Who Needs To Be Seen To Be Green? How Reputational Pressure Affects Responses To Climate Change

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Abstract

Domestic and international laws have been slow and ineffective at regulating firms in response to climate change. For this reason, voluntary self-regulation and private regulatory bodies have become increasingly important. Despite claims that firms oppose costly carbon mitigation strategies, previous research has shown variation in the extent to which firms signal their performance on climate change. What explains this variation? I develop a four-pronged theory of reputational pressure to answer this question. First, firms face different reputational pressure based on their primary consumer audience. Business-to-consumer firms face greater reputational costs of failing to act on climate, and therefore avoid exposure. Second, 'Climate-conscious' reputations matter when consumers are 'primed' to value them. I argue that climate disasters induce consumer awareness, and firms respond by signalling to audiences their climate-reputation. Third, reputations have cascade effects. Firms are more likely to move to carbon mitigation following large early-movers within their sector. Fourth, there is a trade-off for firms signalling action on climate; attention brings greater scrutiny, which may damage the firms reputation more than keeping quiet. Following poor climate evaluations, firms become much less likely to disclose in the future. Using Australia as a case study, I employ data on firm disclosure and climate-mitigating action from the Carbon Disclosure Project between 2010-2021. In addition to natural disaster data from EMDAT, I proxy for the material effects of natural disasters using insurance claims, and use a difference-in-difference estimator to compare high and low years following climate disasters. The empirical tests show reputational pressure can both induce and paralyse firm action on climate.

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1 Introduction

A central message that emerged from the 2015 Paris Climate Conference, and subsequent COP meetings, is that the implementation of intergovernmental climate solutions will require not only cooperation from governments and cities, but also private sector actors taking on "global governor" roles (Avant, Finnemore, and Sell 2010). This call to action represents the political and litigious barriers of regulating industries domestically across different sectors. For example, some sectors involve political constituencies that are highly sensitive to the visible costs of policy interventions on ubiquitous carbon-emitting products, such as gasoline. In other sectors, industrial production revolves around acutely competitive commodities such as steel, and here firms are capable of organizing to hamper, delay or kill policies that could harm price-sensitive and trade-exposed industries (Cullenward and Victor 2020). As a result, designing and implementing regulations for change is complex and difficult. Without regulatory requirements, firms have many reasons not to act on decarbonization. Least of which are the acute and immediate costs of taking action, as well as the logistical issue that key technologies necessary for decarbonization may be immature or risky to adopt (Victor, Geels, and Sharpe 2019). Yet, despite the fact that decarbonization and climate mitigation processes impose substantial costs on corporations, as of 2018, 2,138 firms from 145 countries, amounting to roughly $36.6. trillion USD in revenue, have voluntarily pledged to climate action. A growing trend is the cooperation of firms with private-led quasi-regulatory bodies towards implementing internal change. Why do some firms cooperate with quasi-regulatory bodies on climate change?

I argue that reputational concerns can drive firms to both avoid and signal support for internal climate regulation. First, firms face heterogeneous reputational pressure to present as climate-conscious; firms with large consumer audiences (consumer facing businesses) face greater scrutiny than business facing firms. Rather than incentivizing action, these firms avoid alerting audiences to conceal themselves from scrutiny. In line with existing research, the social pressure to project a climate-conscious reputation remains low as consumer demand is hampered by the cognitive dissonance created by hyperbolic discounting. However, incentives to build or maintain a climate-conscious reputation increase when audiences are 'primed' to scrutinize firm behavior. Natural disasters linked to climate change can create these priming conditions, and inducing firms to project climate-conscious reputations in the short-term. Consumer facing firms, and firms linked to higher emissions, face greater reputational pressure to act. Third, reputations have negative externalities. Firms associated with sectors that are linked to 'high emissions' are more likely to act on internal climate regulation to safeguard against a negative collective reputation. Fourth, reputations have cascade effects; large 'early-mover' firms can induce a cascade of similar behaviour at the sector-level.

The literature on why it's difficult to regulate carbon emitters, and why

some agents – in this case, firms - are incentivized to act has largely been split. In regards to the former, the account of climate change either emphasises a collective action problem of overcoming free-riding, or a distributive problem whereby decision making in one space or time period affects actors at different points of space or time (Aklin and Mildenberger 2020). Collective action approaches (Barrett and R. Stavins 2003; Keohane and Victor 2016; Ostrom 1990; R. N. Stavins 2011; Nordhaus 2015; Budolfson et al. 2012; Victor 2011) and distributive politics offer two important points 1) climate change is a public good, 2) but the harms are unevenly distributed (Gazmararian and Milner 2022). Both these models of climate politics speak to the variation in actors support over space and time on the demand-side.

On the supply-side, work focused on the puzzle of why firms adopt or support climate mitigation has been dominated by two approaches. The first suggests support for regulatory measures aimed at climate change is a type of 'strategic accommodation' (Hacker and Pierson 2002). That is, firms support moderate regulation to avoid more costly measures in the future. Strategic accommodation features prominently in the literature on the disappearance of Big Oil's opposition to climate regulation in the 1990s (Kolk and D. Levy 2001; D. L. Levy and Egan 1998; Newell and Paterson 1998).[1] Running counter to this position is the view that the firm has economic interests in the regulation itself. There are perceived economic advantages for large incumbents to adapt to new technology and squeeze out smaller and emerging competitors. For instance, Kennard (2020) shows that firms support domestic climate change regulation to gain advantage over market competitors, where some firms possess an advantage in adjustment costs. Similarly Colgan, Green, and Hale's (2021) introduce an asset revaluation theory whereby actors possessing a larger share of climate-vulnerable to climate-forcing assets should be more supportive of regulatory measures(Colgan, Green, and T. N. Hale 2021). Both sides have offered keen insights into firm behaviour, however supply-side arguments leave out stakeholder concerns and the social position of the firm in relation to their customers. Exclusively demand-side arguments overlook the variation in responsiveness from actors, or how sensitivity to these demands may vary.

To explain variation in firm support for climate change, I introduce a theory of reputational pressure that incorporates both demand and supply side theories for regulating climate change. Empirically, I leverage data from a rapidly growing private semi-regulatory body - the Carbon Disclosure Project (CDP). The CDP, a registered member of the UN SDG's Partnership Platform, operates a global environmental disclosure system. The program invites firms to submit reports and surveys which are then scored by the CDP to assess the extent to which the firm has a) disclosed its carbon emissions, and b) made

[1] Also further support from US oil and gas majors following the Kyoto ratification, 2007 Supreme Court ruling granting the EPA authority to regulate green house gas emissions under the Clean Air Act, and new state laws (D. L. Levy and Kolk 2002; Meckling 2011; Pinkse and Kolk 2012; Pulver 2007; Skodvin and Skjaerseth 2003; Skjærseth 2013).

progress towards carbon-mitigation. Firms may refuse to participate and, as a voluntary initiative, the CDP has no mechanism through which they can enforce compliance from firms. Since non-compliance has no material cost, the CDP is a suitable case study to evaluate the role of reputation as a mechanism in shaping firm behaviour.

Focusing on Australia as a case study, I collect disclosure and scoring data between 2010-2021. Australia is an ideal setting for two reasons. First, it is exposed to visible and negative shocks from climate change and due to the demographic clustering of the population, natural disasters have widespread, direct effects on the public. Second, firms have been required to submit reports on carbon emissions to the Clean Energy Regulator since the 2007 National Greenhouse and Energy Reporting Act (NGER Act). Mandatory reporting requirements by all publically-listed companies reduces the selection bias of high-performing firms.

I combine annual firm-level data from Refinitiv Eikon, with data on climate-linked natural disasters between 2009-2020 from the EMDAT dataset. I find that consumer-facing firms are less likely, on average, to disclose than B2B firms. Second, following natural disasters, firms are much less likely to disclose information, however firms that do disclose score much higher following hig-disaster years than low-disaster years. Third, following a large 'early-mover' in an industry, smaller firms are more likely to cooperate with the CDP. Fourth, high intensity emitting sectors that are consumer facing score much higher than low-intensity firms. Lastly, poor performing firms that received failing grades are much less likely to disclose information in the future. I find substantial support for the role of fluctuating reputational pressure in inducing firm disclosure and implementation of carbon-mitigation strategies.

In addition to using a variety of model specifications, and estimation measurements, I address the potential issues of variation in the scale of natural disasters. To capture the real impact on consumer audiences of natural disasters that triggers climate awareness, I use a proxy for the potential total economic losses from natural disasters linked to climate disasters by using household insured losses from the Insurance Council Australia database. To address confounders and endogeneity issues, I use a difference-in-difference estimator to compare disclosure and scoring following high versus low disaster years.

This research makes three contributions to the study of business in environmental politics. First, it sets up a probabilistic explanatory model of firm behaviour on climate change. Existing explanation focus on comparative advantage of low versus high carbon emitters, or theories of hedging out the competition, rooted in economic interest and focused on within-business dynamics. In contrast, a reputational theory of firm behaviour builds on these ideas and incorporates a view of heterogeneous audience types (consumers versus businesses), with different expectations over firm behaviour (low or high emitters), depending

on fluctuating awareness and preferences over firms adopting climate-conscious reputations (hyperbolic discounting and climate 'shocks'). The through-line in the theoretical explanation is that firms face varied and shifting pressure to project climate-conscious reputations. Second, I incorporate ideas from behavioural science largely used in the context of individuals to understand firm behaviour has a 'group dynamic' where concern for reputation occurs not in a vacuum, but in response to competitor actions. Third, I develop original findings on which firms and industries are more inclined to signal action on climate, and which abstain, and how negative evaluations can deter future firm participation in voluntary semi-regulatory schemes.

These findings build on more current work showing that firms and industries that intensively emit carbon are more likely to actively oppose climate action depending on their position in the supply chain (Meckling 2015). While this is the case, intensive emitting firms and industries face greater reputational pressure to project climate-conscious reputations. This suggests a gap between the actions of the firm, and the image they project. This largely confirms the position of many environmentalist who are skeptical of voluntary regulations (Steinzor 1998), on the basis that these programs are used by firms to "greenwash" an otherwise poor environmental performance (Prakash and Potoski 2006; King and Lenox 2000). Though possible that these programs are used to project particular environmentally-conscious reputations, voluntary programs can induce firms into progressive environmental action resulting in pollution reduction and higher compliance rates with domestic regulations (Anton, Deltas, and Khanna 2004; Dasgupta, Hettige, and Wheeler 2000; Potoski and Prakash 2005b; Potoski and Prakash 2005a).

2 The Carbon Disclosure Project: Background

Climate legislation has been slow, patchy, and inadequate in most high-emitting nations (Keohane 2015). Where it has been successful it has offered small rewards after years of negotiations (Eskander and Fankhauser 2020). In the absence of satisfactory legislation, private environmental regulatory bodies can fulfil the role of governing institutions by providing a coordinating mechanism to monitor, set standards, provide enforcement, and create ad-hoc dispute settlement mechanisms (Vandenbergh, Rossi, and Faucher 2020). Among the most impactful of these private environmental governance initiates are voluntary semi-regulatory programs that allow firms to disclose information, and receive ratings on their performance. One notable example is the Carbon Disclosure Project (CDP). As a global disclosure system, the CDP invites firms around the world to be surveyed and submit reports on carbon emissions and internal firm regulations towards climate change on an annual basis. Founded in 2000, the CDP is a major private regulatory body with 13,000 companies representing 64% of global market capitalization disclosing to the CDP in 2021.

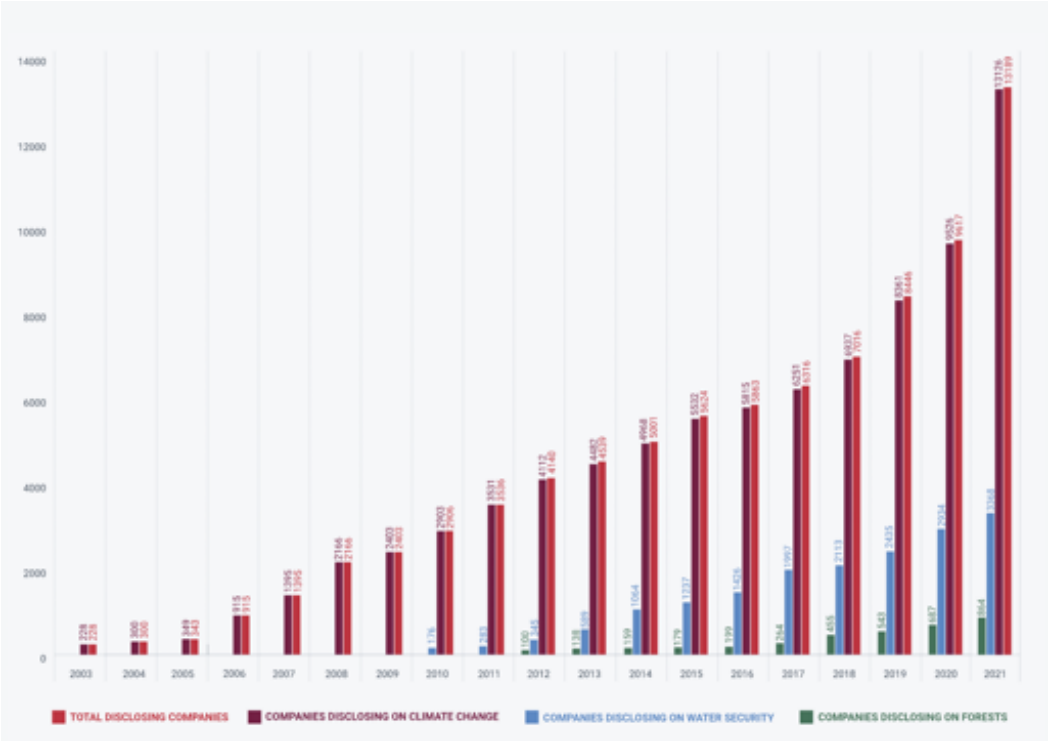

Figure 1: Disclosures issued by Firms to the CDP (2003-2021). Data source: https://www.cdp.net/en/companies/companies-scores

Submissions are voluntary and firms are offered three different disclosure choices. The firm can 1) choose not to participate or respond, 2) answer with confidentiality, where answers are hidden from the general public, and 3) answer with public disclosure. The CDP then surveys each firm, assigning a grade that scores the firm on its efforts towards 'environmental stewardship' across three programs: Climate Change, Water, Forests and Supply Chain programs. Three characteristics of the CDP make it an ideal case study for evaluating the role of reputation on firm behaviour. First, as a voluntary initiative, the CDP resembles the structure of other private regulatory bodies. The scoring is based solely on the activities and positions disclosed to the CDP. The CDP does not set carbon targets, and a major criticism levied by skeptics is that it does it have the capacity to verify the information disclosed by firms (Matisoff, Noonan, and O'Brien 2013). Second, there are no material benefits to joining the CDP, other than the advertisement of the firm's assessed reporting on its climate change activity should it receive a high grade. In this way, the CDP can be utilised by firms to project particular reputations, since "the CDP gives firms a way to distinguish themselves from competitors and gain recognition for going beyond compliance" (ibid., p. 289). Third, the CDP scores firms on both whether or

not they respond to requests to disclose information, and the information itself. Thus, firms that do disclose know they may be subject to a negative evaluation, creating a trade-off for firms in choosing to participate. Positive evaluations can help the firm's reputation, while negative evaluations may harm them.

3 Variation in Firm Behaviour on Climate Change

In developing an argument on the role of audience reputational pressure in shaping domestic firm preferences over how they voluntarily engage with regulatory bodies over internal carbon regulation, I straddle two literature's on firm preferences in political economy and the behavioural science of climate policy.

Whether or not firms or industries choose to act, and signal action, on internal carbon regulation and carbon-mitigation strategies, will be influenced by a confluence of social pressure, political and legislative change, and the distributive effects of climate policy (D. L. Levy and Kolk 2002; Meckling 2015). The first category of determinants in the political economy literature focuses on how economic factors shape firm policy preferences. Recent research has highlighted the differential effect of trade exposure on polluting sectors (Genovese 2019), and the competitive gains for large domestic firms against foreign or emerging competitors (Kennard 2020). Adjustment costs for firms also varies among sectors where the availability of mature technology for low-carbon innovation differs across industries, and non-harmonization across jurisdictions exposes businesses to costly moves in external markets (Bumpus 2015; Cullenward and Victor 2020).

A second category of factors have emphasized the conditioning effect of political and institutional contexts that different firms and industries are situated in. Firms located in industries that are large emitters of greenhouse gases are likely to oppose costly decarbonization measures as they face steep mitigation costs (Goel 2004; Markussen and Svendsen 2005; Cho, Patten, and Roberts 2006; Martin and Rice 2010; Kim, Urpelainen, and Yang 2016), and the same holds for firms that consume electricity linked to fossil fuel sources (Cheon and Urpelainen 2013; Kelsey 2018; Kennard 2020). Firms located within a supply-chain may face downstream costs of carbon-mitigation efforts. The distributional consequences of regulatory policies are greater for large-emitters, who are likely to invest greater resources into lobbying to oppose such changes (Colgan, Green, and T. N. Hale 2021), or adopting 'strategic accommodation' stances on moderate regulatory policies to prevent more drastic changes (T. Hale 2011). In contrast, more recent research has found that some large firms are not feigning support for regulatory change. Major oil firms have invested in natural gas with the expectation that an eventual moderate carbon price will increase the competitive ability of natural gas to become the predominant base-load partner of intermittent renewables and a transitionary fuel towards decarbonization (Skjærseth 2013).

This article integrates these insights, but focuses on this third set of social factors that influence firm behaviour; the role of social forces and internal firm characteristics in influencing firm action on internal climate mitigation strategies. This work points to external influences like strategic competition between interest groups, the strength of supporters and opponents' coalitions (Cheon and Urpelainen 2013), and stakeholder pressure (Martin and Rice 2010). The focus of the literature on external versus internal dynamics has left out an important part of the story on firm responsiveness to climate change – the interaction between consumer and stakeholder preferences and firm behavior, and the extent to which the firm is exposed to sharp shifts in consumer attention to a firm's environmental reputation.

It is difficult to speak about how social influences can pressure firms to implement internal climate regulations, without considering what motivates the consumer to care about the climate. It is this second set of agents - the audience and customers of the firm - that necessitates bringing in discussions on the nature of consumer preferences over climate change. A difficult policy for climate change is that people often make decisions that leave them worse off. Human behavior is both spatially and temporally context-dependent. When the negative effects of climate change are unevenly distributed across time and space, individuals engage in hyperbolic discounting - meaning "the time-declining discount rate to trade-offs between present and future consumption" (Hepburn, Duncan, and Papachristodoulou 2010.[2] Although this applies to costly changes that firms may make, or increased downstream costs for consumers unwilling to pay more for "green products", it also applies to attention. While scientific evidence and discourse over the increasing threat of climate change has increased over the last decade, constant exposure to the same stimulus leads to habitation (Weber and E. J. Johnson 2009), resulting in desensitization to risk evaluation. Taken in conjunction with the dispersion of responsibility of emissions and climate governance (individuals, corporations, governments and international actors), consumer attention is unlikely to be orientated and collectively organised enough to impact whether firms need to make costly investments in, and signal, climate-conscious reputations. Thus, when the environment remains in a constant state, broadly speaking, the effect of social pressure from consumers on firm behaviour may be low. Changes in the environment that trigger sharp 'shocks' can alter this equilibrium, meaning that consumer pressure for firms to signal climate-conscious reputations varies in response to fluctuating awareness. The next section introduces a theoretical framework for the effect of reputation on firm responsiveness to climate change (Posner, Rothbart, et al. 2007).

[2]See also: Weber and Stern 2011.

4 A Reputational Theory of Firm-Level Climate Responsiveness

Reputations are "a perceptual representation of a company's past actions and future prospects that describes the firm's overall appeal to its key constituents when compared to other leading rivals" (Fombrun 2005, p. 72). The main reputational currency of firms is quality, with research showing positive reputations are correlated with better return on assets (Benjamin and Podolny 1999; Standifird 2001; Boyd, Bergh, and Ketchen Jr 2010; Deephouse 2000). Aside from economic performance, good reputations leads to better employee candidates and customers (Turban and Cable 2003), and the ability of the firm to deviate from strategic behaviour without penalty (Deephouse and Carter 2005). Certain firm actions can generate reputational losses, such as downsizing (Love and Kraatz 2009), or reputational gains, such as when firms improve product quality. Increasingly, firms use Corporate Social Responsibility (CSR) Reports to build their reputations (Esen 2013; Sethi, Martell, and Demir 2016). The necessity of cultivating certain reputations, such as quality of products and services, are fixed, while the impetus to develop reputational types (such as human-rights abiding) grow in reaction to changes in consumer preferences.

Firms face pressures to signal reputational types and distinguish themselves from competitors; if consumers develop preferences towards greener corporate policies, firms will respond by signalling their pro-environmental policies. There is some evidence that this occurs at the individual-level; where the desire to develop an altruistic reputation motivates individuals to purchase green products in public (though not privately) despite the higher price and lower quality of the goods (Griskevicius, Tybur, and Van den Bergh 2010). While the visibility of the firm affects the extent to which the firm will feel pressure to send such a signal, the insight can be transposed to private-sector actors. Of course, firms may achieve this by releasing environmentally-friendly products - for instance McDonalds substituting paper wraps for styrofoam containers (Stafford and Hartman 1996), however firms can send clearer signals by cooperating with semi-private regulatory bodies who independently evaluate firm performance. The necessity to signal a climate-conscious reputational type is dependent on 1) the institutional structure of the firm, and their sensitivity to consumer audiences, and 2) the extent to which the consumer audience is primed to care about this reputation.

An external factor that can trigger pressure on corporations to respond to, or signal action on, climate change is the proximity of the firm to the consumer. Consumer-facing firms are companies which "supply goods or services directly to consumer markets instead of supplying to another business entity" (J. Haddock-Fraser and Fraser 2008). In contrast, firms which predominantly involved in business-to-business (B2B) activity have a lower level of interaction with public consumers of their products. As Kolk and Pinkse 2007(374) note,

"the position of the company in the supply chain determines to which extent a company depends on its customers and thus follows a concomitant climate strategy". Several studies find a positive association between the proximity of the firm to the consumer and pro-environmental activities (Damert and Baumgartner 2018; J. E. Haddock-Fraser and Tourelle 2010), as well as carbon disclosure (J. Haddock-Fraser and Fraser 2008). According to these accounts, reputational pressure increases with the firms position in the supply-chain vis-à-vis the final consumer. Although these studies have either focused narrowly on one industry, or have selected case studies of top-performing firms, and it is unclear how impactful this factor is.

While the institutional design of the firm should affect the sensitivity of the firm to reputational costs from consumer audiences, I argue that the effect of this reputational pressure is mediated by 1) the extent to which the firm is cognitively associated with high GHG emissions from consumer audiences, and 2) the trade-offs of signalling firm action on climate change. First, consumer facing firms that are not linked to high-emissions will face lower incentives to project a climate-conscious reputation. Second, B2C facing firms face higher levels of public scrutiny, and submitting to regulatory bodies can increase attention on the firm by increasing the reputational costs of submitting and receiving a poor performance evaluation. Thus, I expect reputational pressure to produce two different outcomes for consumer facing firms. Higher levels of scrutiny can dissuade firms from submitting to regulatory bodies. However, consumer facing firms that are high-emitters already face negative public scrutiny, and can use CDP scoring to repair their reputation; these firms are more likely to submit than high-emitting B2B firms. B2B firms face lower levels of reputational pressure and therefore will be more likely to submit, but also score lower. I therefore introduce both the moderating effect of carbon emitting intensity and disclosure versus scoring into my initial predictions:

> Hypothesis 1a: Consumer facing firms will be less likely to disclose for evaluation to the CDP, but B2C firms that do disclose will score higher than B2B firms.
>
> Hypothesis 1b: B2C firms that are also high-emitters will be more likely to score higher on CDP reports.

4.1 Natural Disasters

As previously stated, individual behaviour is context-dependent. Awareness of risks is influenced greatly by the availability heuristic (Renn and Rohrmann 2000); if a certain risk if cognitively "available" - present, felt or salient - then individuals will have a heightened response to the risk (Sunstein 2006). Here I argue that consumer audiences don't have fixed preferences over climate change, they fluctuate when climate events 'prime' them and reverse their preferences, increasing awareness and attention to whose to blame for climate-linked natural

disasters.

A bi-product of a climate-linked disaster is to trigger greater awareness of the relative contribution of firms to the adverse state of the climate. A reputation for being environmentally-conscious is less important in equilibrium where the effects of climate are difficult to tangibly link back to private sector actions, but when the climate conditions are adverse, bad climate policies may garner more attention. Firms are better adept at 'blending in' where bad climate policies are difficult to distinguish between individual firms within an industry.[3]

Studies have shown a sharp increase in awareness of climate change following climate-linked disasters with tangible effects on behaviour (Jetten et al. 2021; McAllister and Oslan 2021). Baccini and Leemann 2021 find the exogenous shock of a climate-linked disaster (flooding) primes voters in Switzerland in favor of climate protection. Climate is generally second order in political debates, yet other studies find significant effects on voting behaviour in general elections where climate is rarely salient (Bechtel and Hainmueller 2011; Gasper and Reeves 2011). Hazlett and Mildenberger 2020 show that natural disasters can help overcome the temporal mismatch between short-term costs and long-term benefits of climate policy change. The authors find that exposure to wildfires increased support for climate-related ballot measures for individuals living within the vicinity of the event.

Although climate change, and environmentalism in general, are salient political and social issues, agents generally suffer from hyperbolic discounting and cannot make current trade-offs for future benefits. In situations where agents experience direct and consistent effects of climate change, effects of decisions are more tangible and consumers may be willing to pay a premium for firms that possess an environmental reputational type. Studies suggest reputation can be leveraged for competitive advantage, finding consumers use aggregate information to form reputational judgements which subsequently influences their purchase decisions (Graham and Bansal 2007). Thus, as the negative effects of climate change increase, individuals may accept some loss of material utility by choosing firms with climate-conscious reputations to reduce their carbon footprint. The shift in consumer preferences and climate awareness cultivates a culture that values reputations for environmentalism; firms respond to this shift in preferences by increasing their attention to projecting climate-conscious reputations. However, the costs of increased attention on firms environmental performance can dissuade them from disclosing information and increasing negative scrutiny. I therefore expect two polarising outcomes:

[3]See Grenadier, Malenko, and Strebulaev 2014 on the increasing importance of reputation during adverse 'shocks': agents delay the abandonment of R&D projects or investments during periods of economic shocks when it's less likely to send a negative signal of individual ability; thus 'blending in' with the crowd.

Hypothesis 2a: Firms will be less likely to disclose following a year of high climate-linked natural disasters.

Hypothesis 2b:Firms that do disclose will score higher on CDP evaluations in years that follow a high number of climate-linked natural disasters.

These theories examine the role of reputation across sectors, however consumers are more aware of the complicity of some sectors over others, and reputations are often 'benchmarked' to an agent's peers rather than firms in general. I introduce two novel concepts of 'cascade effects' and 'reputational externalities'.

4.2 Reputational Externalities

Firm reputation is not the sole product of a firm's actions. For all agents, observers typically use temporal context to make judgements or inferences about a firms current actions. The historical context of an agent's actions allows observers to assess relative, rather than absolute, improvements or declines. Similarly, there is also a comparative context amongst firms within the same industry, creating the effect of *reputational externalities*. The notion of reputational externalities explains how an agent's behaviour can threaten the collective reputation of the group (Barnett 2007; Tirole 1996). We can conceive of reputational externalities to be a situation where "the actions of one group may damage the reputation of another group, thereby reducing overall welfare" (Evans and Guinnane 2006). This phenomena is discernible in IR; for instance when states join together under an organization or grouping, individual behaviour of one agent can damage the reputation of other members. Or, perhaps, when heterogeneous agents or bodies develop common reputations through associations or long-standing alliances. Political parties are particularly conscious of the effect of individual member's behaviour on the collective reputation of the party (Marland and DeCillia 2020; Kreps 1984; Calvert 1987).

The idea is more prevalent in the business and organizational literature where reputational spillovers have been observed in firm layoffs (Goins and Gruca 2008), after corporate social responsibility (CSR) crises (Winn, MacDonald, and Zietsma 2008), and geographical proximity of firms (Bertels and Peloza 2008). The adoption of environmental policies in particular suggests significant reputational externalities are driving firm behaviour. Hargrave 2008 finds that whether or not firms participate in 'green clubs' is influenced by peer-firms. A statement by an Amaco executive in 2001 following an Exxon oil spill illustrates the reputational pressures that intra-industry firms can exert on each other.

> *"We are still an oil company, and we still have to live with the sins of our brothers. We were doing fine until Exxon spilled all that oil.Then we were painted with the same brush as them."*(Hoffman 2001)

Observer perceptions of an industry sector relate to the reputations of firms within, as evidenced by findings in studies by Shamsie 2003; Cable and Graham 2000 and Brammer and Pavelin 2006. Intra-industry firm reputation is damaged when other firms within the sector, who provide similar services, possess poor climate or environmental policies. Firms will push for stringent regulatory regimes to create a common reputational climate practice amongst heterogeneous firms. In this way, concerns over the collective reputation of the industry drives firm support for improving collective reputation through regulatory regimes.[4] (Standifird 2001). As a high-emitting sector with a notorious link to carbon emissions, I focus on the oil, gas and mining industry to determine whether within-sector negative externalise motivate firms to disclose and self-regulate:

> Hypothesis 4: Firms in the oil, gas and mining sector will be more likely to disclose information to the CDP.

4.3 Reputational Cascades

Economic self-interest might predict that firms will support climate policy when such a policy benefits the industry. However, self-interest cannot explain why, in situations where the regulatory proposal imposes net costs, firms that once held opposing positions suddenly reverse their stance (Vormedal, Gulbrandsen, and Skjærseth 2020). And, although the conventional 'strategic accommodation' view can offer insight into why firms might offer support for climate-mitigation proposals as a means to offset radical alternatives, the theory is less adept at explaining the heterogeneity in firm positioning or the timing in which firms switch positions. One mechanism through which reputation can incentivize firms to move towards internal carbon regulation is a *cascade effect*.

Reputations are not formed in vacuums, and they rely on a tenuous informational environment. Reputations are qualities that actors do not own – rather "because credibility and reputation in a relational Concepts they depend entirely on the perception of others" (Van Jackson). Observers form reputational judgements by assessing an actor's alike peers to benchmark them to or against; and actors assess their reputational type based on their peers as well. Thus, whether or not an actor has a 'good' or 'bad' reputation (their reputational type), depends on the actor's peers. Meaning that an actor may make an action or abstain from an action based on what their peers do (or do not do). This is called a cascade effect.

When making judgements about facts, values, tastes or even decisions, cascade effects can occur. They can happen privately or publicly – within or between individuals, groups, or institutions. Affective connections between alike

[4] One might argue that some industry sectors, such as oil, will never be able to develop 'good' environmental reputations. It's more important to firms to avoid negative reputations than it is for them to cultivate 'good' reputations, where "negative reputations are more impactful and deterministic than positive reputations"

actors increases the likelihood of a cascade effect. Building on the definition offered by Sunstein 2019 work on social cascades, I define reputational cascades as "large-scale judgements and movements in which actors begin to believe something, or do something, because of the beliefs or actions of a few early movers". First-mover advantage is a concept recognized in non-cooperative game theory, but it also has an interesting effect on group-dynamics by polarizing outcomes or leading to inefficiencies based on a tendency to defer to initial judgements (Kahneman, Sibony, and Sunstein 2021).

In a reputational cascade, actors may act against their preferences in a conformity-rewarding process. Reputational cascades are a distinct phenomenon to informational cascades, but we can think of them as siblings. Here is the distinction: in informational cascades, individuals fail to reveal private information to the group out of concern that their information is 'wrong' if their information contradicts that of the first early-movers. In contrast, in reputational cascades the failure to reveal private information to the group does not arise out of a fear of that information being 'wrong' but rather the fear of exclusion or disapproval for contradicting the group. Kuran 1997 refers to this as 'pluarlistic ignorance'. Most of the work on reputational cascades is based on individuals and has been tested in laboratory settings. A famous laboratory experiment on urns illustrates the effects of reputational cascades. In this experiment, subjects had to guess whether the experiment was using an urn filled with two red balls and one white ball (urn A) or one containing two white balls and one red (urn B). For each period one of the urn's balls were emptied into a container, a randomly selected participant selected one ball, recording the ball's colour and their opinion about which urn was in use. The subject's colour was undisclosed to the group, but the subject's opinion on which urn was in use was shared. All participants would complete the same task and after the last participant, the answer of which urn was in use would be announced. The experiment revealed that individuals would make decisions about which urn was in use based on the majority of previous announcements, even if it contradicted with the color of the ball. Over 77 percent of each round of the experiment revealed cascades, with few 'private signals', that is information provided by the individual's own draw. Interestingly, when one person's ball draw contradicted the decision of two or more previous participants, the next participant was likely to ignore this 'outlier' and follow the consensus of those who went before. Although the majority of decisions followed Bayes law, the conclusion from the study was, "Initial misrepresentative signals start a chain of incorrect decisions that is not broken by more representative signals received later." The idea of these early-movers and cascades can clearly be seen in different settings;

The concept of 'early movers' is foreign to IPE and the literature on climate change, despite how important it is for shaping policy. Early-movers are often acting on private information and therefore their decision can send a 'private signal' about whether or not they've made the correct judgement. However, when you have two early-movers sending the same signal, others may rationally

fall into line, even if it's incorrect. As Anderson and Holt 1997 note, "Initial misrepresentative signals start a chain of incorrect decisions that is not bro- ken by more representative signals received later".

As a result of this noisy signalling, though a reputational cascade is not a normative concept in and of itself, they can lead to "widespead errors, factual or otherwise" (Sunstein 2005). In some situations of IR a cascade effect will overcome collective torpor or reluctance in creating public goods, for instance acting on climate change or environmental governance. We can see how this would play out in IR. Suppose a state suggests that the actions of state B in dumping toxic nuclear waste is a serious problem, and that state C concurs publicly with state A, not because state C necessarily agrees with state A but because they do not want to seem to state A as ignorant or indifferent to health or environmental protection. If we move down to the level of the firm, large early-movers can have a similar reputational cascade effect. Cascade effects amongst firms in relation to corporate social responsibility are rife. For instance, the reaction of multinational companies to the invasion of Ukraine by Russia in early 2022. Following the initial invasion, the corporate exodus out of Russia followed a pattern of within-sector closely linked firms following withdrawal strategies of their peers. Oil and energy companies largely moved within a week-long unison while discretionary goods – fast food restaurants and chains like Starbucks and PepsiCo – moved within days if not hours of McDonald's announcement to leave. Firms that remained – or only partially withdrew or suspended operations like Papa Johns and Yum Brands! – were subject to within-group comparisons, since the early-movers had now shifted the relative benchmark through which consumers could evaluate their CSR reputations. In the area of climate change and environmental governance, cascade effects are evident across litigation, where environmental regulations at sub-global levels can trigger regulation at higher levels (Engel and Saleska 2005). A clear example of a reputational cascade causing firms to change their behaviour in reducing emissions was clear when Xcel Energy of Minneapolis agreed to disclose the risk that global warming posed to its business in 2008, causing competing firms to follow suit. Within months Dynegy followed suit, and AES Corporation the following year.

These examples highlight how cascades can increase the reputational pressure for firms to conform. If we think about the preferences of firms as being represented by a utility function of a) the company's private utility and b) their reputational utility, the private utility is the firm's preferences over whether or not they disclose carbon, and whether or not they implement carbon-mitigating policies and internal regulations, while the reputational utility is how their decisions are viewed by consumers and shareholders. The reputational utility increases when competitors and within-industry peers publicly signal a move towards green-policy change. I therefore expect:

> Hypothesis 5: Firms will be more likely to disclose to the CDP if large-firms within their industry submit the year prior.

5 Research Design

5.1 Case Study: Australia

Prior studies investigating the effect of carbon information disclosed by firms on variables such as shareholder wealth, pricing, and company market capitalisation have been criticized for using voluntary disclosed carbon emissions data, given the issues with selection bias and endogeneity towards high-performing firms incentivized to submit this information voluntarily. However, Australia offers an ideal case study to alleviate these issues since Australian public firms have been required to submit reports on carbon emissions to the Clean Energy Regulator since the 2007 National Greenhouse and Energy Reporting Act (NGER Act). Since reporting is mandatory, the CDP offers a way for firms to publicize these efforts to a wider audience in reducing GHG emissions and signal to the public carbon-mitigation efforts to improve their reputation. Furthermore, although the effects of climate change are geographically variable, Australia has experienced both visible and widespread climate-induced disasters over the last decade and extreme events like flooding and bushfires have become more frequent. Yet the country often ranks very low in comparable climate change performance indexes, ranking last behind 193 United Nations member countries in the 2021 Sustainable Development Report. The domestic economy is heavily dependent on coal for electricity generation, as well as a major export commodity, and as such Australians are "high per capita contributors to anthropogenic climate change" (Head et al. 2014). These characteristics of a generally poor-climate-performing business environment, mandatory reporting, and tangible negative climate change-induced events, make Australia a favourable setting to test the effects of reputational pressure on firm behaviour.

5.2 Data

Using Rvest, I scrape data from the Carbon Disclosure Project on Australian firms between 2010-2021, with yearly reports on which firms respond to the CDP and their corresponding grade and scoring. In total there are 383 unique firms, with observations covering a twelve year period, amounting to 4,888 observations. Due to missing data, some observations are dropped from the analysis. There are two dependent variables; scoring and response. Responded is a binary variable that takes the value of 1 if the firm responded for evaluation that year, and 0 otherwise. Since Responded also captures firms who 'fail to respond' I include an additional variable 'Responded_Robust' and drop these observations. Firms are scored between 0-100 and assigned a grade between A-F based on the firm's progress towards "environmental stewardship". Each scoring is sector-specific, allowing a peer-to-peer benchmarking. I recode the scoring variable to be a weighted variable between 0 and 1; companies scoring A grades closer to 1 while companies scoring F grades closer to 0. The global stock market return data is from the Thomson Refinitiv datastream database. I compile firm level data from Refinitiv Eikon, and use a fuzzy matching command to match

company stock-market codes. I cross-checked firm matches. Since the data is unbalanced, I impute missing values for continuous (binary) variables based on linear (logistic) regression models. Descriptive statistics of the distribution of sectors is shown in figure 2.

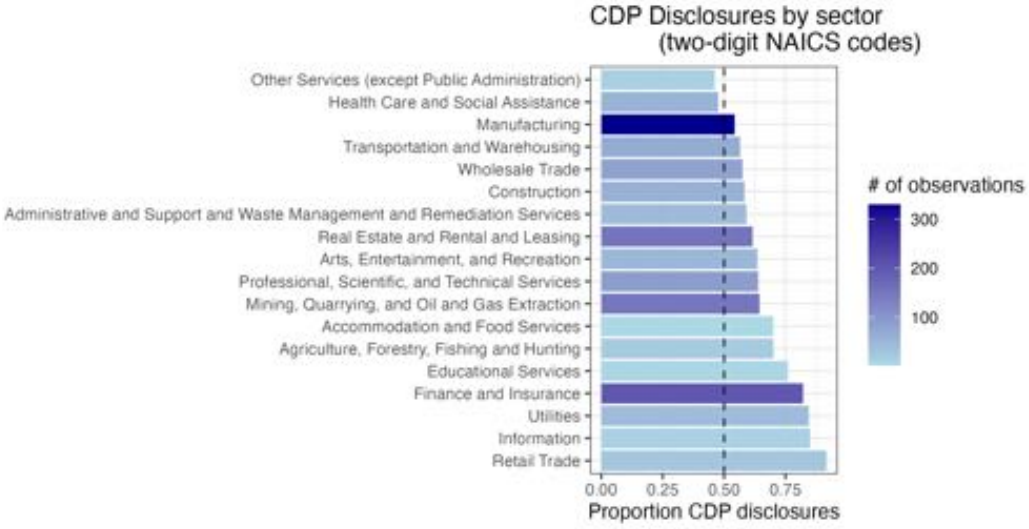

Figure 2

5.3 Explanatory variables

There is a dichotomy between B2B (business to business) firms and B2C (business to consumer) firms (Lilien 2016). In B2B markets, organizational buyers will purchase goods and services on behalf of businesses, organizations or institutions. In contrast, in consumer markets, individual consumers purchase goods and services for their own consumption and that of other individual consumers. Many past accounts on corporate social performance have omitted PMP from theoretical or empirical models (for exceptions: Flammer 2015; M. Johnson, Redlbacher, and Schaltegger 2018; Servaes and Tamayo 2013), since these studies have used datasets conflating B2B and B2C firms, the heterogeneous effects of firm audiences to firm action has not been fully addressed. B2C firms face a larger 'public' audience, while B2B firms are shielded from consumer audiences, and instead face businesses. Thus, public and consumer attention differs between B2B and B2C firms and therefore reputational pressure differs widely between the two.

My independent variable is PMP (product-market-profile) which reflects the institutional structure of the firm and their sensitivity to consumers versus busi-

ness audiences. To construct the variable, I follow recent research (Srinivasan, Lilien, and Sridhar 2011; Luffarelli et al. 2019) and use a well-established classification based on four-digit SIC codes.[5] As Refinitiv only use NAICS codes, I manually recode six-digit NAICS codes to SIC codes using the `Concordance` package in R. PMP is a binary indicator variable that equals 1 if a firm principally operates in business markets and 0 if the firm principally operates in consumer markets. This classification is based on the idea of product-market profiles reflect firms operating in either B2B markets or B2C markets (Dwyer and Tanner 2008), however a secondary scheme of product-market profiles conceives of firms as either offering goods or services (Parasuraman, Zeithaml, and Berry 1985). It is possible that B2C firms offering goods may face varied reputational pressure than those offering services, since there may be a stronger relationship between employees and customers in the latter. Therefore, as a further robustness test, I disaggregate the variable into 4 categories further to account for the two variations in product-market profiles. I consider B2C goods, B2C services, B2B goods, and B2C services – that I expect to differentially influence the effect of reputational pressure on firm behavior.

I use the carbon emissions measurements created by Cory, Lerner, and Osgood 2021 to capture industries that both directly emit carbon dioxide, heavily consume CO2-intensive electricity, and suppliers of carbon-intensive industries. Although climate policy and climate-orientated activists focus on first-in-line industries (direct emitters and electricity consumers), carbon intensity affects the entire industrial supply chain, affecting a greater set of firm-level actors. I use estimates on CO2 carbon emissions at the industry-level (Henry, Khan, and Cooke-Hull 2010). 'Direct' carbon emissions is a single variable that refers to industries that either emit CO2 through their own activities or consume electricity that emits CO2. This measurement satisfies the literature's findings on both areas of importance for quantifying emissions. Australia's industrial sectors vary widely in the intensity and degree of their carbon emissions, which is the ratio of emissions generated to the value of the output produced by a given industry or sector.

I use two measures of exposure to a climate-disaster. I first use data on climate-induced natural disasters from the EMDAT dataset in Australia spanning 2010-2021. I cross-check all disasters that are specifically linked to climate change, and aggregate the number of climate disasters experienced each year (count_dis). I include variables related to magnitude of the disaster, number of deaths, and number of people affected.

[5]Firms with the following four-digit SIC codes are categorized as B2C: 2011–2273, 2299–2399, 2511–2519, 2676–2741, 2771, 2842, 2844, 2851, 3142–3199, 3261–3269, 3421, 3634–3641, 3711, 3714–3716, 3751, 3911, 3931–3952, 3961–3991, 3995, 4121, 4724, 4725, 5012, 5021, 5023, 5091, 5093–5099, 5122–5154, 5181, 5182, 5192–6011, 6411–6515, 6531–6541, 7011–7299, 7513–8699, and 8811. Firms with the other four-digit SIC codes are categorized as B2B

Additionally, to capture the real impact on consumer audiences of natural disasters that triggers climate awareness I use a proxy for the potential total economic losses from natural disasters linked to climate disasters by using household insured losses from the Insurance Council Australia database. I measure aggregate amounts of total claims received, original loss value, and normalized loss value. There are some limitations to using this proxy. Insurance data tallies insured losses only, and as such accounts for only a proportion of the total cost of a disaster. Insurance coverage is patchy - with residential buildings underinsured and insurance penetration coverage of crops and fences limited (Keating and Handmer 2011). A number of intangible costs are difficult to capture with insurance data, for example (non)residential clean-up, disruption or loss of public services, and disaster response and relief (Ladds et al. 2017). Despite these limitations, insurance data is a useful standardized proxy, and where possible I include alternative measurements of natural disaster effects from EMDAT.

5.4 Controls

An additional consideration is that my dataset of publicly traded companies contains firms of all sizes. Particularly when market-capitalisation weight is used, larger companies can disproportionately dominate the results, since larger companies have both the time and resources for carefully-crafted responses, as well as increasing their public profile and costs of non-compliance/poor behavior. I therefore include a control for company size. Following standardized practice, I define small cap companies as any company with a market capitalization up to $2 billion; mid-cap companies as any company with a market capitalisation between $2 billion and $10 billion; and large cap as any company with a market capitalisation over $10 billion. Market cap are measured in USD. I also use company size to determine whether large 'early movers' can induce reputational effects between smaller firms.

Past studies have used ESG as a measurement of a firm's socially-consious reputation. To proxy for a firm's social consciousness or social capital (Guiso, Sapienza, and Zingales 2008a; Guiso, Sapienza, and Zingales 2008b; Guiso, Sapienza, and Zingales 2009), I use the firm's ESG score derived from Refinitiv Thomas Eikon. The literature has mixed findings on whether firms with high ESG scores are "followers" or "leaders" (Dyck, Volchkova, and Zingales 2008). While there is much evidence for the latter, the former represents the "dark view" of firms with high ESG scores. For instance, Cohen, Gurun, and Nguyen 2020 show that green-tech innovation is actually driven by oil and gas firms instead of firms with high environmental scores. I include data on industry level classification from Refinitiv Eikon.

6 Results

The main statistical analysis consists of a set of 2FE models estimated by ordinary least squares (OLS), probit and fractional logit models - adjusted to the dependent variable. The two general estimating equations are:

$$Y_{it} = \gamma_i + \lambda_t + \delta B2C_{it} + X_{it}\beta + \epsilon_{it} \tag{1}$$

$$Scoring_{it} = \gamma_i + \lambda_t + \delta B2C_{it} + X_{it}\beta + \epsilon_{it} \tag{2}$$

$$Y_{it} = \gamma_i + \lambda_t + \delta B2C_{it} * \delta GHGintensity_{it} + X_{it}\beta + \epsilon_{it} \tag{3}$$

$$Scoring_{it} = \gamma_i + \lambda_t + \delta B2C_{it} * \delta GHGintensity_{it} + X_{it}\beta + \epsilon_{it} \tag{4}$$

In equation (1), Y_{it} is firm i's decision to disclose information in year t, and is equal to either 0 or 1. In equation (2) and (4) Y_{it} is a firm's scoring on internal climate regulations and policies. γ_i represents a set of firm (and in some models, industry-level) fixed effects. γ_i is a set of year fixed-effects. $\delta B2C$ is a dummy variable that indicates whether the firm is B2C or B2B. For equation (3) and (4) B2C is interacted with $\delta GHGintensity$ which is the intensity of emissions in the sector. λ_t is the parameter of primary interest, the effect of B2C (and emission intensity) on firm behaviour.X_{it} is a matrix of covariates, β a vector of coefficients, ϵ_{it} is the error term. The two-way fixed effects model controls for unobserved variation in the firm, sector or year levels. Without making causal claims, these results are interpreted as possible relationships between institutional structure and emissions intensity of firms and their behaviour in disclosing information and performance on climate change.

Table 1 displays the results of four models. The point estimates are standard OLS coefficients, with robust standard errors clustered at the firm and year. As predicted, the B2C status variable is negative and significant across different specifications. To ensure the significance of the variable is not an artifact of the selected covariates, I report the bivariate model. The variable remains positive, and indeed increases in effect when adding firm and year fixed effects in models 2, 3, and 4. The control variables on ESG scoring and direct emissions, and company-market capitalisation and firm size are understandably significant. ESG score, company market capitalisation, and company size are positively associated with disclosure, while high emitting firms are negatively associated with disclosure. The added controls do not absorb the variation in the dependent variable, and it remains substantive: the most conservative estimate is that B2C firms are 9.7 percentage points less likely to disclose to the CDP than B2B firms. Model (4) with all controls and fixed-effects estimates

that B2C firms are 27.7 percent less likely to disclose information to the CDP than B2B firms. Adding firm, industry and time fixed effects show these results hold for the same firm over time.

	Dependent variable:			
	Disclosure Dummy			
	OLS		*probit*	
	(1)	(2)	(3)	(4)
Business to Consumer	-0.070*** (0.022)	-0.097** (0.041)	-0.187*** (0.060)	-0.277** (0.138)
ESG Score		0.007*** (0.001)		0.020*** (0.002)
Direct Emissions		-0.001*** (0.0005)		-0.003** (0.001)
Company Market Cap (USD)		0.000*** (0.000)		0.000*** (0.000)
NAICS Sector (Administrative and Support and Waste Management and Remediation Services)		0.495 (0.319)		5.260 (265.000)
NAICS Sector(Agriculture, Forestry, Fishing and Hunting)		0.162 (0.324)		0.418 (278.000)
NAICS Sector (Arts, Entertainment, and Recreation)		0.479 (0.316)		5.230 (265.000)
NAICS Sector (Construction)		0.514* (0.310)		5.190 (265.000)
NAICS Sector (Educational Services)		0.559 (0.375)		5.400 (265.000)
NAICS Sector (Finance and Insurance)		0.598* (0.306)		5.480 (265.000)
NAICS Sector (Health Care and Social Assistance)		0.217 (0.313)		3.360 (265.000)
NAICS Sector (Information)		0.507 (0.335)		5.260 (265.000)
NAICS Sector (Manufacturing)		0.518* (0.307)		5.260 (265.000)
NAICS Sector (Mining, Quarrying, and Oil and Gas Extraction)		0.637** (0.306)		5.570 (265.000)
NAICS Sector (Other Services (except Public Administration))		0.640* (0.336)		5.700 (265.000)
NAICS Sector (Professional, Scientific, and Technical Services)		0.308 (0.314)		4.640 (265.000)
NAICS Sector (Real Estate and Rental and Leasing)		0.695** (0.308)		5.770 (265.000)
NAICS Sector (Retail Trade)		0.783** (0.318)		5.850 (265.000)
NAICS Sector (Transportation and Warehousing)		0.478 (0.309)		5.090 (265.000)
NAICS Sector (Utilities)		0.624* (0.319)		5.590 (265.000)
NAICS Sector (Wholesale Trade)		0.453 (0.310)		5.010 (265.000)
Company Size: Medium		-0.040 (0.043)		-0.064 (0.141)
Company Size: Large		-0.203*** (0.048)		-0.583*** (0.159)
Constant	0.393*** (0.011)	-0.225 (0.312)	-0.272*** (0.029)	-5.970 (265.000)
Observations	2,663	1,377	2,663	1,377
R^2	0.004	0.265		
Adjusted R^2	0.003	0.252		
Akaike Inf. Crit.			3,514.000	1,493.000
Note:				*p<0.1; **p<0.05; ***p<0.01

Table 1

B2C Firms and CDP Scoring: 2FE

	Dependent variable:		
	CDP Scoring		
	OLS	*panel linear*	
	(1)	(2)	(3)
Business to Consumer	0.025** (0.012)	0.205 (0.142)	0.063 (0.040)
Emission Intensity		0.002*** (0.001)	0.005*** (0.0005)
Direct Emissions		-0.003** (0.001)	-0.001* (0.0003)
Company Size: Medium		-0.044 (0.028)	-0.040** (0.020)
Company Size: Small		-0.024 (0.033)	-0.064*** (0.023)
NAICS Sector (Administrative and Support and Waste Management and Remediation Services)			0.106 (0.160)
NAICS Sector(Agriculture, Forestry, Fishing and Hunting)			0.008 (0.162)
NAICS Sector (Arts, Entertainment, and Recreation)			-0.019 (0.159)
NAICS Sector (Construction)			0.185 (0.155)
NAICS Sector (Educational Services)			0.081 (0.187)
NAICS Sector (Finance and Insurance)			0.117 (0.152)
NAICS Sector (Health Care and Social Assistance)			0.001 (0.157)
NAICS Sector (Information)			-0.051 (0.171)
NAICS Sector (Manufacturing)			0.052 (0.152)
NAICS Sector (Mining, Quarrying, and Oil and Gas Extraction)			0.030 (0.153)
NAICS Sector (Other Services (except Public Administration))			0.013 (0.172)
NAICS Sector (Professional, Scientific, and Technical Services)			0.027 (0.158)
NAICS Sector (Real Estate and Rental and Leasing)			0.223 (0.154)
NAICS Sector (Retail Trade)			0.203 (0.163)
NAICS Sector (Transportation and Warehousing)			0.109 (0.155)
NAICS Sector (Utilities)			0.213 (0.162)
NAICS Sector (Wholesale Trade)			0.121 (0.155)
B2C*ESG			-0.001* (0.001)
Constant	0.235*** (0.006)		
Observations	2,663	1,377	1,377
R^2	0.002	0.021	0.285
Adjusted R^2	0.001	-0.125	0.121
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 2

Table 2 reports the results using CDP scoring as the dependent variable. The point estimates are standard OLS coefficients, with robust standard errors clustered at the firm and year. Although the B2C variable is positive and significant in the bivaraite model, adding fixed-effects and additional covariates largely absorbs this effect, and B2C has no significant effect on the scoring results of firms that do submit to the CDP. To test whether firms who are generally high ESG performers and also B2C facing would score higher, the results suggest this is not the case. Although substantively small, B2C firms with high ESG scores are slightly more likely to score worse on CDP climate reports. Interestingly, though table 1 suggests that high emitting firms are slightly less likely to disclose information to the CDP, the high-emitting firms that do submit score higher

than low-emitting firms. This would not be incompatible with the idea that high-emitting firms only submit if they are certain they would receive a positive rating, and make reputational gains by signalling their climate-consciousness. High-emitting firms with poor internal regulations would avoid disclosing and suffering from even greater public scrutiny. Table 3 (see appendix) largely confirms this hypothesis, where the interaction effect of B2C and high-intensity emitters results in a 15.5 percent increase in the liklihood these firms disclose information to the CDP.

6.1 Natural Disasters

The second statistical analysis consists of 2FE models estimated by OLS models. These models swap out B2C firms for several variables capturing high-impact climate-linked natural disasters. In order to measure the effects of climate-linked disasters on firm disclosure and climate performance, it is critical to confront issues of selection. Although I control for confounders and time-variant effects, firms who disclose may be systematically different than non-disclosers on some unobservable metric (e.g. latent value of disclosing on fir value) resulting in biased inferences. To address this issue I employ a difference-in-difference approach. I use a multiple time periods DiD design that adopts a staggered treatment assumption, and parallel trends assumption based on not-yet treated units taking the group-time average treatment effect. The proposed linear hierarchical model for the change in disclosure levels before and after years with high-impact natural disasters between firms i and j is given by:

$$\sum[\Delta\tau_{ijth}\chi_{ijt}^{high-disaster}] - \sum[\Delta\tau_{ijth}\chi_{ijt}^{lowdisaster}] = \beta^{highdisaster} + \gamma_h^{lowdisaster} \tag{5}$$

Here $\Delta\tau_i jth$ represents a change in the average likelihood of disclosure i and j at time t. $\chi_{ijt}^{high-disaster}$ is an indicator of whether the year has experienced acute natural disasters linked to climate-change. For additional robustness, I use three measurements of high-disaster treatment. First, I code the number of climate-linked natural disasters that have occurred in a given year; three or more disasters constitutes a 'high' disaster year. I then use the total number of insured damages that year, exploiting a sizeable jump in the data with four years of high-insured costs of climate disasters. I then use the total number of individuals affected by climate disasters in a given year, again exploiting a sizeable jump between high and low numbers affected. All three measurements capture different dimensions of the material, tangible costs of climate disasters on individuals that might be missed by a single measure. I take the lead variable of disclosure status as the outcome. Table 3 depicts the results of the estimator, showing a negative and statistically significant relationship between high-disasters and subsequent submission. As predicted, the most conservative

estimate from the measurements (total number of individuals affected) predicts firms are 15.9 percent less likely to disclose to the CDP following a high-disaster year. The most favourable estimate (number of natural disasters) predicts a 22.3 percent decline in disclosures following high-disaster years. As a further robustness and sensitivity check, I recode the high-disaster variable to include 4 or more disasters. The results remain significant. The second part of my hypothesis relies on this relationship 'switching' for firms that do submit following high disaster years. Table 4 depicts a positive and significant relationship between disasters and CDP scoring. Firms that do submit to the CDP following high-disaster years are more likely to receive higher scores. These findings suggest that when Australia experiences a high-number of acute climate-linked natural disasters with tangible negative effects on individuals, firms are much less likely to disclose to the CDP. As a signalling mechanism, disclosure can bring unwanted public scrutiny if the firm has a poor climate track-record. However, firms that do disclose information, score much higher in the years that follow high climate-linked natural disasters. Since audiences are primed to care about a firm's climate-related behaviour, these firms use this as an opportunity to rebuild or repair their reputation.

Difference-in-Difference OLS models

	Dependent variable:		
	Company Score		
	(1)	(2)	(3)
treated_Dis	-0.034*** (0.013)		
time1	-0.242*** (0.009)		
did_dis	0.201*** (0.016)		
treated_TA		-0.066*** (0.010)	
time2		-0.207*** (0.008)	
did_affected		0.139*** (0.014)	
treated_insured			-0.040*** (0.013)
time3			-0.248*** (0.009)
did_insured			0.168*** (0.016)
Constant	0.266*** (0.005)	0.318*** (0.007)	0.272*** (0.004)
Observations	4,808	4,808	4,808
R^2	0.131	0.122	0.152
Adjusted R^2	0.130	0.122	0.152
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 3

It might be the case that firms do not find negative reporting costly, nor may the prospect of negative reporting impact their behaviour in terms of disclosure. I therefore test whether negative reporting by the CDP impacts subsequent firm behaviour. I use a 2FE models estimated by ordinary least squares (OLS), and test the effect of a failing or low grade ('D' or 'F') from firms in a given reporting year. The results are depicted in table 5 showing that firms that receive a failing grade are 31.1 percent less likely to resubmit to the CDP in the years that follow. This suggests that reports on poor climate performance from the CDP may be costly for the firm. I also include an interaction effect with B2C facing firms; the effect is both significantly negative and substantial. This lends further support to the hypothesis that B2C facing firms are deterred from disclosing to avoid public scrutiny if their poor performance on climate is exposed. Since these firms face higher reputational costs than B2B firms, they are even less likely to disclose information to the CDP following a failing grade.

Difference-in-Difference OLS models

	Dependent variable:		
	Disclosure Dummy:lead	Disclosure Dummy:lead	
	(1)	(2)	(3)
treated_Dis	0.089*** (0.024)		
time1	0.168*** (0.017)		
did_dis	-0.223*** (0.030)		
treated_TA		0.028 (0.018)	
time2		0.103*** (0.016)	
did_affected		-0.159*** (0.025)	
treated_insured			0.102*** (0.024)
time3			0.151*** (0.016)
did_insured			-0.218*** (0.031)
Constant	0.596*** (0.009)	0.600*** (0.012)	0.600*** (0.008)
Observations	4,809	4,809	4,809
R^2	0.022	0.016	0.019
Adjusted R^2	0.021	0.015	0.018
Note:			*p<0.1; **p<0.05; ***p<0.01

Table 4

Turning to reputational externalities (hypothesis 4) and reputational cascades (hypothesis 4). I again use 2FE models estimated by ordinary least squares (OLS). On reputational externalities, I find no support for within-industry effects. For reputational cascades, I regress large firms (coded from their company market capitalisation) on disclosure. Table 6 shows that conditional on a large-firm within the sector submitting, firms are more likely to disclose to the CDP.

Effect of Failing Grade on Future Disclosure (Year & Firm Two-Way Fixed-Effects)

	Dependent variable:	
	Disclosure Dummy	
	(1)	(2)
failing_grade_dummy	-0.364*** (0.027)	-0.314*** (0.032)
ESG	0.003*** (0.001)	0.003*** (0.001)
company_sizemedium		-0.146*** (0.049)
company_sizesmall		-0.186*** (0.058)
failing_grade_dummy:B2C_Dumy		-0.137** (0.053)
B2C_Dumy	-0.929*** (0.245)	-0.782*** (0.250)
Observations	1,377	1,377
R^2	0.156	0.169
Adjusted R^2	0.032	0.044
Note:		*p<0.1; **p<0.05; ***p<0.01

Table 5

Effect of Early Movers on Sector-Level Disclosure (Year & Firm Two-Way Fixed-Effects)

	Dependent variable:	
	Disclosure Dummy	
	OLS	*panel linear*
	(1)	(2)
large_submitted	0.371*** (0.049)	0.469*** (0.043)
ESG	0.004*** (0.001)	0.003*** (0.001)
B2C_Dumy	-0.024 (0.037)	-0.367 (0.243)
naics_sector_name.xAdministrative and Support and Waste Management and Remediation Services	-0.061 (0.289)	
naics_sector_name.xAgriculture, Forestry, Fishing and Hunting	0.002 (0.297)	
naics_sector_name.xArts, Entertainment, and Recreation	-0.034 (0.290)	
naics_sector_name.xConstruction	-0.159 (0.287)	
naics_sector_name.xEducational Services	0.157 (0.335)	
naics_sector_name.xFinance and Insurance	-0.067 (0.284)	
naics_sector_name.xHealth Care and Social Assistance	-0.196 (0.289)	
naics_sector_name.xInformation	0.166 (0.307)	
naics_sector_name.xManufacturing	-0.186 (0.283)	
naics_sector_name.xMining, Quarrying, and Oil and Gas Extraction	-0.106 (0.285)	
naics_sector_name.xOther Services (except Public Administration)	-0.151 (0.305)	
naics_sector_name.xProfessional, Scientific, and Technical Services	-0.040 (0.286)	
naics_sector_name.xReal Estate and Rental and Leasing	-0.144 (0.286)	
naics_sector_name.xRetail Trade	-0.141 (0.297)	
naics_sector_name.xTransportation and Warehousing	-0.173 (0.286)	
naics_sector_name.xUtilities	0.166 (0.289)	
naics_sector_name.xWholesale Trade	-0.059 (0.287)	
company_market_cap_usd	-0.000 (0.000)	
Constant	0.494* (0.285)	
Observations	1,405	1,377
R^2	0.178	0.107
Adjusted R^2	0.166	-0.025
Note:	*p<0.1; **p<0.05; ***p<0.01	

Table 6

7 Conclusion

Why do some firms implement internal carbon regulations? Why do some firms seek to be seen as climate-friendly? Climate change is a "global market failure" resulting from excessive greenhouse gas emissions. Firms constitute a large actor in excessive pollution because such pollution is directly costless - however these harms are then 'externalised' on a distant other (either future generations or different locations), who then face the brunt of climate impacts. For the most part hyperbolic discounting and diffuse actors insulates firms from audience awareness of firm behaviour on climate change. However, whether firms feel pressure to cultivate climate-conscious reputations can vary depending on the institutional structure of the firm and their exposure to consumer audiences, the association of the firm's industry as a high-emitting 'culprit', and whether or not the consumer is 'primed' to be aware of the negative externalities of climate change.

Using Australia as a case study, I argue that B2C facing firms are more sensitive to public scrutiny, and therefore avoid sending any signals of their performance on climate change, to avoid negative exposure. A similar relationship holds for high-emitters. However, high-emitting B2C facing firms already face acute public scrutiny over their environmental impacts, with little to loose, these firms can use CDP disclosure and reporting to repair their reputation. I theorize that natural disasters - climate shocks - can deter firms from submitting for reporting, however firms that do submit score substantially higher following natural disaster years. Again, since audience attention towards climate (and culpable agents) is sharpened, firms face a trade-off in disclosing information. Firms that do submit reports only do so if they can ensure a positive outcome, since the reputational costs of poor performance are heightened. I theorize two additional mechanisms through which concern for reputation can affect firm behaviour - reputational cascades and reputational externalities. I find robust support for these theories - following large early-movers (large companies within a sector), firms within that industry are more likely to follow suit. Similarly, firms from sectors with collectively poor reputations are more likely to disclose to the CDP in an effort to repair their reputation-by-association.

My theory advances the idea that public-interest climate policies are not so 'Osonian' but may also be 'Stiglerian' by providing reputational benefits and competitive advantages to some industry groups, while harming others. My argument does not conflict with the idea that market forces have shifted the economic interests of many major industrial firms towards natural gas expansion and conservative support for carbon pricing, nor does it contradict the idea of strategic accommodation. In fact, reputation could be considered part of a looser interpretation of strategic accommodation. Following Levy and Newell's (2005) idea that corporate support for environmental policies is a means of maintaining corporate legitimacy, and that support of carbon pricing enhances the firm's responsible image. Highly visible corporations are open to public

criticism, if they ignore calls for climate action they will incur significant reputational costs.

This paper does not establish the efficacy of these semi-private regulatory bodies on regulating firm behaviour on climate change, however it does suggest the conditions under which firms will voluntary self-regulate by going above what they are legally obligated to do. The results speak to the relationship between the civil society, quasi-regulatory bodies and corporate responsiveness. In the absence of timely, comprehensive domestic litigation on climate change where stakeholders cannot easily or directly challenge powerful firms through legal channels like regulatory bodies or domestic judiciaries, self-regulation of firms through semi-private regulatory bodies is an important channel of changing firm behaviour. This paper suggests that if reputational pressure can fluctuate in conjunction with consumer awareness, increasing attention and improving transparency on firm behaviour on climate change may induce positive outcomes.

Although the empirical analysis here focuses solely on Australia, future research could extend the analysis to other countries over different time-periods. A crucial limitation of this paper is the lack of data on the consumer-side and incorporating survey data on changing consumer attitudes is a promising area of inquiry. Future work should investigate whether business coalitions affect individual firm behaviour in semi-regulatory carbon mitigation schemes. Existing research shows these enduring and emerging coalitions have shaped climate policy through lobbying activity (Downie 2017; Kennard 2020; Kim, Urpelainen, and Yang 2016). Future work may fruitfully examine how firm's use coalition participation in conjunction with their involvement in private-regulatory initiatives.

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