from the database provided by Sautner et al. (2023)[2]. Firm-level financial information, used to construct our control variables, is obtained from the Compustat database. A final sample of 27,265 firm-year observations, covering 2,878 firms for the period 2001-2021, is available to test our hypotheses.

Model

News events, such as the announcement of a state adopting a CAP, often influence investor perceptions and portfolio goals heterogeneously, leading to increased trading activity. Researchers therefore commonly use stock liquidity as a measure to proxy for investor attention (Peress & Schmidt, 2020; Bamber, Barron, & Stober, 1997; Busse & Green, 2002). In an important example of this, Barber & Odean (2008) observe that investors tend to place a higher proportion of buy orders for stocks that capture more attention. We therefore interpret a higher trading volumes as indicative of increased investor attention, and operationalize *VOLUME* as one of our key dependent variables. Similarly, bid-ask spreads, calculated as the difference

[2] They first identify a set of climate change-related bigrams, and then use these bigrams to evaluate the degree of climate change disclosure reflected in each transcript. The data is downloaded from this website: https://osf.io/fd6jq/.

between the best ask price and the best bid price for a specific stock relative to the ask price, also reflect market-level supply and demand conditions and, in turn, how liquid an individual stock is. Narrow bid-ask spreads signal high levels of buy and sell interest from investors, indicative of higher investor attention. We therefore also use *BASPREAD*, a measure of the bid-ask spread, as a dependent variable that proxies for investor attention.

We employ a Difference-in-Differences (DiD) specification to examine the impact of state-level CAPs on investor attention. Our treatment (control) group includes all firms that are (are not) headquartered in a state that adopts a CAP in year t. we then use the following regression setup:

$$Investor\ Attention_{i,t+1} = \beta_0 + \beta_1 Treat \times Post_{i,t} + \delta X_{i,t} + Firm_i + Year_t + \varepsilon_{it} \quad (1)$$

where i and t represent firm and year, respectively. The dependent variable, *Investor Attention*$_{i,t+1}$, represents each of our two proxies for investor attention, *VOLUME*$_{i,t+1}$ and *BASPREAD*$_{i,t+1}$, for firm *i* in year *t+1* following initial implementation of a state-level CAP. Our independent variable of interest is the interacted *Treat*×*Post*$_{i,t}$ term, a dummy variable that is equal to one for all firms headquartered in a state that has adopted a CAP in year *t*, and zero otherwise. Finally, $X_{i,t}$ is a vector of firm-level controls, and $Firm_i$ and $Year_t$ are firm and year fixed effects, respectively.

In constructing our empirical model, we include a range of control variables, $X_{i,t}$, that align with the existing literature (Hirshleifer et al., 2004; Bergman & Roychowdhury, 2008; Aouadi & Marsat, 2018). Specifically, we account for fundamental and financial performance firm characteristics to account for their potential influence on our measures of investor attention (see Appendix A for detailed definitions). We control for firm size using *SIZE* and for financial

leverage using *LEV*. Financial performance is accounted for by including *ROA* and *SALE*. Firm growth is captured by *GROWTH*, and investment in physical assets is represented by *TANGIBLE*. We also include *PTB* to offer a market-based perspective on firm valuation, and *CASH* to account for liquidity.

In our baseline model, we also incorporate firm fixed effects to control for unobserved firm-specific factors and year fixed effects to manage unobservable time-varing influences. Our variable of interest, $Treat \times Post_{i,t}$, which varies by state, necessitates clustering the standard errors by the headquarters state to address potential serial correlation within the cross-sectional data.

Empirical results

Summary statistics

As shown in Table 1, the average trading volume (*VOLUME*) and bid-ask spread (*BASPREAD*) for each firm are 0.181 and 2.656, respectively. The mean volume of 0.181 indicates that, on average, the traded volume is 18.1% of the shares outstanding for the firms in the sample. The mean bid-ask spread of 2.656 (scaled by 1000) indicates that, on average, the spread between the ask price and the bid price is 0.2656% of the ask price. *TREAT*×*POST* is a variable that captures the interaction between treatment, i.e., CAP implementation, and the post-treatment period. The mean of 0.341 indicates that, on average, the firms in the sample are observed in the post-treatment period 34.1% of the time. In examining voluntary corporate climate change disclosures, as indicated by *CC_EXPO*, we observe an average value of 0.825. This figure suggests that, on average, firms include approximately 0.825 words related to climate change for every 1,000 words in their annual conference call transcripts, after adjusting for the total word count. Higher values of *CC_EXPO* indicate greater exposure to climate-

related discussions. Similarly, when considering the measure *CC_RISK* as a proxy for firm climate risk disclosures, the average value is 0.022. This indicates that, on average, bigrams related to climate change and risk/uncertainty appear 0.022 times per 1000 words in the transcripts of earnings conference calls. A higher *CC_RISK* value indicates greater concern or discussion around the risks and uncertainties related to climate change.

----------INSERT TABLE 1 HERE----------

Baseline results

Table 2 reports our baseline results from regressing Equation (1). Our two investor attention measures are regressed against our variable of interest, $TREAT \times POST_{i,t}$, with fixed effects in the first two models. Model (3) – (4) then include our full set of control variables. In support our hypothesis, the coefficient of $TREAT \times POST_{i,t}$, is positive and significant at the 10% and 1% level of significance, respectively, when dependent variable is $VOLUME_{i,t+1}$, and the coefficients of $TREAT \times POST_{i,t}$, is negative and significant at the 1% level of significance when dependent variable is $BASPREAD_{i,t+1}$. This indicates that CAPs are positively associated with increased trading activities for firms headquartered in states that implement them. Moreover, CAPs are linked with reduced transaction costs, and improved stock liquidity, consistent with the notion that affected firms are capturing increased investor attention. We then infer economic significance and analyze the percentage increase in investor attention that occurs when a state adopts a CAP relative to the standard deviation of each investor attention measure. The coefficient of $TREAT \times POST_{i,t}$ ($\beta = 0.010$) in Model (3) is significant at the 1% level, suggesting that post-CAP adoption, investor attention, as measured by trading volume,

increases by 7.75% of its standard deviation[3]. Similarly, the coefficient of $TREAT \times POST_{i,t}$ (β = -0.324) in Model (4) is significant at the 1% level, indicating that following CAP adoption, investor attention, as proxied by the bid-ask spread, increases by 6.42% of its standard deviation[4].

This finding indicates an unintended positive externality of CAPs. Although primarily designed to address environmental concerns, these policies also have implications for improving market pricing efficiency in affected firms. Specifically, the increased trading volume implies improved market liquidity, which is beneficial for market participants as it allows for easier and more efficient trading of securities. The reduction in bid-ask spreads translates to lower transaction costs for investors, further improving market conditions. This suggests that CAPs, while not legally binding, still capture significant investor attention and influence market behavior. This attentiveness to environmental initiatives by the market highlights the importance for firms and their managers to consider the implications of such soft laws. Investors evidently value these initiatives, which aligns with the principles of stakeholder theory, emphasizing the need for corporate strategies that consider a broader range of stakeholder interests.

----------INSERT TABLE 2 HERE----------

Mechanism

We predict that the relationship between CAP adoption and investor attention is moderated by voluntary corporate disclosures related to climate change. We define *CC_EXPO*

[3] The mean and standard deviation of *VOLUME* are 0.181 and 0.129, respectively.
[4] The mean and standard deviation of *BASPREAD* are 2.656 and 5.046, respectively.

as the relative frequency of bigrams related to climate change occurring in the transcripts of earnings conference calls. Furthermore, we define *CC_RISK* as the relative frequency of bigrams related to climate change mentioned together with the words "risk" or "uncertainty" (or synonyms thereof) in one sentence in the transcripts of earnings conference calls. To test this hypothesis, we include an interaction term between corporate climate-related disclosure and our *TREAT*×*POST* variable.

We report the results of this estimation in Table 3. In the first two columns, we use climate-change-related exposure (*CC_EXPO*) to measure voluntary corporate disclosure regarding climate matters, and include both *CC_EXPO* and the three-way interacted term in the DiD settings. We find that the moderating effect of increasing climate change discussions in earnings conference calls increase trading volume by approximately 6.2% of its standard deviation and decrease the bid-ask spread by approximately 3.4% of its standard deviation[5]. In the last two columns, we use climate-risk-related exposure (*CC_RISK*) to measure voluntary corporate disclosure regarding climate risks and include both *CC_RISK* and the three-way interacted term in the DiD settings. We find that the moderating effect of increasing climate change risk discussions in earnings conference calls increase trading volume by approximately 0.6% of its standard deviation and decrease the bid-ask spread by approximately 5.9% of its standard deviation [6]. We find that voluntary climate change-related disclosure moderates the positive relationship between CAPs and investor attention such that the relationship is more strongly positive for firms that voluntarily disclose more climate change-related information. Our results show statistically significant support for hypothesis two.

[5] The economic effect of the moderating variable, i.e., *CC_EXPO*, on *VOLUME* and *BASPREAD* is computed as follows: (0.008+0.004−0.004)/0.129=0.062; (−0.197−0.214+0.237)/5.046=−0.034.
[6] The economic effect of the moderating variable, i.e., *CC_RISK*, on *VOLUME* and *BASPREAD* is computed as follows: (0.009+0.069−0.072)/0.129=0.006; (−0.289−2.688+2.679)/5.046=−0.059.

This finding elucidates the significant influence of voluntary corporate disclosures related to climate change on investor behavior. Incorporating climate change discussions and climate change risk discussions in earnings conference calls demonstrably increases trading volume and reduces bid-ask spreads, thereby indicating heightened market liquidity and diminished transaction costs. This evidence shows that managers understand and can take advantage of soft laws to drive stronger capital market outcomes for their firms. In addition, it shows that environmental soft law not only captures investor attention as a positive externality but also influences a broader range of stakeholders.

----------INSERT TABLE 3 HERE----------

Additional analysis

Manufacturing industries, characterized by their substantial energy consumption and greenhouse gas emissions, play a pivotal role in the global economy. Their operations place them at the forefront of climate change discussions, making it crucial for sectors with high energy intensity to integrate sustainable practices into their core business strategies (Bassi, Yudken, & Ruth, 2009; Cadez & Czerny, 2016). Against this backdrop, firms in manufacturing sectors face increased pressure from various stakeholders to mitigate climate change risks. Consequently, these firms may potentially attract more investor attention following the adoption of a CAP in their home state.

Moreover, the relationship between stakeholder pressure and strategic environmental behaviours significantly varies with firm visibility (Darnall, Henriques, & Sadorsky, 2010; Lee & Rhee, 2007). Research indicates that firms with higher asset turnovers are more likely to adopt proactive environmental strategies compared to their counterparts, a tendency attributed

to their greater resource availability and higher visibility among stakeholders (Etzion, 2007; Seroka-Stolka & Fijorek, 2020). We therefore also expect investor attention to be more readily evident among firms with higher asset turnovers.

We first divide our sample into different groups based on their industry, Then, we re-run the previous DiD model separately. We classify firms operating in manufacturing industry as manufacturing firms, and other industries as non-manufacturing firms. The results of this estimation are presented in Table 4 (Columns 1 & 2; Columns 5 & 6). We find that firms operating in manufacturing industries attract significantly increased attention from investors, when compared to those in other sectors. Specifically, the results show a notable increase in trading volume by 9.3% and a decrease in the bid-ask spread 8.8%, both significant at the 1% level for manufacturing firms[7]. The magnitude of coefficients in *TREAT×POST* for *VOLUME* and *BASPREAD* are smaller in non-manufacturing firms. Moreover, the differences in coefficients between manufacturing and non-manufacturing firms for *VOLUME* is not statistically significant, while for *BASPREAD* they are statistically significant at the 5% level.

Subsequently, we classify firms with assets turnover above the sample median as high-visibility firms and low-visibility firms otherwise. The results of this analysis are detailed in Table 4 (Columns 3 & 4; Columns 7 & 8). We find that firms with higher visibility tend to experience an increase in trading activity relative to firms with lower assets turnover. Specifically, the results demonstrate that trading volume increases by 37.2%, and the bid-ask spread decreases by 7% for high-visibility firms, statistically significant at the 1% level and the 5% level, respectively[8]. The magnitude of coefficients in *TREAT×POST* for *VOLUME* and

[7] The 9.3% increase means the relative percentage change in the trading volume as a fraction of shares outstanding, which is computed as follows: 0.012/0.129=0.093; The 8.8% decrease means the relative percentage change in the bid-ask spread as a fraction of the ask price, which is computed as follows: -0.445/5.046=0.088.

[8] The 37.2% increase means the relative percentage change in the trading volume as a fraction of shares outstanding, which is computed as follows: 0.048/0.129=0.372; The 7% decrease means the relative percentage change in the bid-ask spread as a fraction of the ask price, which is computed as follows: -0.354/5.046=0.070.

BASPREAD are smaller in low-visibility firms. Moreover, the difference in coefficients between high- versus low-visibility firms for *VOLUME* is statistically significant at the 1% level, while for *BASPREAD* it is statistically significant at the 5% level.

----------INSERT TABLE 4 HERE----------

These findings are important because they demonstrate that firms in manufacturing industries and those with high visibility are more responsive to stakeholder pressures to adopt sustainable practices, thereby attracting more investor attention. The increased trading volume and decreased bid-ask spread among manufacturing firms and high visibility firms suggest that investor scrutiny leads to better market liquidity and reduced information asymmetry. This finding is particularly relevant in the context of strategic environmental behaviors, where stakeholder pressure drives firms towards more sustainable practices.

Robustness checks

Trend analyses

The validity of difference-in-differences tests depends on the parallel trends assumption, which posits that, without CAPs, investor attention in the treated firms would behave similarly to that in the control firms. We next present the results from our trend analyses of the variable, *TREAT×POST*. If *TREAT×POST* accurately indicates a significant change in investor attention following a state's CAP implementation, any lagged CAP indicators should not be significant. Otherwise, our baseline findings would be questionable, as a pre-treatment trend in investor attention before CAP adoption would invalidate the DiD parallel trends assumption. To check

for a pre-trend, we replace *TREAT×POST* in Equation (1) with several indicator variables: CAP_0 equals one in the year of a state's CAP adoption and zero otherwise; CAP_{t-1}, CAP_{t-2}, CAP_{t-3}, CAP_{t-4}, and CAP_{t-5} equal one for the years one up to five before adoption, respectively, and zero otherwise. In addition, we include five forward-looking CAP variables: CAP_{t+1}, CAP_{t+2}, CAP_{t+3}, and CAP_{t+4} equals one for the years one up to four after adoption, respectively, and $CAP_{t\geq 5}$ equals one for the fifth year after adoption and beyond, with zero otherwise. Including these lead variables helps us understand the post-adoption effects of CAPs.

----------INSERT TABLE 5 HERE----------

Table 5 shows that the coefficients for the lagged variables are all statistically insignificant, indicating no pre-treatment trend in investor attention before CAP adoption. Instead, the impact on investor attention becomes significant in the year following adoption, with both CAP_{t+1} coefficients significant at the 5% level and the 1% level, respectively. Furthermore, the significance of the forward-looking CAP indicators suggests that the effect of CAP implementation continues to influence investor attention in the subsequent years.

Propensity Score Matching with Difference-in-Differences Analysis

While our DiD models indicate that CAP adoption is associated with increased attention from investors toward affected firms, some concerns can persist in relation to the comparability of our treatment and control firms. This raises the possibility that our findings might be attributed to inherent differences in the fundamental conditions of our sampled firms, rather than the effect of CAPs. To address this concern, and isolate the impact of CAPs, we employ a propensity score matching (PSM) method to pair firms in our treatment and control groups.

Initially, we estimate a probit model where the dependent variable is assigned a value of one for firms with an adopted CAP in year *t* (treatment firms), and zero otherwise (control firms). The independent variables include several fundamental firm-level characteristics, including firm size, leverage, profitability, and industry. Subsequently, we use the propensity scores derived from the probit model to conduct nearest-neighbour matching. The results are presented in Table 6. The coefficient of $TREAT \times POST_{i,t}$ (β = 0.013) in Model (3) is significant at the 1% level, suggesting that post-CAP adoption, investor attention, as measured by trading volume, increases by 10.08% of its standard deviation[9]. Similarly, the coefficient of $TREAT \times POST_{i,t}$ (β = -0.315) in Model (4) is significant at the 1% level, indicating that following CAP adoption, investor attention, as proxied by the bid-ask spread, increases by 6.24% of its standard deviation[10]. These results lend further, more robust support to our first hypothesis that the implementation of state-level Climate Action Plans (CAPs) significantly improves investor attention towards the affected firms.

----------INSERT TABLE 6 HERE----------

Permutation inference tests

To ensure that our baseline results are specifically due to the adoption of CAPs in the states where firms are headquartered, we conduct permutation inference tests. Following Liu & Lu (2015), this process involves randomly generating a year for CAP adoption and randomly assigning states as implementation states. Using these random draws, we create a false $TREAT \times POST$ variable, which is then used as the regressor in the baseline regression. To strengthen

[9] The mean and standard deviation of *VOLUME* are 0.181 and 0.129, respectively.
[10] The mean and standard deviation of *BASPREAD* are 2.656 and 5.046, respectively.

the test, we repeat this experiment 1000 times, recording the coefficient and p-values of *TREAT* $\times$ *POST* for each iteration. If Equation (1) is correctly specified, most of these 1000 coefficients should be close to zero and not systematically different from zero overall.

----------INSERT FIGURE 2 HERE----------

In Figure 2, we display the density distribution of the 1000 estimates from the random draws of the CAP adoption year and states. Panel A, which focuses on the *VOLUME* variable, shows that the distribution of estimates is centered around zero (i.e., the mean value is 0.00000448), and our estimate using the actual CAP adoption year and states (i.e., 0.010) exceeds the 95th percentile of these 1000 placebo estimates (i.e., the 95th percentile is 0.003). Panel B, which focuses on the *BASPREAD* variable, also centers around zero (i.e., the mean value is 0.0002), and our true estimate (i.e., -0.324) falls beyond the 5th percentile of the placebo estimates (i.e., the 5th percentile is -0.075). These results further strengthen our confidence that our findings are not significantly biased by misspecification of the estimation equation.

Conclusion

In this study, we examine the influence of climate-related soft law on investor behavior within the United States, focusing on the effects of state-level Climate Action Plans (CAPs) on investor attention. Utilizing a staggered difference-in-differences (DiD) method, we find a positive association between the adoption of these plans and increased investor attention. Furthermore, our results indicate that voluntary corporate climate-related disclosures significantly mediate this relationship. To ensure the robustness of our findings, we perform a

series of robustness checks, including trend analyses, a Propensity Score Matching Difference-in-Differences (PSM-DiD) approach, and permutation inference tests, all of which further support the plausibility of a causal relationship.

In addition, our cross-sectional analyses indicate notable variations in the impact of governmental soft law adoption on investor attention across different industry characteristics and levels of firm visibility. Specifically, firms within the manufacturing sectors and those with higher visibility among stakeholders are more likely to attract investors focused on environmental activism. This trend can be attributed to the increased visibility associated with substantial energy consumption or a larger organizational footprint, which necessitates a higher standard of environmental performance for these firms.

Our research contributes to the literature on the impact of soft law on capital market outcomes and deepens the understanding of stakeholder theory. We provide empirical evidence that soft laws, such as Climate Action Plans (CAPs), significantly increase investor attention towards affected firms, illustrating the powerful influence of non-legislative policy mechanisms on market behavior. Furthermore, our findings align with the principles of stakeholder theory, suggesting that firms can create value for a wide range of stakeholders through voluntary compliance with soft laws.

Moreover, our research indicates that CAPs are valuable for fostering environmental responsibility and improving market efficiency. These findings can help policymakers create and enforce more effective climate policies that employ market mechanisms to meet environmental objectives. Specifically, our study shows that thoughtfully designed soft law instruments can encourage firms to embrace sustainable practices and increase information transparency, thereby attracting investor attention and potentially resulting in more efficient capital markets.

References

Abbott, K.W., Keohane, R.O., Moravcsik, A., Slaughter, A.M., & Snidal, D. (2003). The concept of legalization. *International Organization*, 54(3), 401-419.

Ai, L., & Gao, L. S. (2023). Firm-level risk of climate change: Evidence from climate disasters. *Global Finance Journal*, 55, 100805.

Albuquerque, R., Koskinen, Y., & Zhang, C. (2019). Corporate social responsibility and firm risk: Theory and empirical evidence. *Management Science*, 65(10), 4451-4469.

Aouadi, A., & Marsat, S. (2018). Do ESG controversies matter for firm value? Evidence from international data. *Journal of Business Ethics*, 151, 1027-1047.

Bamber, L. S., Barron, O. E., & Stober, T. L. (1997). Trading volume and different aspects of disagreement coincident with earnings announcements. *Accounting Review*, 575-597.

Barber, B. M., & Odean, T. (2008). All that glitters: The effect of attention and news on the buying behavior of individual and institutional investors. *The Review of Financial Studies*, 21(2), 785-818.

Bassi, A. M., Yudken, J. S., & Ruth, M. (2009). Climate policy impacts on the competitiveness of energy-intensive manufacturing sectors. *Energy Policy*, 37(8), 3052-3060.

Beermann, M. (2011). Linking corporate climate adaptation strategies with resilience thinking. *Journal of Cleaner Production*, 19(8), 836-842.

Benlemlih, M., Shaukat, A., Qiu, Y., & Trojanowski, G. (2018). Environmental and Social Disclosures and Firm Risk (March 24, 2018). *Journal of Business Ethics*, 152(3), 613-626.

Bergman, N. K., & Roychowdhury, S. (2008). Investor sentiment and corporate disclosure. *Journal of Accounting Research*, 46(5), 1057-1083.

Bodansky, D. (1999). The legitimacy of international governance: a coming challenge for international environmental law. *The American Journal of International Law*, 93(3), 596-624.

Busse, J. A., & Green, T. C. (2002). Market efficiency in real time. *Journal of Financial Economics*, 65(3), 415-437.

Cadez, S., & Czerny, A. (2016). Climate change mitigation strategies in carbon-intensive firms. *Journal of Cleaner Production*, 112, 4132-4143.

Cai, L., Cui, J., & Jo, H. (2016). Corporate environmental responsibility and firm risk. *Journal of Business Ethics*, 139, 563-594.

Campiglio, E., Dafermos, Y., Monnin, P., Ryan-Collins, J., Schotten, G., & Tanaka, M. (2018). Climate change challenges for central banks and financial regulators. *Nature Climate Change*, 8(6), 462-468.

Cassotta, S. (2019). The Development of Environmental Law within a Changing Environmental Governance Context: Towards a New Paradigm Shift in the Anthropocene Era. *Yearbook of International Environmental Law*, 30(1), 54-67.

Chava, S. (2014). Environmental externalities and cost of capital. *Management Science*, 60(9), 2223-2247.

Christensen, H.B., Hail, L., & Leuz, C. (2021). Mandatory CSR and sustainability reporting: economic analysis and literature review. *Review of Accounting Studies*, 26, 1176-1248.

Clarkson, P.M., Li, Y. Richardson, G.D., & Vasvari, F.P. (2011). Does it really pay to be green? Determinants and consequences of proactive environmental strategies. *Journal of Accounting and Public Policy*, 30(2), 122-144.

Coglianese, C. (2021). Environmental soft law as a governance strategy. *Jurimetrics*, 61(1), 19-51.

Coglianese, C., & Nash, J. (2009). *Government clubs: Theory and evidence from voluntary environmental programs* (M. Potoski & A. Aseem, Eds.). Voluntary programs: A club theory perspective. Cambridge, MA.

Cordeiro, J.J., & Tewari, M. (2014). Firm characteristics, industry context, and investor reactions to environmental CSR: A stakeholder theory approach. *Journal of Business Ethics*, 130, 833-849.

Curcio, D., Gianfrancesco, I., & Vioto, D. (2023). Climate change and financial systemic risk: Evidence from US banks and insurers. *Journal of Financial Stability*, 66, 101132.

Darnall, N., Henriques, I., & Sadorsky, P. (2010). Adopting proactive environmental strategy: The influence of stakeholders and firm size. *Journal of Management Studies*, 47(6), 1072-1094.

Deegan, C., & Unerman, J. (2006). *Financial accounting theory: European edition*. McGraw-Hill.

Dhaliwal, D.S., Li, O.Z., Tsang, A., & Yang, Y.G. (2011). Voluntary nonfinancial disclosure and the cost of equity capital: The initiation of corporate social responsibility reporting. *The Accounting Review*, 86(1), 59-100.

Etzion, D. (2007). Research on organizations and the natural environment, 1992-present: A review. *Journal of Management*, 33(4), 637-664.

Flammer, C. (2015). Does corporate social responsibility lead to superior financial performance? A regression discontinuity approach. *Management Science*, 61(11), 2549-2568.

Flammer, C., Toffel, M.W., & Viswanathan, K. (2021). Shareholder activism and firms' voluntary disclosure of climate change risks. *Strategic Management Journal*, 42(10), 1850-1879.

Freeman, R.E., Harrison, J.S., Wicks, A.C., Parmar, B.L., & de Colle, S. (2010). *Stakeholder theory: the state of the art.* Cambridge: Cambridge University Press.

Freeman, R.E. (1984). *Strategic Management: A stakeholder approach*. Cambridge: Cambridge University Press.

Friedman, A. L., & Miles, S. (2002). Developing stakeholder theory. *Journal of Management Studies*, 39(1), 1-21.

Gersen, J.E., & Posner, E.A. (2008). Soft law: Lessons from congressional practice. *Stanford Law Review*, 61(3), 573-628.

Gjølberg, M. (2011). Explaining regulatory preferences: CSR, Soft Law, or Hard Law? Insights from a survey of Nordic pioneers in CSR. *Business and Politics*, 13(2), 1-31.

Harrison, J.S., Bosse, D. A., & Phillips, R. A. (2010). Managing for stakeholders, stakeholder utility functions, and competitive advantage. *Strategic Management Journal*, 31(1), 58-74.

Harrison, J.S., & Wicks, A.C. (2013). Stakeholder theory, value, and firm performance. *Business Ethics Quarterly*, 23(1), 97-124.

Herremans, I.M., Nazari, J.A., & Mahmoudian, F. (2016). Stakeholder relationships, engagement, and sustainability reporting. *Journal of Business Ethics*, 138, 417-435.

Hillman, A.J., & Keim, G.D. (2001). Shareholder value, stakeholder management, and social issues: what's the bottom line? *Strategic Management Journal*, 22(2), 125-139.

Hirshleifer, D., Hou, K., Teoh, S. H., & Zhang, Y. (2004). Do investors overvalue firms with bloated balance sheets?. *Journal of Accounting and Economics*, 38, 297-331.

Hirshleifer, D., Subrahmanyam, A., & Titman, S. (2006). Feedback and the success of irrational investors. *Journal of Financial Economics*, 81(2), 311-338.

Huang, H.H., Kerstein, J., & Wang, C. (2018). The impact of climate risk on firm performance and financing choices: an international comparison. *Journal of International Business Studies*, 49, 633-656.

Ilhan, E., Krueger, P., Sautner, Z., & Starks, L.T. (2023). Climate risk disclosure and institutional investors. *The Review of Financial Studies*, 36(7), 2617-2650.
IPCC. (2014). *Climate Change 2014: Impacts, adaptation, and vulnerability*. https://www.ipcc.ch/site/assets/uploads/2018/02/WGIIAR5-PartA_FINAL.pdf
Jo, H., Kim, H., & Park, K. (2015). Corporate environmental responsibility and firm performance in the financial services sector. *Journal of Business Ethics*, 131(2), 257-284.
Jones, T. M., Felps, W., & Bigley, G. A. (2007). Ethical theory and stakeholder-related decisions: The role of stakeholder culture. *Academy of Management Journal*, 50(2), 368-396.
Kahneman, D. (1973). *Attention and effort*. Englewood Cliffs, NJ: Prentice-Hall.
Knox-Hayes, J., & Levy, D.L. (2011). The politics of carbon disclosure as climate governance. *Strategic Organization*, 9(1), 91-99.
Konar, S., & Cohen, M.A. (2001). Does the market value environmental performance? *The Review of Economics and Statistics*, 83(2), 281-289.
Krüger, P. (2015). Corporate goodness and shareholder wealth. *Journal of Financial Economics*, 115(2), 304-329.
Kujala, J., Lehtimäki, H., & and Myllykangas, P. (2016). Toward a Relational Stakeholder Theory: Attributes of Value-creating Stakeholder Relationships. *Academy of Management*, 2016(1), 13609-13640.
Lee, S., & Rhee, S. K. (2007). The change in corporate environmental strategies: a longitudinal empirical study. *Management Decision*, 45(2), 196-216.
Li, D., Cao, C., Zhang, L., Chen, X., Ren, S., & Zhao, Y. (2017). Effects of corporate environmental responsibility on financial performance: the moderating role of government regulation and organizational slack. *Journal of Cleaner Production*, 166, 1323-1334.
Liu, Q., & Lu, Y. (2015). Firm investment and exporting: Evidence from China's value-added tax reform. *Journal of International Economics*, 97(2), 392-403.
Matsumura, E. M., Prakash, R., & Vera-Muñoz, S. C. (2022). Climate-risk materiality and firm risk. *Review of Accounting Studies*, 1-42.
Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review,* 22(4), 853-886.
Nwete, B. (2007). Corporate Social Responsibility and Transparency in the Development of Energy and Mining Projects in Emerging Markets; Is Soft Law the Answer? *German Law Journal*, 8(4),311-339.
Reid, E.M., & Toffel, M.W. (2009). Responding to public and private politics: corporate disclosure of climate change strategies. *Strategic Management Journal*, 30(11), 1157-1178.
Pauwelyn, J., Wessel, R.A., & Wouters, J. (2014). When structures become shackles: stagnation and dynamics in international lawmaking. *European Journal of International Law*, 25(3), 733-763.
Pan, H., Page, J., Zhang, L., Chen, S., Cong, C., Destouni, G., Kalantari, Z., & Deal, B. (2019). Using comparative socio-ecological modelling to support Climate Action Planning (CAP). *Journal of Cleaner Production*, 232, 30-42.
Parmar, B. L., Freeman, R. E., Harrison, J. S., Wicks, A. C., Purnell, L., & De Colle, S. (2010). Stakeholder theory: The state of the art. *Academy of Management Annals*, 4(1), 403-445.
Peress, J., & Schmidt, D. (2020). Glued to the TV: Distracted noise traders and stock market liquidity. *The Journal of Finance*, 75(2), 1083-1133.
Pollak, M., Meyer, B., & Wilson, E. (2011). Reducing greenhouse gas emissions: Lessons from state climate action plans. *Energy Policy*, 39(9), 5429-5439.

Sautner, Z., Van Lent, L., Vilkov, G., & Zhang, R. (2023). Firm-level climate change exposure. *The Journal of Finance*, 78(3), 1449-1498.

Seroka-Stolka, O., & Fijorek, K. (2020). Enhancing corporate sustainable development: Proactive environmental strategy, stakeholder pressure and the moderating effect of firm size. *Business Strategy and the Environment*, 29(6), 2338-2354.

Shaffer, G., & Pollack, M.A. (2010). Hard vs. Soft Law: Alternatives, complements and antagonists in international governance. *Minnesota Law Review*, 94(3), 706-799.

Shum, P.K., & Yam, S.L. (2011). Ethics and Law: Guiding the invisible hand to correct corporate social responsibility externalities. *Journal of Business Ethics*, 98(4), 549-571.

The White House. (2013). *The president's Climate Action Plan.* https://obamawhitehouse.archives.gov/sites/default/files/image/president27sclimateactionplan.pdf

Trubek, D.M., Cottrell, M.P., & Nance, M. (2005). "Soft Law," "Hard Law," and European Integration: Toward a Theory of Hybridity. *Univ. of Wisconsin Legal Studies Research Paper*, No. 1002.

Van den Broek, O. (2021). Soft law engagements and hard law preferences: Comparing EU lobbying positions between UN global compact signatory firms and other interest group types. *Business and Politics*, 23(3), 383-405.

Wasim, R. (2019). Corporate (non) disclosure of climate change information. *Columbia Law Review*, 119(5), 1311–1354.

Weinhofer, G., & Busch, T. (2013). Corporate strategies for managing climate risks. *Business Strategy and the Environment*, 22(2), 121-144.

Zhou, Y., Shu, C., Jiang, W., & Gao, S. (2019). Green management, firm innovations, and environmental turbulence. Business Strategy and the Environment, 28(4), 567-581.

Table 1. Sample summary statistics and correlations

	Variable	Mean	SD	Sample correlations											
				(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
(1)	*VOLUME*	0.181	0.129												
(2)	*BASPREAD*	2.656	5.046	-0.223											
(3)	*TREAT×POST*	0.341	0.474	0.120	-0.151										
(4)	*CC_EXPO*	0.825	1.567	-0.025	-0.053	0.043									
(5)	*CC_RISK*	0.022	0.070	-0.011	-0.037	0.022	0.576								
(6)	*SIZE*	6.983	1.771	0.137	-0.439	0.055	0.138	0.109							
(7)	*LEV*	0.218	0.187	0.067	-0.080	-0.024	0.086	0.059	0.404						
(8)	*ROA*	0.002	0.048	-0.018	-0.244	-0.005	-0.013	-0.012	0.220	-0.079					
(9)	*CASH*	0.181	0.197	0.090	0.110	0.067	-0.122	-0.082	-0.432	-0.429	-0.183				
(10)	*GROWTH*	0.108	0.315	0.111	-0.043	-0.074	-0.039	-0.027	-0.070	-0.027	0.101	0.086			
(11)	*SALE*	5.445	1.819	0.108	-0.419	0.054	0.074	0.064	0.917	0.315	0.321	-0.496	-0.064		
(12)	*TANGIBLE*	0.256	0.233	0.111	-0.078	-0.189	0.211	0.158	0.270	0.316	0.015	-0.399	-0.026	0.192	
(13)	*PTB*	3.336	3.971	0.068	-0.065	0.023	-0.100	-0.069	-0.082	0.078	-0.049	0.245	0.144	-0.067	-0.146

Note: This table reports summary statistics and correlations for all variables used in our regression analyses. The sample consists of 27,265 firm-year observations over the period 2001–2021. Variable definitions are provided in Appendix A. All continuous variables are winsorized at the 1st and 99th percentiles to minimise the influence of outlier observations on our results.
All correlations greater than 0.012 in absolute value are different from zero at the 5% significance level.

Table 2. The effect of state-level climate action plans on investor attention

Variable	(1) $VOLUME_{t+1}$	(2) $BASPREAD_{t+1}$	(3) $VOLUME_{t+1}$	(4) $BASPREAD_{t+1}$
TREAT× POST	0.008*	-0.326***	0.010***	-0.324***
	(1.973)	(-2.683)	(2.730)	(-2.784)
SIZE			0.010***	-0.760***
			(3.301)	(-5.549)
LEV			0.044***	2.156***
			(4.484)	(9.100)
ROA			0.010	-7.607***
			(0.320)	(-6.495)
CASH			0.046***	-0.915**
			(4.194)	(-2.617)
GROWTH			0.024***	-0.489***
			(5.648)	(-6.647)
SALE			-0.004	-0.137
			(-0.928)	(-1.344)
TANGIBLE			0.101***	-0.049
			(6.634)	(-0.104)
PTB			0.001***	-0.070***
			(4.649)	(-7.274)
Constant	0.178***	2.767***	0.080**	8.829***
	(132.660)	(66.801)	(2.474)	(8.920)
Observations	27,265	27,265	27,265	27,265
Adj. R-squared	0.472	0.546	0.480	0.559
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
State FE	YES	YES	YES	YES

This table presents panel OLS regression results that demonstrate the influence of CAPs on investor attention, as specified in Equation (1). The sample consists of 27,265 firm-year observations over the period 2001–2021. The first two columns show fixed effects models, while the last two columns incorporate control variables. Variable definitions are provided in Appendix A. Standard errors are in parentheses and are clustered by headquarter state.
***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 3. The moderating effect of voluntary corporate climate-related disclosure on investor attention[11]

Variable	(1) $VOLUME_{t+1}$	(2) $BASPREAD_{t+1}$	(3) $VOLUME_{t+1}$	(4) $BASPREAD_{t+1}$
TREAT×POST×CC_EXPO	0.004**	-0.214***		
	(2.558)	(-2.744)		
TREAT×POST×CC_RISK			0.069**	-2.688**
			(2.452)	(-2.536)
TREAT×POST	0.008*	-0.197	0.009**	-0.289**
	(1.951)	(-1.553)	(2.439)	(-2.551)
TREAT×CC_EXPO	-0.004**	0.237***		
	(-2.473)	(2.685)		
TREAT×CC_RISK			-0.072**	2.679**
			(-2.656)	(2.518)
CC_EXPO	0.001	-0.038		
	(0.633)	(-0.921)		
CC_RISK			0.003	-0.596*
			(0.251)	(-1.980)
Constant	0.081**	8.756***	0.081**	8.797***
	(2.547)	(8.661)	(2.500)	(8.881)
Controls	YES	YES	YES	YES
Observations	27,265	27,265	27,265	27,265
Adj. R-squared	0.480	0.559	0.480	0.559
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
State FE	YES	YES	YES	YES

Note: This table reports results from examining the moderating effect of voluntary corporate climate-related disclosure on investor attention. Standard errors are in parentheses and are clustered by headquarters state. Variable definitions are provided in Appendix A.
***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

[11] We do not include the variables *TREAT*, *POST*, *POST* × *CC_EXPO*, and *POST* × *CC_RISK* in our regression models due to multicollinearity issues.

Table 4. The effect of state-level climate action plans on investor attention across different groups

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variable	$VOLUME_{t+1}$	$VOLUME_{t+1}$	$VOLUME_{t+1}$	$VOLUME_{t+1}$	$BASPREAD_{t+1}$	$BASPREAD_{t+1}$	$BASPREAD_{t+1}$	$BASPREAD_{t+1}$
	Manufacturing v.s. Non-Manufacturing Firms		High-visibility v.s. Low-visibility Firms		Manufacturing v.s. Non-Manufacturing Firms		High-visibility v.s. Low-visibility Firms	
TREAT×POST	0.012***	0.009	0.015***	0.005	-0.445***	-0.196	-0.354**	-0.181
	(3.344)	(1.657)	(3.033)	(0.921)	(-2.862)	(-1.341)	(-2.400)	(-1.321)
Constant	0.104***	0.061	0.120***	0.009	8.258***	9.449***	9.468***	9.186***
	(4.161)	(1.147)	(4.294)	(0.156)	(6.660)	(7.764)	(6.071)	(10.204)
Differences in coefficient estimates (p-value)	0.115		0.000***		0.015**		0.045**	
Controls	YES	YES	YES	YES	YES	YES	YES	YES
Observations	13,438	13,827	13,458	13,442	13,438	13,827	13,458	13,442
Adj. R-squared	0.468	0.492	0.527	0.454	0.561	0.556	0.578	0.546
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Year FE	YES	YES	YES	YES	YES	YES	YES	YES
State FE	YES	YES	YES	YES	YES	YES	YES	YES

Note: This table reports regression results after subsampling the data. In columns (1), (2), (5), & (6), Manufacturing firms are those operating in manufacturing industries such as Petroleum & Coal Products. Otherwise, they are placed in the Non-Manufacturing category. In columns (3), (4), (7), & (8), High-visibility firms are defined as firms with asset turnover higher than the median. Otherwise, they are placed in the Low- visibility category. Standard errors are in parentheses and are clustered by headquarters state. Variable definitions are provided in Appendix A.
***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 5. Trend analyses

Variable	(1) $VOLUME_{t+1}$	(2) $BASPRED_{t+1}$
CAP_{t-5}	0.003	-0.126
	(0.700)	(-0.803)
CAP_{t-4}	0.006	0.030
	(0.886)	(0.186)
CAP_{t-3}	0.004	0.148
	(0.473)	(0.689)
CAP_{t-2}	0.007	0.133
	(0.876)	(0.659)
CAP_{t-1}	0.004	0.035
	(0.325)	(0.191)
CAP_{0}	0.011	0.031
	(1.509)	(0.184)
CAP_{t+1}	0.013**	-0.370*
	(2.016)	(-1.991)
CAP_{t+2}	0.011	-0.340**
	(1.337)	(-2.236)
CAP_{t+3}	0.005	-0.004
	(1.222)	(-0.040)
CAP_{t+4}	0.004	-0.101
	(0.744)	(-0.948)
$CAP_{t\geq5}$	0.007	-0.144
	(1.359)	(-1.202)
Constant	0.077**	8.802***
	(2.406)	(9.018)
Controls	YES	YES
Observations	27,265	27,265
Adj. R-squared	0.480	0.559
Firm FE	YES	YES
Year FE	YES	YES
State FE	YES	YES

Note: This table presents trend analyses results by substituting $TREAT \times POST_{i,t}$ in Equation (1) with a series of indicator variables to capture the effects of CAPs before and after adoption. Standard errors are in parentheses and are clustered by headquarters state. Variable definitions are provided in Appendix A.

***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Table 6. The effect of state-level climate action plans on investor attention after the Propensity Score Matching approach

	(1)	(2)	(3)	(4)
Variable	$VOLUME_{t+1}$	$BASPREAD_{t+1}$	$VOLUME_{t+1}$	$BASPREAD_{t+1}$
TREAT×POST	0.011***	-0.293*	0.013***	-0.315**
	(3.254)	(-2.006)	(4.146)	(-2.207)
SIZE			0.007***	-0.741***
			(2.783)	(-5.332)
LEV			0.048***	2.130***
			(4.672)	(8.630)
ROA			0.018	-6.955***
			(0.579)	(-7.000)
CASH			0.047***	-0.788**
			(4.090)	(-2.260)
GROWTH			0.026***	-0.572***
			(5.612)	(-7.148)
SALE			-0.005	-0.095
			(-1.125)	(-0.892)
TANGIBLE			0.107***	-0.586
			(6.088)	(-1.031)
PTB			0.001***	-0.069***
			(4.803)	(-6.452)
Constant	0.177***	2.751***	0.102***	8.541***
	(134.007)	(48.910)	(4.265)	(8.651)
Observations	24,104	24,104	24,104	24,104
Adj. R-squared	0.471	0.543	0.479	0.555
Firm FE	YES	YES	YES	YES
Year FE	YES	YES	YES	YES
State FE	YES	YES	YES	YES

Note: This table examines the effect of state-level climate action plans on investor attention using a PSM-DiD specification. We use propensity scores to match firms in the treatment and control groups based on several covariates including firm size, leverage, profitability, and industry. Subsequently, we examine the effect of state-level climate action plans on investor attention using the DiD in Equation (1). Standard errors are in parentheses and are clustered by headquarters state. Variable definitions are provided in Appendix A.
***, ** and * indicate significance at the 1%, 5% and 10% levels, respectively.

Figure 1. Conceptual framework

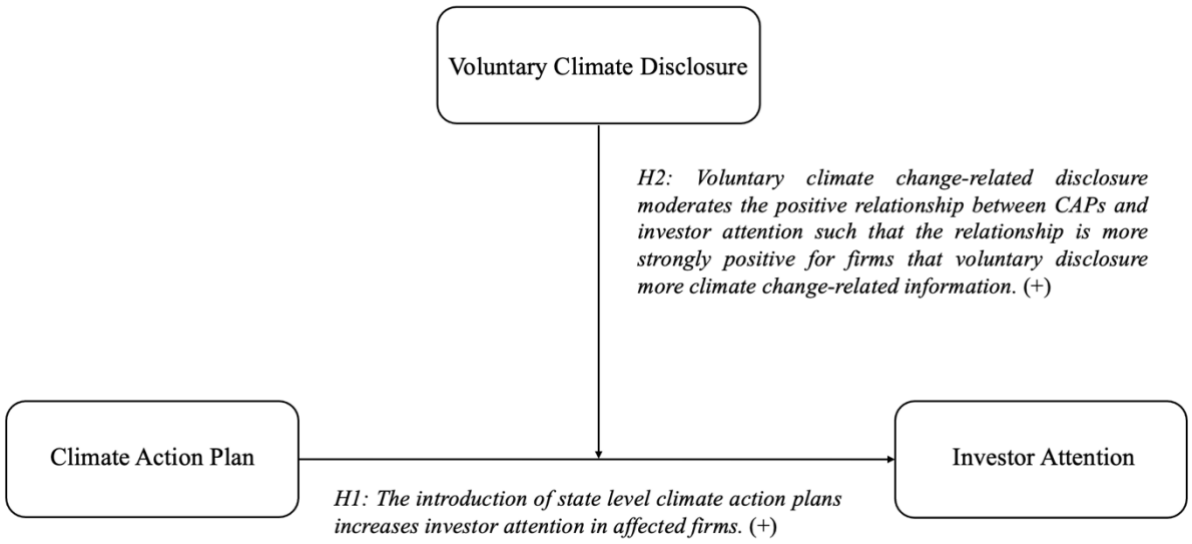
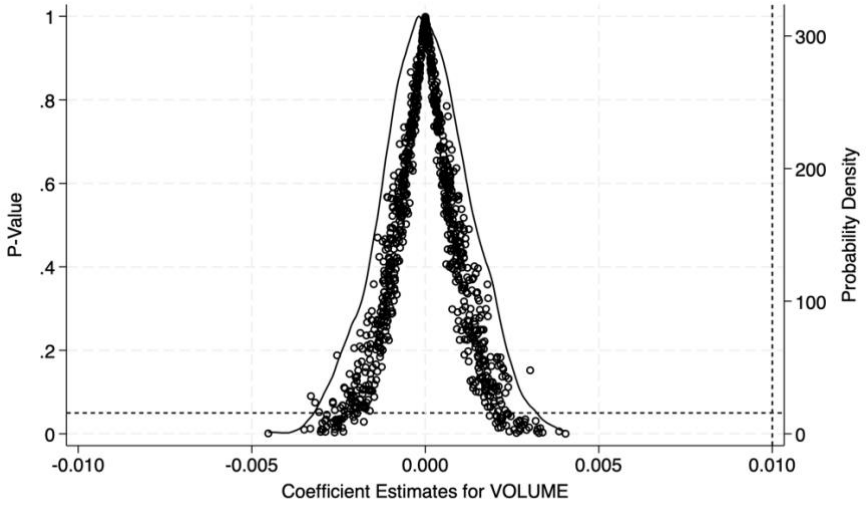
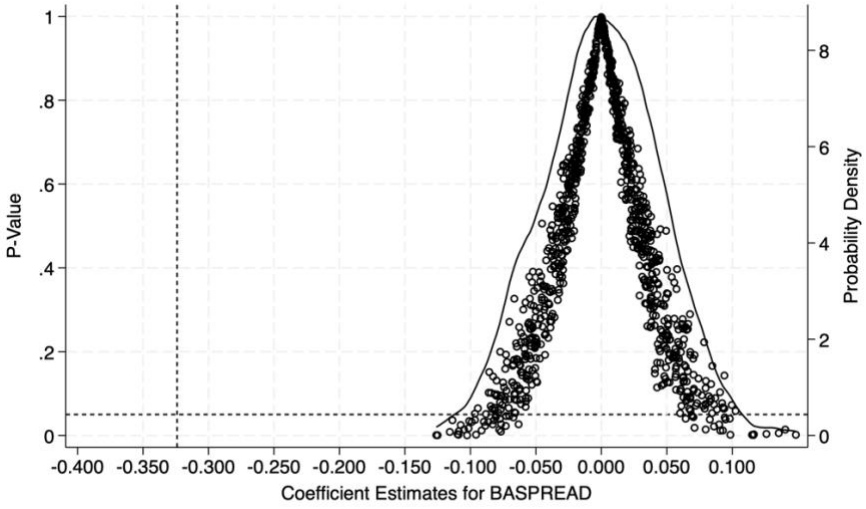


Figure 2. Permutation inference test

Panel A. This panel reports the distribution of estimated coefficients with placebo years and states of CAP adoption, using *VOLUME* as the dependent variable



Panel B. This panel reports the distribution of estimated coefficients with placebo years and states of CAP adoption, using *BASPREAD* as the dependent variable



Appendix A. Variable definitions

Variable	Definitions
TREAT	A binary variable equal to 1 for firms headquartered in states that have adopted a Climate Action Plan (CAP) in a given year, and 0 otherwise.
POST	A binary variable equal to 1 for the years following the implementation of a Climate Action Plan (CAP) in a given state, and 0 otherwise.
TREAT×POST	An interaction term equal to 1 for firms headquartered in states with a CAP in the years following its implementation, and 0 otherwise.
VOLUME	Total trading volume (CRSP item VOL) divided by shares outstanding at the end of the year (CRSP item SHROUT).
BASPREAD	Ask price (CRSP item ASK) minus Bid price (CRSP item BID) at the end of the year relative to the ask price, scaled by a factor of 1000.
CC_EXPO	Relative frequency with which bigrams related to climate change occur in the transcripts of earnings conference calls, scaled by a factor of 1000.
CC_RISK	Relative frequency with which bigrams related to climate change are mentioned together with the words “risk” or “uncertainty” (or synonyms thereof) in one sentence in the transcripts of earnings conference calls, scaled by a factor of 1000.
SIZE	Log of total assets (in $ millions) at the end of the year (Compustat item AT).
LEV	Sum of the book value of long-term debt (Compustat data item DLTT) and the book value of current liabilities (DLC) divided by total assets (Compustat data item AT).
ROA	Income before extraordinary items (Compustat data item IB) divided by total assets (Compustat data item AT).
TANGIBLE	Property, plant, and equipment (Compustat data item PPENT) divided by total assets (Compustat data item AT).
CASH	Cash and short-term investments (Compustat data item CHE) divided by total assets (Compustat data item AT).
GROWTH	Difference in sales between the current year and the previous year divided by the sales of the previous year (Compustat item SALE).
SALE	Log of sales (in $ millions) at the end of the year (Compustat item SALE).
PTB	Price to book ratio at the end of the year (CRSP data item PTB)