Letting the Fox Guard the Hen House? Corporate Social Responsibility and Environmental Governance

Daniel C. Matisoff[1]

Georgia Institute of Technology

Why CSR?

Corporate social responsibility emerged as a fringe topic, addressed by just several companies in the 1980s, to being ubiquitous across industry, with nearly every large firm containing an office of corporate social responsibility or sustainability (Tschopp and Huefner 2015). These firms employ CSR professionals, they report on CSR indicators, and they produce annual sustainability reports. This movement has been driven by investors, consumers, employees, and firm leadership. In an era when federal action on pressing environmental issues, such as climate change, has been slow, scholars have looked to other actors, such as cities, states, and corporations, to address climate change, reduce toxic chemical exposure and address a range of Grand Challenges. More recently, the Paris Accord and related Science Based Targets initiative have sought to directly engage firms to mitigate the impacts of climate change.

Despite the prevalence of CSR throughout firms and industry, the study of CSR efforts has been hard pressed to find significant evidence of environmental impact (Portney 2008), with numerous analyses concerned about the prevalence of Greenwashing (Bromley and Powell 2012), where firms selectively report on positive news, or overrepresent their CSR performance

[1] Daniel C. Matisoff is an associate professor at the School of Public Policy at the Georgia Institute of Technology and is co-director of their Masters in Sustainable Energy and Environmental Management Program.

to buy goodwill with investors, consumers, and other stakeholders (Lyon and Maxwell 2011). Other studies show effect sizes that do not seem to indicate that CSR has the ability to address major environmental policy problems (Koehler 2007; Lyon and Maxwell 2007; Lyon and Maxwell 2008; Portney 2008; Rangan et al. 2015). Recent efforts have sought to unpack these findings and understand the conditions in which CSR can produce environmental benefits (Lyon and Maxwell 2008; Portney 2008), conditions in which firms are more or less likely to greenwash (Magali A Delmas and Burbano 2011; Marquis et al. 2016), and the conditions in which CSR efforts may seed innovation and change across an entire industry (Kitzmueller and Shimshack 2012; Lyon and Maxwell 2007; D. Matisoff 2015a).

Corporate social responsibility has been studied from multiple disciplinary perspectives including economics, business and management, and public policy and public affairs and has been subject to numerous theoretical and empirical analyses, and has generated a substantial number of reviews. These different approaches and perspectives drive several paradigms or models explaining why firms pursue CSR and the consequences these actions. While a wide range of management literature seeks to answer the question of whether CSR can be profitable – and under what conditions, for the purposes of this essay I consider whether CSR can provide environmental benefits (ignoring social dimensions of sustainability, and paying less attention to the profitability of CSR). That is, can CSR change the behavior and emissions of firms, relative to the business as usual (BAU) case?

The answer to this question informs federal regulatory agencies, such as the Environmental Protection Agency or Department of Energy, and interest by policy-makers, investors, consumers and other stakeholders in CSR initiatives. Summarizing the existing theory and literature, these perspectives are divided into three distinct but inter-related perspectives on

CSR. First, a strategic model invokes a market-driven approach to CSR that suggests that firms deflect more costly regulation, access lower cost capital, and experience abnormal returns by pursuing CSR. Second, a stakeholder model that suggests that firms may go beyond the Friedman (1970) fiduciary model and attempt to appeal to a broad range of stakeholders, even though this may sacrifice short term profitability. And third, a market barrier model of CSR that suggests opportunities to environmental improvements impeded by market failures or market barriers. While these three perspectives are inter-related, the bodies of research that define these perspectives are relatively distinct, with differences in core assumptions about the market, firm motivations, and firm behavior. A unique perspective provided in this essay hinges on an emerging body of literature that suggests a role of CSR in seeding transformational change that can disseminate across an industry.

Three Models of Corporate Social Responsibility

The Strategic Model

The Strategic Model of CSR begins with basic assumptions that any CSR behavior by firms is strategic (Lyon and Maxwell 2008). That is, firms aren't wasting shareholder dollars, nor are they appealing to non-financial preferences when pursuing CSR initiatives (Friedman 1970). Rather, when firms act strategically, there are several pathways that might lead them to CSR behavior. Assuming a rational model of costs and benefits, firms seek to reduce the cost of more costly mandatory regulation by voluntarily engaging in CSR behavior. They do this through three approaches. First, they can preempt the enactment of more stringent, more costly mandatory regulation. By acting voluntarily, regulatory agencies or legislative bodies won't

perceive a need to enact more stringent mandatory regulation. Second, they deflect the enforcement of mandatory regulation. If firms are perceived as responsible actors, they build goodwill with regulatory agencies, reducing the likelihood of costly implementation or enforcement action. Under this model of CSR behavior, environmental outcomes are inherently second best, and are less stringent than mandatory regulatory efforts. This conclusion suggests socially suboptimal outcomes from CSR initiatives. However, if these voluntary efforts are implemented more quickly and less expensively than potential mandatory efforts, then both the regulated entities and the public may be better off. (Lyon and Maxwell 2004)

A separate approach to understanding the strategic model examines financial market impacts of CSR initiatives. In this model, firms pursue CSR initiatives in order to mitigate risk and uncertainty by appealing to communities, gain access to lower cost of capital by appealing to shareholders, lower operating costs by pursuing cost-effective investments and appealing to employees, and improve shareholder returns (Portney 2008). This body of research often uses abnormal changes in short term share prices or other financial indicators as indicators of financial markets response to CSR behavior. Under this model, the disclosure of CSR information, or the pursuit of CSR initiatives might serve as a signal to investors of managerial quality, or as an indicator of investment risk (Cheng et al. 2014; Flammer and Bansal 2017; Pek et al. 2018; Shiu and Yang 2017). This model connects with the rational model by providing a mechanism to understand the link between CSR engagement and impact of regulations on firm financial performance, as well as with the stakeholder model, discussed in depth below, that provides a link between stakeholder and community relations and financial performance.

A key component in the strategic model is that reputational or marketing benefits improve with CSR. For example, consider a firm deciding to invest in energy efficiency

technologies. While some level of investment in energy efficiency technology will be cost effective simply due to energy costs and potential energy savings, if a firm can accrue reputational benefits through eco-certification, or other marketing benefits, it can lead to a firm investing additional resources in CSR technologies or behaviors than they would have otherwise (Daniel C Matisoff et al. 2014). These marketing benefits can potentially improve financial performance by reducing labor costs or improving labor quality (Burbano 2016), by appealing to consumer preferences boosting market share (Peattie 2010), or by appealing to shareholder or investor preferences by reducing capital costs (Cheng et al. 2014; Weber 2008). In the rational model, these efforts are taken because they are cost effective, rational, strategic approaches to profit maximization. In contrast, however, some management scholars suggest that firms undertake these behaviors in an effort to appeal to a wider range of stakeholders beyond strategic profit maximization. The literature that describes these approaches to CSR is broadly referred to as stakeholder theory.

The Stakeholder Model of CSR

While the strategic model of CSR suggests that all efforts undertaken by firms are aimed at maximizing profit, the stakeholder model of CSR views similar behaviors and outcomes from a slightly different perspective. In the stakeholder model, firms operate with a social license from their communities, and are responsible not just to shareholders, but to their consumers, supply chain, and their employees, representing a shift in fiduciary duty. In the stakeholder model, stakeholders are viewed as groups that can affect or are affected by the achievement of an organizations purpose (Freeman 2010). While for some, stakeholder relationships and CSR are a strategic maneuver to manage uncertainty, risk, and the business operating environment (Freeman 2010), for others, CSR is viewed less as a strategic profit maximization maneuver, but

as an ethical obligation to community groups, consumers, investors, and employees (Schwartz and Saiia 2012).

In this model, CSR initiatives are voluntary efforts to go beyond compliance to contribute to a better society, or an improved environment. These efforts involve taking economic, social, and environmental concerns into firm strategies, management tools, and activities and involve going beyond compliance (Russo and Perrini 2010). While researchers and corporations are often skeptical that firms would act contrary to their economic self-interest, evidence of corporate social reporting behavior, the Certified B Corporation movement where firms explicitly advocate social and environmental goals at the expense of profits, and cases where firms radically depart from existing business practice to pursue environmental goals, suggest that at least under some conditions firms appear to depart from narrow financial interest to incorporate real social and environmental responsibilities (S. Kim et al. 2016). Some theorists note that this moral or altruistic management of firms generates outcomes that may be indistinguishable from strategic management (Baron 2001). Cases where firms truly sacrifice economic value appear to be driven by individual CSR entrepreneurs and create a market for socially responsible mutual funds, where investors collectively sacrifice some profitability for the achievement of CSR outcomes (Baron 2007). Certified B corporations, while growing in number exponentially, tend to be small and medium sized privately held corporations (S. Kim et al. 2016). This perspective often points to cases where firm leadership and values driven management has spurred (often risky) CSR initiatives in an effort to achieve transformative change across industry (Visser 2011).

The Market Barrier Model of CSR

The market failure model of CSR incorporates a number of explanations that suggest that firms might pursue increased environmental or social performance, but a variety of market barriers and market failures might inhibit the adoption of potentially cost-effective management strategies. While economists are skeptical that firms would leave $20 bills scattered on the ground, there may be a wide variety of reasons that firms don't take advantage of seemingly win-win situations, or where firms fail to pick the low-hanging fruit. One explanation for this seemingly suboptimal behavior is that there might be a range of search and transaction costs associated with pursuing improved environmental performance (Daniel C. Matisoff et al. 2016). Some firms might become early adopters of improved environmental behavior to gain experience with new technologies, create market advantages, or prepare for prospective regulations. This behavior involves significant information costs and transaction costs associated with uncertainty regarding returns of new technologies, search costs associated with developing new supply chains, and transaction costs involved with producing unique one-sized fits all solutions (Blackburn et al. 2018). Along these lines, Porter and van der Linde (1995) suggest that innovation creates win-win opportunities in a dynamic setting with imperfect information, where imperfect information.

The prevalence of these "soft costs" is frequently underestimated by approaches that examine the cost effectiveness of potential technological or managerial solutions. Other explanations might include high discount or hurdle rates associated with technology or capital investment that is not part of a firm's core business strategy (Linares and Labandeira 2010). Further, organizational management or principal agent problems within a firm might create disincentives for long term investment, and favor short-run returns (Ciliberti et al. 2011). Finally, compounding these market factors, are barriers within individual organizations and managers

often behave in a boundedly rational behavior, making decisions using heuristics such as employing a status quo bias or employing risk averse strategies such as minimax (minimizing maximum regret) (Lindblom 1959). Strategies that employ improved management systems, improved information, and experimentation and innovation may help firms overcome these market barriers or market failures.

Conditions for Environmentally Effective CSR

The 3 models and motivations for CSR discussed above point towards some conditions and situations that might promote CSR that addresses environmental problems. First, perhaps paradoxically, effective CSR may be most effective when there a strong threat of regulatory action. That is, while CSR may be sold as an alternative to regulation, in reality, the regulatory threat provided by government may be effective to promoting beyond compliance behavior by firms. Under the Strategic model, voluntary CSR approaches can dissuade more costly regulatory intervention. These unilateral actions may be effective and efficient solutions for the public and for the firm because they can be quickly implemented, produce higher levels of compliance, and reduce enforcement costs. If firms and government can generate a pattern of cooperation in social and environmental performance, it may be feasible to create a virtuous cycle. A virtuous cycle suggests that firms – wary of a lurking regulatory threat, continuously improve environmental performance to keep regulators at bay. Under certain conditions, this may be welfare enhancing (Kitzmueller and Shimshack 2012; Lyon and Maxwell 2008). Evidence from the 33/50 program, for example, suggests that firms reduced toxic emissions by 50% a year before the target date. Early joiners reduced emissions more quickly than late joiners (Magali A. Delmas and Montes-Sancho 2010); and even non-participants in the program reduced emissions

substantially, suggesting that changing norms, technologies and behaviors quickly spread across the industry, improving environmental performance (Daniel C. Matisoff 2015b).

Similarly, if firms are engaged in CSR to gain a strategic advantage by experimenting with new technologies or managerial approaches, then, under this scenario as well, effective CSR may be a function of a strong perceived future regulatory threat. Induced innovation suggests that firms react to current or future regulatory threats through innovation (Jaffe et al. 2002). For example, firms may act strategically to gain an advantage in low carbon technologies or products, but these actions are taken because firms anticipate a carbon price or costly carbon regulations in the future. This chicken and the egg problem with CSR suggests that – under a number of scenarios – environmentally effective CSR can only exist when a strong regulatory threat exists.

The second major pathway to effective CSR is through a signaling mechanism that allows firms to communicate with shareholders, employees, customers, or the community. When major corporations such as Apple or Google invest in renewable energy, or improved environmental performance of their supply chains, they are managing relationships with their employees, consumers, and investors. The marketing benefit accrued by investing in CSR activities can change the calculus of investment in CSR, inducing additional investment in CSR. According to this model, firms can earn additional return on investment by being able to capitalize on the reputational or marketing benefit associated with CSR (Prakash and Potoski 2006). This model suggests that CSR is most likely to occur when product quality is difficult to observe and it is less expensive for high quality firms to signal (Mason 2013). By appealing to shareholders, firms may gain lower access to capital or maintain higher share prices. By appealing to employees, they may have higher employee satisfaction, lower employee turnover,

or even pay lower wages. By appealing to customers, firms are able to target consumers with green preferences. Finally, by appealing to the community, firms are able to claim more legitimacy, build reputational capital, and avoid costly taxes, fines or laws that target business activities which do not conform to community expectations (Chan et al. 2014).

If firms continuously improve environmental investment and performance in order to signal to stakeholders, this might be indicative of a Race to the Top, where firms engage in an iterative cycle of improved environmental performance. Evidence from the Green Slopes program finds that across the industry, environmental performance improved over time (Rivera et al. 2006), and evidence from the green building industry suggests that buildings have become greener over time (D. Matisoff et al. 2015). Greening these industries is likely a function of changing technologies and costs, policies, and stakeholder relations. These factors are often difficult to disentangle.

Importantly, this signaling model of effective CSR is not entirely separate from the regulatory threat mechanism that posits effective CSR. Research that investigates abnormal financial returns (e.g. event studies) often revolve around interactive effects between CSR activity and environmental regulation. That is, firms with stronger CSR profiles might be experience higher returns when environmental regulation is more likely (E.-H. Kim and Lyon 2011).

There are few cases where researchers suggest that firms engage in CSR activity that is demonstrably unprofitable (these cases will be addressed below). Rather, consumer and investor demand for sustainable products suggests that there a demand driven model for CSR. With changing preferences and expanding green markets, numerous scholars have shown a business case for CSR meeting sustainable demand, often suggesting a market-differentiation approach

for understanding sustainable product development (Eriksson 2004). While Milton Friedman would not have considered this CSR, given that this behavior could be interpreted as normal profit maximizing strategy, some case studies suggest that a leadership-driven and supply side effect, driving demand for CSR. Key cases include Interface's entrance to the market for sustainable products, before known demand existed (Visser 2011). This dynamic model of innovation finding win-win opportunities provides an optimistic perspective for CSR.

This green consumerism model does not necessarily guarantee that this approach to CSR is social welfare enhancing (Eriksson 2004). And the success of dynamic approaches to finding win-win opportunities through innovation may be due to market structure and competition in particular industries (Kitzmueller and Shimshack 2012). In particular, firms with market power might be able to pass along increased costs associated with CSR to consumers. Further, these industries also may have inefficiencies that create more win-win opportunities. Thus, few actors, high barriers to entry, inelastic demand, and high industry concentration might be correlated with additional CSR activities. However, the conditions in which firms can effectively and profitably signal CSR are not well understood.

The market barrier framework of CSR suggests alternative mechanisms that might be successful at generating effective CSR, and suggests similar win-win opportunities to sustainable innovation. If search and transaction costs are high, or if firms are operating sub optimally, it is possible that programs that encourage improved management practices, or programs that facilitate the dissemination of information across industry may allow firms to find low cost opportunities for environmental improvement, or to realize potentially profitable investments that may not have been profitable without the diffusion of information (Dowell and Muthulingam 2017). The opportunities to find these efficiencies may also be correlated with firm

size and supply chain characteristics. Across CSR efforts, environmental management system approaches, such as ISO certification, that focus on the adoption and diffusion of best practices, have been more successful (Darnall and Kim 2012). These programs work by disseminating best practices, providing accounting methodologies, and ensuring compliance with environmental and labor regulations. These types of programs may also provide information externalities and spillovers, as well as the diffusion of best practices across industry that may facilitate effective CSR (Potoski and Prakash 2013).

Still, adopting environmental management systems or adopting innovative technology or management approaches can be quite costly. There are several mechanisms that may encourage the adoption of these costly CSR improvements. First, signaling mechanisms, as discussed above, may allow firms to derive financial benefit or justify costly CSR improvements to various stakeholders (D. Matisoff 2015a). Second, environmental management systems and other visible improvements aimed at improved performance may be required by supply chains, making large corporate purchasers such as Walmart, Nike, and Apple as major actors that might push environmental change up a supply chain. This type of industry wide change can shift environmental practices creating broad based impact, but impact that might be difficult to capture using policy evaluation metrics.

A number of researchers have sought to articulate this mechanism for CSR. Lyon and Maxwell note that agencies have incentives to disseminate best practices for CSR; further, if environmental practices (e.g. lighting technology) are not perceived as part of the core business strategy, firms may not oppose sharing or disseminating information across the industry (Lyon and Maxwell 2007), while Dowell et al. have observed that customization and organizational complexity inhibit the adoption of these practices (Dowell and Muthulingam 2017). Others have

noted efforts where market development has taken place for new practices and technologies, increasing the uptake of environmentally friendly practices (Lange 2009). This type of market development and information spillovers may lead firms to naturally adopt or emulate environmentally friendly practices – as well as core strategic practices and that industry associations and non-profit organizations actively attempt to disseminate these lessons. Evidence across the literature suggests that even firms that do not formally engage in CSR activities have improved their environmental performance, it seems possible that changing norms and the dissemination of knowledge and practice across industry has generated near-universal improvement in firm behavior (D. Matisoff 2015a). Still, the inability of academics to find strong evidence of a causal effect between visible CSR efforts and environmental performance suggests that mechanisms that lead to environmentally successful CSR require more research and attention.

Barriers to effective CSR

While there are numerous examples of changes in corporate environmental behavior, and average environmental behavior has improved over time, these efforts do not seem to making a substantial dent in some of the most challenging problems the world faces, such as climate change. This due to several reasons. First, firms are at a competitive disadvantage if they spend more for improved environmental performance. While firms can sometimes capitalize on these investments, it remains unclear when improved environmental performance can pay for itself. If improved CSR were truly cost effective for all firms and in all situations, then environmental regulation wouldn't be necessary at all! Environmentally effective CSR is likely limited to specific domains, such as in areas where poor performance represents a significant financial risk,

in areas where products are highly differentiable, and in areas where concentrated market power allows firms to pass along costs to consumers. Unfortunately, the vast majority of carbon emissions and other pollutants are not generated from these sorts of firms and processes. Most carbon emissions are produced in highly competitive markets such as fossil fuels, or areas where product quality is difficult to differentiate, such as electricity.

In these and other markets, if there is no price on carbon, firms may be hard pressed to spend more resources to address climate change. For example, extracting petroleum from oil wells is far cheaper than generating liquid petroleum biofuels from algal fuels. It is not possible for oil companies to simply forgo selling petroleum in the ground and attempt to sell algal fuels. Thus, oil companies, such as Exxon Mobil, BP, and Shell have called for a carbon tax to level the playing field and allow them to pursue more sustainable strategies (Mufson 2018). The need for carbon prices or regulation to address climate change highlights both role for government intervention as well as the manner that firms interact and rely on mandatory policies when forming CSR strategies. Ultimately, without strong regulatory policies, the ability for firms to profit from sustainable primary goods and commodities is limited. Further, because firms have a fiduciary duty to their shareholders, they simply cannot unilaterally engage in highly costly CSR activities. And efforts to unilaterally move to more sustainable products or production models would result in losing market share to competition that has lower cost models. Thus, actions taken by firms are likely to be incremental and justifiable to shareholders. Marginal efforts improving energy efficiency and improving the efficiency of oil and natural gas extraction or reducing waste methane emissions are likely justifiable. Alternatively, reducing environmental impacts by recycling waste water from hydrofracturing processes may be justifiable by reducing liability risk. However, firms are unlikely to engage in costly investments, nor unilaterally curtail

the use of fossil fuels necessary to address grand challenges like climate change. Nevertheless, a strategic and proactive response may be induced by regulatory threats. Efforts such as the EPA's Clean Power Plan may have led to shifts in how firms viewed carbon strategy in the long term, even if the regulation never took effect.

Greenwashing

A key mechanism for the effectiveness of CSR is the ability to market these improvements to stakeholders in order to gain a marketing premium for sustainable products. The need for firms to market CSR activities in order to capitalize upon them means that firms may attempt to overrepresent their CSR performance. In a review, Lyon and Montgomery (2015) note that Greenwash incorporates a variety of misleading communications related to environmental performance at both the firm and product levels. With hundreds of billions of dollars spent annually on green advertising, and a larger percentage of firms making environmental claims, some studies have found that over 95% of these claims are demonstrably false or mislead consumers (Terrachoice 2010). This problem is exacerbated by the difficulty of observing many CSR activities and the difficulties of assessing and rating firms on CSR performance. The ease of engaging in green communication, coupled with the relative difficulty of improving environmental outcomes, means that it is often easier to change environmental messaging than underlying environmental performance (Magali A Delmas and Burbano 2011). When paired with a lax regulatory environment, little oversight, and the difficulty of assessing green claims, it is unsurprising that the number of firms making unsubstantiated green claims appears to increase each year. Numerous scholars have suggested that the answer to reduced greenwashing is increased scrutiny – empowering a variety of stakeholders: NGOs, governments, and citizens to monitor green claims and empower them with mandatory

information disclosure in order to reduce the propensity for greenwash (Magali A Delmas and Burbano 2011; Marquis et al. 2016). In contrast with a Race to the Top, where firms continuously improve CSR performance in order to outperform competitors, A Race to the Bottom or a Race the Bar might occur when firms attempt to claim a marketing benefit without providing any substantive environmental improvements. Some have argued that due to increased scrutiny from social media, such "symbolic" compliance may be the more pernicious of behaviors, where firms implement business as usual behavior, yet market it as "green" (Bowen 2014; Lyon and Montgomery 2013).

Approaches and Measurement of Corporate Social Responsibility

A number of approaches have been suggested to measure CSR behaviors and performance. Triple Bottom Line reporting, where firms account and disclose environmental and social information, in addition to their annual financial reports, has gained momentum and is implemented through a number of government, NGO, industry, and unilateral firm led initiatives. A growing number of firms now release annual sustainability reports that attempt to measure environmental and social outcomes. Efforts such as the Toxic Release Inventory, or Greenhouse Gas Reporting Rule mandate the disclosure of toxic and greenhouse gas emissions, respectively. NGO efforts such as the Global Reporting Initiative (GRI) and the CDP (formerly the Carbon Disclosure Project) represent efforts by institutional investors pressure firms into disclosure of environmental performance. GRI, for example, asks firms to disclose a range of pollution and outcome metrics. The CDP asks firms to report Scope 1, 2, and 3 level emissions, as well as risks, strategies, and opportunities around greenhouse gasses, as well as to quantify financial risk associated with climate change. Meanwhile, rankings and other disclosure sources such as

TruCost (S&P), Sustainalytics, Bloomberg ESG, and MSCI / KLD take disclosed information from voluntary and mandatory reporting efforts and process information for use by investors and researchers seeking to incorporate social and environmental performance into investment decision-making or research.

The CSR metrics landscape has become crowded. With a flood of information about CSR performance, ranging from corporate sustainability reports to detailed facility level environmental performance, it is unclear how investors and stakeholders can make sense or use of these data. On one hand, this information is potentially the key to reducing greenwash, providing useable metrics for gauging sustainability, and can enable green stakeholder preferences to influence behavior. On the other hand – the lack of standardization around firm level reporting, the lack of transparency into the ratings, the self-selection into voluntary reporting, and the enormous amounts of information flooding stakeholders enables greenwashing. Research is needed to understand the differences across ratings methodologies and how these ratings explain firm level behavior.

Innovative Approaches to CSR

For the mechanisms for effective CSR discussed above, researchers remain quite skeptical about the likelihood that firms would pursue many these efforts if they require an explicit sacrifice of profitability. In the rational market model, stakeholder model, and even the market barrier model, successful CSR is dependent, ultimately, on the ability for firms to profit from its CSR efforts. Perhaps market share increases by appealing to green customers. Perhaps firms attract higher quality employees, or reduces costly turnover, or even pays lower wages. Or perhaps firms translate CSR efforts into improved shareholder returns through stock price premia. None of these mechanisms specifically involve a direct tradeoff between profitability

and CSR. In contrast social enterprise, B corporations and the regenerative economy represent more radical approaches at CSR that seek to make this break.

The cases where firms engage in *unprofitable* CSR seem rare. One example of unprofitable CSR suggests that do not increase profitability by engaging in CSR, but that profitable firms may engage in CSR due to pressure from stakeholders. While firm leadership plays a major role in CSR activity, CSR is enabled by managerial slack, allowing firms that are more profitable to take risks associated with CSR activity (Seifert et al. 2004). For example – Apple has the luxury of worrying about the sustainability of its supply chain because it is so profitable. This research suggests that firms with excess cash flow have the luxury of engaging in philanthropy or CSR, and that this effort does not necessarily drive increased profitability (Seifert et al. 2004). Other cases suggest a strong role for individual entrepreneurs who value CSR over profitability. Certified B corporations, social enterprise, and other alternative approaches to ownership suggest that these cases exist. However, they appear to be limited to small and medium sized enterprises that tend to be privately held, or are held through alternative management structures (S. Kim et al. 2016).

Social enterprise, coops, and B Corporations that explicitly deviate from the shareholder centric fiduciary model allow firms to specify environmental and social goals into their mission and performance goals. These businesses represent a blend between a traditional firm and non-profit organization. Social enterprises appear to align more closely with a non-profit model, where most of the firm's activity is aimed at social outcomes, though often allowing profitability. Coops also operate similar to an NGO, for the benefits of the members of the cooperative. Some of these organizations explicitly build social and environmental goals into their mission and strategy. These firms represent a very small fraction of business and have operated in margins

(such as small scale banking for low income women in developing countries) that the traditional for-profit business world has failed to address.

Recent and more radical approaches involve moving towards a "Circular Economy" or "Regenerative economy", where (at least conceptually), the process of production is reimagined away from marginal reductions in emissions or negative impacts to a regenerative system that involves closing energy and material loops and involves concepts such as maintenance, repair, reuse, remanufacturing, and up-cycling. In practice, it is less clear how these newer concepts deviate with older practices such as pollution prevention (P2), where it was thought that by re-designing production processes negative environmental outcomes could be reduced or eliminated.

Certified B corporations are another effort to deviate from the traditional fiduciary model. B-Corporations pledge to build social and environmental goals into their aims and strategies, report on environmental, social, and economic outcomes, and appear to allow leeway for certified B Corporations to sacrifice profits for CSR goals. While more than 1600 certified B Corporations exist, unfortunately, very little is known about these organizations, and in particular, their impact relative to similar firms that have not adopted an alternative ownership model (Cao et al.). Some existing research suggests that the vast majority of B Corporations are privately held, and are far more likely to be owned by women (Gehman and Grimes 2017). Despite representing some widely recognized brands like Patagonia, North Face, and Honest, firms adopting this certification have been hesitant to promote their certification (Gehman and Grimes 2017). Being privately held, firms may have more leeway to experiment with risky strategies that may involve greater investment into CSR strategies. Organizationally, however, B-Corporations and regenerative approaches to business appear to involve much greater

tradeoffs between short term profitability and social and environmental outcomes. Nevertheless, it is not clear whether B Corporations will be able to go beyond the incremental changes that have traditionally populated the CSR space.

Entrepreneurship, Venture Capital and Angel Investors

Entrepreneurship, venture capital and angel investors have emerged as mechanisms for making high risk investments in energy and environmental technology. There might be a variety of motivations for these investments beyond financial returns (York et al. 2016). York et al. (2016) suggest that investors who operate in this space use both an ecological identity as well as a commercial identity – and that these investors are often motivated by opportunities to promote environmental change.

Conclusion and challenges for further research

CSR efforts are unlikely to solve major, costly, environmental issues. For wicked problems like climate change, it is simply too costly for "green" firms to unilaterally take action and adopt cost structures that are much higher than "traditional" firms. This difficulty is compounded by information asymmetry, commodity products, and the difficulty of observing and measuring environmental performance. These factors make it easy for firms to greenwash, and make it difficult to differentiate sustainable products.

Nevertheless, there are numerous areas where CSR efforts by firms has appeared to drive incremental improvements, and scholars have noted areas where industry, as a whole, has appeared to adopt norms of improved environmental performance. While in some cases these innovations have been motivated by changing consumer, investor, and employee preferences, in other cases they appear motivated by entrepreneurs, firm leadership, and other investors. To the extent that technological innovations that have enabled industry-wide change, these changes

have appeared to have the potential to gain widespread traction throughout industry. These efforts paint an optimistic view of changing corporate culture and the ability of firms to address a limited set of environmental problems. As discussed above, these problems likely pose regulatory risks, and occur in areas where the market structure allows firms to pass along costs to consumers.

Despite these efforts, CO_2 emissions continue to increase, and there are a large number of Grand Challenges that are simply not profitable with today's technology to address. Firms are not going to stop mining and burning fossil fuels when greener alternatives are far costlier. Rather, efforts around CSR appear to be limited to several areas: those where marginal improvements can be marketed to stakeholders in order to earn a return on investment, and areas where there are other market barriers or failures that appear to inhibit the uptake of potentially low-cost environmental improvements.

Most importantly, however, the mechanisms for effective CSR appear to be rooted in a credible threat of more costly mandatory policy or litigation. A credible threat of strong mandatory regulation provides a pathway to effective CSR through multiple avenues. First, as discussed above, firms may pursue CSR to deflect the enactment, implementation, or enforcement of more costly mandatory policy. Second, that regulatory threat can allow firms to justify early or risky action aimed at addressing environmental behavior. Third, a legal risk of environmental damages may encourage firms to be more proactive in reducing environmental risk. Fourth, even if future regulations are uncertain, firms may seek, for strategic reasons, be proactive in CSR behavior.

Moving forward, there are several directions that require increased research and action. With policy action on major Grand Challenges like climate change stalled at the federal level,

corporations have been pressed to take the lead to address environmental problems as part of their CSR strategies. In response, corporations are reporting increased CSR activities each year. If CSR is to help climate change, research that demonstrates the potential for CSR to develop innovative solutions to address climate change and diffuse these solutions across industry must be more robust. Causal identification has been challenging in this area: it is often unclear whether firms engage in CSR because they have managerial slack, or because it represents an opportunity for profitability. Distinguishing CSR efforts from the broader innovation ecosystem that includes changing technologies, prices, policies, and norms has been difficult. With firms committing to Science Based Targets inspired by the Paris Agreement, it is essential to understand if and how these firms are implementing these targets internally, why firms are implementing these, and whether – and under what conditions – firms can meet their science based targets. Research that highlights the interactive role of CSR and innovation in driving systemic change may provide some reason for optimism about CSR efforts. Research that shows changing norms and universal improvements in CSR behavior can change the paradigm of how we think about the role of CSR, and its role in a complex innovation ecosystem that has a number of changing factors such as prices, policies, and technologies.

Second, with a flood of information made available via the various sustainability indices, detailed emissions reporting, and third-party rankings, there is a role for academic research to process this enormous amount of information to determine which – if any of it – is useful. New techniques such as text mining, machine learning, and web scraping might be useful to synthesize the enormity of sustainability information to better understand how firm CSR information correlates with environmental and social behaviors. Further, while a number of commercial efforts have been launched aimed at processing this information into indices, it is

unclear how useful these indices are, what they are measuring, and what that information really means.

Third, the relationship between regulatory risk and firm behavior requires continued research. In most models of CSR behavior, CSR performance is directly or indirectly dependent on current or future risk or liability related to environmental performance. How firms consider regulatory risk and how they change their behavior due to perceived risks is an important lever that requires increased attention by researchers.

Finally, the role of more radical approaches to CSR, such as Certified B Corporations, cooperative ownership arrangements, and regenerative approaches to business are not well understood. The existing research on certified B Corporations has focused primarily on which firms sign up and why, rather than the impacts of joining and whether or not these firms are making a difference. While these more radical approaches are not yet highly prevalent, they represent large shifts from the traditional shareholder driven model and might represent innovative approaches to improve the environmental and social performance of commerce.

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