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David Freiberg, Jean Rogers and George Serafeim*

Abstract

Management and disclosure of environmental, social and governance (ESG) issues have received substantial interest over the last decade. In this paper, we outline a framework of how ESG issues become financially material, affecting corporate profitability and valuation. We argue that understanding this process is important both for actors driven by financial or societal motives. The former group, which includes companies and return-first investors, can use the framework to make resource allocation decisions based on expectations about future materiality thereby enhancing risk-adjusted returns. The latter group, which includes regulators, NGOs, and impact-first investors, can use the framework to design and implement interventions that create market-based incentives for companies and investors to align their behavior with social and environmental outcomes.

Keywords: sustainability disclosure, ESG, materiality, social impact, corporate valuation

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INTRODUCTION

In September of 2019, Purdue Pharma, one of the largest manufacturers of drugs, and specifically of the opioid OxyContin, filed for bankruptcy under the burden of thousands of lawsuits accusing the company of fueling the opioid epidemic through their aggressive marketing practices. The opioid epidemic has ravaged communities across the US. Since OxyContin came on the market in 1996, more than 400,000 Americans have died from opioid overdoses, including some 200,000 from prescription opioids.¹ Reports of OxyContin abuse emerged in 2000 (Cicero, Inciardi and Muñoz 2005), yet abuse of the drug continued. In 2012, almost 81 opioid prescriptions were written for every 100 Americans.² The societal cost of such overuse and misuse was estimated to approach \$80 billion annually (Florence, et al. 2016). Purdue Pharma highlights how ethical marketing, an environmental, social and governance (ESG) issue that was traditionally not deemed financially material and thereby not warranting disclosure, rapidly became an important consideration for corporate profitability and valuation in the pharmaceutical industry.

The example above is not an isolated case. In the past decade, great progress has been made in understanding the materiality of ESG issues. During this time we have witnessed an exponential growth in the number of companies measuring and reporting environmental (i.e. carbon emissions, water consumption, waste generation, etc.), social (i.e. employee, product, customer related, etc.), and governance (i.e. political lobbying, anticorruption board diversity, etc.) data. Empirical analysis demonstrating the financial materiality of certain ESG issues (Khan, Serafeim and Yoon 2016; Grewal, Hauptmann and Serafeim 2020) and the release of industry-based standards by the Sustainability Accounting Standards Board (SASB) in 2018 have accelerated mainstream

¹ <https://www.cdc.gov/drugoverdose/epidemic/index.html>

² <https://www.cdc.gov/drugoverdose/data/prescribing/prescribing-practices.html>

acceptance that in order to properly integrate ESG issues into a company or industry analysis, one must focus on material factors.³

In this paper, we provide a framework for how issues become financially material. We start by studying several ESG issues, how they evolved over time from financially immaterial to material (or not) and the conditions under which this evolution took place. Next, we develop a framework that describes the evolution of ESG issues to financial materiality.

Our approach provides a theory of change for actors that prioritize social progress (governments and regulators, NGOs, impact first investors) and a theory of action for actors that prioritize economic outcomes (companies and return first investors). For the former group, we advocate that understanding how issues become financially material can be a powerful framework for creating incentives for companies and investors to change their assessments of risks and opportunities thereby altering capital allocation and product development. Impact can therefore be assessed against an actor's success in elevating the issue to becoming financially material. This is because once an issue becomes financially material, decision makers focus attention and direct resources to the issue. For the latter group, we argue that the opportunity lies not only in actively managing issues that are already financially material but monitoring and proactively managing the issues that are becoming financially material. Our framework of action provides guidance on how to predict which issues are likely to become financially material by understanding the social context within which they are operating.

³ Financial materiality information is defined by opinions of the U.S. Supreme Court to refer to information that if disclosed would have a substantial likelihood of being viewed by a reasonable investor as having significantly alter the "total mix" of information available (TSC Industries, Inc. v. Northway, Inc., 426 U.S. 438, 449). Moreover, The determination of materiality and duty to disclose lies with corporations, which are subject to federal securities laws.

It is our hope that by illuminating these materiality pathways, we can shift the perception of materiality as a “state of being” to a “process of becoming” material over time. The important question becomes not only *whether* an issue is material, but *how* an issue becomes material.

BACKGROUND TO ESG DISCLOSURE AND MATERIALITY

Thousands of publicly listed companies around the world are now measuring, managing and reporting on ESG issues (Ioannou and Serafeim 2019). This is a relatively recent phenomenon with most companies having initiated their ESG strategies in the last decade. Companies are now appointing C-level executives to execute these strategies and setting public, ambitious targets on issues ranging from carbon reductions, to diversity and employee or product safety (Li, Ioannou and Serafeim 2015). At the same time, the number of investors committed to integrating ESG issues in investment decisions and actively engaging with companies on ESG issues has grown exponentially. The Principles for Responsible Investment now has more than 2,300 signatories who have more than \$89 trillion in assets under management.⁴

As both companies and investors are spending more resources on ESG issues, a central question has become which ESG issues are financially material and why. The lack of a standard materiality framework made comparing firm performance on many of the issues deemed material by individual firms challenging for investors and other stakeholders. SASB addressed this issue by adopting a standard setting approach towards industry-specific materiality (SASB, 2017). Through a combination of a process that involves archival research for evidence of stakeholder interest and evidence of financial impact, expert industry working groups and the deliberations of a standards council, they defined which ESG issues are material for 77 industries across 10 sectors.

⁴ <https://www.unpri.org/pri/about-the-pri>

Several studies have found that an industry-specific approach to materiality yields economically significant results. Using the SASB industry specific standards (SASB, 2018), studies have shown that firms improving their performance on material ESG issues in the future outperform competitors with declining performance on material ESG issues, and more disclosure on material ESG issues is associated with more informative stock prices and other capital market proxies for capital formation and efficiency (Khan et al. 2016; Grewal et al. 2020). No such relationships were observed for ESG issues not classified as material in each industry.

Most institutional investors now report that the primary reason why they use ESG data is because these issues are or will become financially material (Amel-Zadeh and Serafeim 2018). The largest institutional investors, such as Blackrock and Vanguard, have released guidance for board of directors and senior management on expectations about corporate performance on ESG issues. The proposition that ESG issues can be financially material has gained general acceptance not only among investors but also among companies and increasingly among regulators. For example, thousands of companies now produce materiality assessments of ESG issues leading to the prioritization of certain issues based on their identified materiality to the company and society.

Conferring the status of “financially material” on any type of issue is significant in several ways. It elevates the discourse within corporate management, as companies are compelled to manage and disclose financially material issues to investors. Characterizing an issue as “material” focuses the attention of corporations, triggering the need for performance data, internal controls, disclosure to shareholders, acknowledgement by the CEO and CFO, and allocation of resources to manage the issue. But perhaps most importantly, it elevates the issue to one for consideration, diligence and integration into the governance processes and systems of the corporation by its ultimate governing body: its board of directors. Securities law provides an elegant definition of

materiality that has stood the test of time: that which would cause a reasonable investor to think differently about whether to buy or sell the stock.

Against this backdrop, interest has been generated on understanding materiality and using that knowledge in the creation of corporate strategies, investment products and new regulations.

HOW DO ISSUES BECOME FINANCIALLY MATERIAL?

While the evidence is compelling that some issues are financially material and some issues are not, the question of how they become financially material is much less well understood. In this section, we seek to shed light on the pathways of materiality. We segment the materiality pathways framework into five stages: the status quo, catalyst events, stakeholder reaction, company reaction, and regulatory reaction as well as innovation.

Our inductive approach follows from eight years of field work with SASB. The standard setting process, using a combination of tests for evidence of financial interest and impact and the participation of thousands of experts in industry working groups, resulted in the classification of more than 2,000 industry-ESG issue pairs as financially material or not, across the 77 industries. Using this experience, we attempt to synthesize these experiences and provide a unifying framework. As with any framework, we recognize that it is unlikely to accurately represent the dynamic process of materiality for every single one of the more than 2,000 industry-issue pairs. Our goal is rather to provide readers with a framework that is representative of what we observed as the most common pathways to materiality. Table 1 includes a description of the state of affairs in each stage, a hypothesis generated from the framework, an evaluation of the degree of misalignment between business and societal interests and predictions about pricing and valuation effects.

Status Quo

Initially the industry is in equilibrium as it relates to the level of externalities from a given ESG issue, and thus the focal ESG issue is not financially material (Table 1). Often there exists a degree of misalignment between the interests of business and the interests of society. In the pursuit of profit businesses may take actions which negatively impact society, either directly through their products (e.g. the public health effects of tobacco use) or through their operations, often viewed as externalities (e.g. the promotion of climate change through the release of greenhouse gases). This misalignment might not be inherently malicious, and in some cases businesses may view this misalignment as a societal cost of doing business or insignificant relative to the societal good created through their operations (e.g. job creation, provision of energy and electricity etc.). Moreover, in some cases, businesses (and potentially society as well) could be unaware this misalignment even exists. For example, in the early 20th century there was little or no awareness of the harmful effects of tobacco consumption on health, or fossil fuel burning on climate.

Misalignment between business and societal interests is tolerated either because societal norms or lack of information about the true level of misalignment. An example of the former case is society tolerating drug price increases and accepting them as legitimate compensation for high costs of innovation due to high risk of product failure during research and development. Moreover, conflicting societal norms exist, leading to conflicting versions of societal interests (e.g. the abortion debate in the U.S.). Misalignment can also be tolerated when a clear majority, or perceived majority, (i.e. “vocal minority”) does not exist, as misalignment for one version of societal interests may be alignment for the competing version of societal interests (Edgley, Jones and Atkins 2015). In the latter case, society lacks information about the true extent of misalignment. For example, the health damage or climate impact caused by carbon emissions and

pollution. While it was known that burning fossil fuels pollutes the environment resulting in environmental damage, the extent and longevity of the damage was not well understood by the public. Perception of the misalignment is therefore more important for the materiality of an issue than the true level of the misalignment.

An issue that is still in this stage in the pharmaceutical industry is drug pollution – pharmaceuticals present in the environment from human metabolites and improperly disposed of drugs. While environmental data indicate widespread pharmaceutical contamination is affecting ecosystems, drinking water supplies and human health (Fick et al. 2009), companies have not yet been held responsible for this “externality” because society has not internalized the information regarding the magnitude of the misalignment. Many factors are exacerbating this issue, including increasing potency of drugs, a dramatic increase in the population taking prescription medication daily, and the inadequacy of wastewater treatment systems in most urban areas of the world. Investors are beginning to take note of this issue and to raise public awareness. For example, Nordea Asset Management is beginning to engage with pharmaceutical companies in Hyderabad, India over this issue. Conditions are ripe for a catalyst that could trigger the materiality of this issue.

Table 1: Different Stages of Materiality

	Status Quo	Catalyst	Stakeholder Pressure	Company Response	Regulatory Response and Innovation
	Issue financially immaterial	Issue still financially immaterial	Issue becoming financially material for some companies	First sign issue could become financially material for entire industry	Issue financially material for entire industry
Description of state	Degree of misalignment between business and societal interests is tolerated and no industry players pursue increased profits by increasing negative externalities. Misalignment is either accepted by societal norms or due to a lack of information about true state of affairs.	Some companies deviate from equilibrium seeking to capture more rents, increasing business and social misalignment. Some companies are successful in capturing rents. Alternatively, societal expectations can change due to information about companies' existing behavior and about true state of negative externalities.	NGOs, media and other stakeholders react to the furthering of the misalignment between business and societal interests. Political stirring may occur, but action is unlikely at this point. Public ire is generally focused on the offending companies and not on the practices of the industry as a whole.	Companies attempt to regain trust through company-specific or industry self-regulation, aiming to minimize the cost of reaction while successfully deterring stakeholder pressure and regulation. Politicians or regulators threaten action in response to misalignment. New norms and beliefs are set for industry behavior.	New regulation forces firms to decrease misalignment, creating a new equilibrium. Alternatively, innovation disruptions the industry leading to a new equilibrium. Either through regulation or innovation, the issue is integrated into the competitive landscape of the industry.
Hypothesis	Issues are more likely to become financially material in industries and countries with weaker norms and beliefs that societal and business interests should be aligned.	Issues are more likely to become financially material when it is easier for stakeholders to receive information about the true alignment between societal and business interests.	Issues are more likely to become financially material when media and NGOs have more power and politicians are more responsive to this power. Issues will remain material for one (or several) companies if performance on the issue can be isolated from the rest of the industry or if it deviates significantly from industry norms.	Issues are more likely to become financially material when companies lack ability to self-regulate and truly address the issues of misalignment.	Issues more likely to become financially material when new regulations are enforced or when some companies develop an innovation that addresses the misalignment offering a differentiated service/product.
Misalignment	Misalignment is minimal or within a margin accepted by society. Moreover, misalignment is static.	Misalignment is increasing, either due to changes in corporate behavior or because of new information on corporate behavior.	Misalignment peaks. Diverging companies cease further misalignment increases and see if the negative public response continues or gains regulator attention.	Misalignment shrinks as companies, to a degree, walk back actions which drove misalignment. Degree of misalignment is still greater than what would exist in the presence of new regulation or disruptive innovation.	Regulation or disruptive innovation drives misalignment to a new equilibrium level. Misalignment again becomes static.

Price reaction and valuation effects	None	Diverging companies capturing rents may outperform other industry players.	Diverging companies specifically targeted by public response likely to experience negative price reaction.	Other companies in industry may also begin to experience negative stock reactions. Companies with relatively better performance on the issue in question may escape negative or could experience positive price reactions.	Performance on issue affects all industry firm's market valuation. Firms compete on relative performance of issue.
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Catalyst

We observe two distinct types of catalysts that start the materiality process. In the first case, company behavior moves away from what is currently considered socially acceptable. In the second case, societal norms about what is acceptable corporate behavior move away from current corporate practices. Therefore, in the first case it is companies that widen the misalignment while in the second case it is a revision of societal expectations that widen the gap.

In the first case, some companies deviate from the equilibrium seeking to capture rents, further misaligning business and societal interests. For some time, deviating companies can successfully capture these rents. However, the presence of additional uncaptured rents invites temptation. Some companies become enticed to aggressively pursue rents, further increasing misalignment. Drug pricing in the pharmaceutical industry is a case in point. In the past few years, there have been several instances where drug companies have drawn public attention after making extremely aggressive price increases. Drug companies' standard defense for increasing prices is the cost of innovation: only 1 out of every 12.5 potential drugs ever reach patients, the average drug takes 11-14 years to develop, and the costs of bringing a drug to market range from \$1 to \$2.6 billion.⁵ However, the industry spends \$30 billion annually on marketing in the US alone; \$20 billion to reach doctors and \$6 billion for advertisements directed at the public.⁶ Therefore some argue that through high drug prices, companies are recouping both R&D and marketing costs.

Mylan, one of the largest drug manufacturers in the US, sells EpiPen, a patented self-injector that delivers epinephrine to people experiencing severe allergic reactions. The drug epinephrine costs less than \$1.00 per dose.⁷ The patent covering the self-injector prevented competitors from developing a viable alternative, allowing Mylan to control 90% of the market. Mylan took

⁵ <https://thehill.com/opinion/healthcare/369727-us-drug-prices-higher-than-in-the-rest-of-the-world-heres-why>

⁶ <https://arstechnica.com/science/2019/01/healthcare-industry-spends-30b-on-marketing-most-of-it-goes-to-doctors/>

⁷ <http://money.com/money/4481786/how-much-epipen-costs-to-make/>

advantage of its dominant position by increasing the price for a two-pack of EpiPens from \$103.50 in 2009 to \$608.61 in 2016. Valeant was another pharma company pursuing a similar pricing strategy. Valeant grew by acquiring companies using large amounts of debt and then aggressively increasing the prices of the drugs sold by the acquired companies. Valeant's price increases made headlines beginning in 2015, when the company hiked prices on drugs for such diseases as diabetes, acid reflux and serious heart conditions, in some cases by more than 500%. Research found the price changes caused far fewer patients to get access to the heart drugs (Khot, Vogan and Militello 2017). Turing Pharma pursued a similar strategy. It purchased the rights to a drug called Daraprim, which is a specialized treatment of a relatively uncommon illness, and increased the price per pill to \$750 from \$13.50.

In the second case, societal expectations about corporate behavior change, or a consensus is reached for issues defined by competing societal expectations. Changes in societal expectations result from new information about companies' existing behavior or about the true state of negative externalities being produced. For example, the #MeToo movement grew from increasing public awareness of the systemic nature of sexual harassment in the workplace. Climate change is another example because, like sexual harassment in the workplace, it has been a topic of public discourse and disagreement for over half a century. Societal expectations changed due to the introduction of new information detailing the salience of climate change and the catastrophic consequences associated with failing to act now. Similarly, in the case of ethical marketing and the opioid crisis, ProPublica, an investigative journalist organization, provided data about the role of pharmaceutical companies.⁸ Moreover, the public scrutiny of marketing practices was aided by sunshine laws enacted in the US in 2013, which compelled pharmaceutical companies to disclose the doctors and

⁸ <https://www.propublica.org/datastore/dataset/dollars-for-docs>

hospitals to which they made payments. Therefore, ESG issues are more likely to become financially material when it is easier for stakeholders to receive information about the true alignment between societal and business interests (Table 1).

Table 2 shows the evolution of events in four high profile cases, Facebook, Massey, JUUL and climate change in the oil and gas industry. We have categorized the evolution of those events tracing the status quo, the catalytic events, the subsequent stakeholder action, the company/industry response and the action (or lack thereof) by regulators. For example, the e-cigarette company JUUL received intense scrutiny for their marketing practices, which critics claimed targeted children. Despite the well documented health consequences of tobacco product use, society, in general, accepts that adults may undertake those risks if they choose. However, youth tobacco use is not accepted by society, and any perceived marketing to youths invokes a negative societal response. Moreover, according the US Food and Drug Administration (FDA), JUUL marketed their products as a safer alternative to cigarettes despite no scientific evidence supporting the claim.⁹ Recent medical research has called JUUL's safety claim into question, and in August 2019, the CDC issued a health advisory on the "severe pulmonary disease associated with using e-cigarette products."¹⁰

⁹ <https://www.cnbc.com/2019/09/09/fda-says-juul-illegally-promoted-its-e-cigarettes-as-less-harmful-than-cigarettes.html>

¹⁰ <https://emergency.cdc.gov/han/han00421.asp>

Table 2: Materiality Development in Four Industries

	Mining Safety: Massey Energy	Marketing Practices: JUUL
Status Quo	Mining companies were not required to disclose mining safety data, at times resulting in unsafe working conditions for miners. Between 1995 and 2010, the Mine Safety and Health Administration (MSHA) levied more than 3,000 safety violations against Massey Energy, the fourth largest coal producer in the US with primary operations in West Virginia, Kentucky, and Virginia.	E-cigarettes were quickly gaining popularity, with flavored e-cigarettes use rapidly increasing amongst youth demographics. However, no legislation existed regulating flavored e-cigarette production. Many stakeholders claimed e-cigarette companies used flavored products to market directly to children.
Catalysts	On April 5, 2010, a coal dust explosion occurred at Massey Energy's Upper Big Branch coal mine, located in West Virginia, killing 29 out of the 31 on-site miners. It was the worst mining accident in the US since 1970.	Reports of high school students' e-cigarettes use increases and increase flavored tobacco product appeal in youth affixed public attention on e-cigarette companies, particularly JUUL, the dominant player in the e-cigarette market. ¹¹ Further drawing public scrutiny, JUUL's revenue increased sevenfold from 2016 to 2017, while a study showed teens are 16 times more likely to use JUUL than older age groups. ¹²
Stakeholder Response	Massey Energy was condemned by politicians and local communities as stakeholders alleged the explosion occurred due to safety violations. Alpha Natural Resources purchased Massey Energy in 2011 and agreed to pay the fines associated with the mine explosion.	In September 2018, the U.S. Food and Drug Administration (FDA) labeled teen vaping an "epidemic". ¹³ JUUL received much of the backlash from families whose children had started using e-cigarettes. JUUL's valuation more than doubled from \$16B to \$38B from summer to December 2018.
Company Response	Massey claimed the explosion was not due to safety violations, but instead due to physical conditions leading to a sudden surge of natural gas. ¹⁴	JUUL publicly apologized for its role in youth e-cigarette use. The company publicly supported increasing the legal age to smoke to 21 and deleted their Facebook and Instagram accounts to reduce advertising exposure to youths. In November 2018, JUUL announced they would stop selling flavored JUUL pods in stores. All flavored JUUL pod sales would be online to consumers at least 21 years old.
Regulatory Response	The MSHA concluded flagrant safety violations occurred issuing 369 citations and \$10.8 million in civil fines and \$209 million for Department of Justice settlement. In 2015, Massey CEO at the time of explosion, Don Blankenship, was sentenced to 1 year in prison for conspiring to willfully violate safety standards. In December of 2011, as part of the Dodd-Frank Act, the Securities and Exchange Commissions (SEC) adopted new disclosure rules regarding mine safety information. The MSHA also implemented correction actions that included changes to policy directives and new oversight systems.	In November 2018, the FDA introduced new restrictions on flavored e-cigarette sales and proposed a ban on menthol cigarettes and flavored cigars. 17 states raised the age for purchasing tobacco products and e-cigarettes to 21. In Jun 2019, San Francisco banned the sale and distribution of e-cigarettes.

¹¹ https://www.cdc.gov/tobacco/data_statistics/fact_sheets/youth_data/tobacco_use/index.htm

¹² <https://truthinitiative.org/press/press-release/new-study-reveals-teens-16-times-more-likely-use-juul-older-age-groups>

¹³ <https://www.fda.gov/news-events/press-announcements/statement-fda-commissioner-scott-gottlieb-md-new-steps-address-epidemic-youth-e-cigarette-use>

¹⁴ https://www.bdtonline.com/news/local_news/afternoon-update-massey-disputes-key-msha-findings-on-w-v/article_4b48624b-108a-565f-96ca-07f86b4faa01.html

Data Privacy: Facebook

Climate Change: Oil and Gas

Status Quo	British political consulting firm Cambridge Analytica harvested personal data from millions of Facebook profiles without knowledge or consent from users. These data were used for political advertising purposes. While some users consented to their personal information being collected through a survey, which stated was for academic use only, Facebook's design allowed personal information to be collected from non-consenting users who were in the social networks of consenting users.	The link between fossil fuels and climate change has been acknowledged by the scientific community for decades. Despite the established knowledge action must be taken to reduce carbon emissions, action of the required scope and scale has not yet occurred. Some early adaptor companies have begun addressing the issue, either by reducing their own carbon emissions or by creating low carbon products or solutions. However, meaningful government action has been limited.
Catalysts	Despite reports of illicit personal data harvesting going back to 2015 (of which Facebook was aware per Attorney General for District of Columbia) ¹⁵ , the scandal went mainstream in March 2018 following emergence of an ex-Cambridge Analytica employee whistle-blowers.	While not the first multinational climate change agreement, the 2015 Paris Agreement marked a turning point in the global discussion around climate change. The Agreement, along with research outlining the potential catastrophic consequences of failing to reduce global emissions, changed the climate change discussion.
Stakeholder Response	Outraged Facebook users claimed the company was consciously misusing personal data. On July 26, 2018 alone, more than \$100 billion was lost from Facebook's market capitalization.	Concerned with how a transition to a low carbon economy and regulatory actions (ex. carbon pricing) might affect the financial performance of oil and gas firms, investors began pushing on management to report on the potential impacts climate change mitigation could have on their businesses. In 2017, this resulted in ExxonMobil's management being defeated in a proxy vote requiring the company to report on this issue.
Company Response	Facebook CEO Mark Zuckerberg publicly apologized and pledged to address the issues which led to the scandal by both limiting scope of and ease of access to user personal data for developers. Facebook also announced they would voluntarily enforce the EU's General Data Protection Regulation in all areas in which Facebook operates.	Oil and Gas companies have long history of funding climate changer denial research. ¹⁶ In a similar vein, management at many of these companies sought to mitigate concerns about the competitiveness of their business in a low carbon economy. Despite attempts to reassure investors and other stakeholders of a "business as usual" scenario, many upstream oil companies were forced to impair assets by billions of dollars, due to low oil prices.
Regulatory Response	Zuckerberg was called upon to testify before Congress in what became a highly publicized testimony. In 2019, the Federal Trade Commission approved fining Facebook \$5 billion following an investigation of the scandal. While no major federal regulation has been enacted in the US, in June 2018 California passed the California Consumer Privacy Act which stipulates greater data protection for consumers.	46 national jurisdictions and 31 subnational jurisdictions are currently have carbon pricing regimes in place, either in the form of an emissions trading system (ETS) or a carbon tax. ¹⁷ However, current carbon pricing practices have failed to produce real change in global emissions. In part driven by lack of global cooperation on regime setting, resulting in large gaps across countries on the price of carbon, but also because carbon prices are not rising faster enough. ¹⁸

Note: JUUL and Massey describe instances in which company actions were the catalyst in altering the status quo. In both these cases regulatory changes occurred, resulting in a new equilibrium that more closely aligned societal and business interests. Facebook describes an example in which company actions similarly were the catalyst in altering the status quo but no meaningful regulatory response occurred. In the case of oil and gas companies, changing societal expectations catalyzed a change in the status quo. No meaningful regulatory change was enacted and thus a new equilibrium was not established.

¹⁵ <https://www.theguardian.com/uk-news/2019/mar/21/facebook-knew-of-cambridge-analytica-data-misuse-earlier-than-reported-court-filing>

¹⁶ <https://www.theguardian.com/environment/2015/jul/08/exxon-climate-change-1981-climate-denier-funding>

¹⁷ <https://carbonpricingdashboard.worldbank.org/>

¹⁸ <https://www.oecd.org/ctp/tax-policy/few-countries-are-pricing-carbon-high-enough-to-meet-climate-targets.htm>

Stakeholder Reaction

NGOs, media, and other stakeholders react to the furthering of the misalignment between business and societal interests, and may engage firms directly attempting to correct the misalignment. When direct engagements with firms are unsuccessful, stakeholders may appeal to politicians or the general public and call for regulatory reform or boycotts, respectively. While beyond the scope of this paper, it is important to note the potential engagement strategies of activist stakeholders are diverse. Waldron, Navis and Karam (forthcoming) describe the engagement strategies of activist stakeholders and how different strategies impact the effectiveness of individual engagements. Commonly, stakeholder actions are intended to induce reaction within political circles. However, in most cases no legislation or regulatory action is taken. For example, on the issue of drug pricing, the pharmaceutical companies in question received condemnation by politicians across the political spectrum. Both US Senator Bernie Sanders and US President Donald Trump denounced pharmaceutical pricing practices, citing evidence of price gouging by drawing comparisons to drug prices in European and Canadian markets. However, no regulatory action was taken by Congress.

Nonetheless, stakeholder action can increase the likelihood of investigations, future regulatory action, and reputational and brand damage from bad publicity, which all can cause valuation changes. Here we find the first evidence an issue could be financially material. Frequently the materiality of the issue in question is limited to specific companies rather than the whole industry, as initial stakeholder action often targets a single company deviating from industry norms and the equilibrium misalignment (stakeholders are more likely to engage an entire industry when societal expectations change, resulting in industry norms being misaligned with societal expectations). At that point, sometimes but not always, stock prices are reacting to stakeholder pressure, and investors recalibrate expectations about risk and future growth. Therefore, when media and NGOs

have more influence and when politicians are more responsive to this influence, ESG issues are more likely to become financially material (Table 1).

Target companies for stakeholder action are usually those that are performing significantly worse than the industry average for the focal issue. For example, Valeant raised drug prices significantly more than the industry norm. This deviation was observable in advance of material effects on Valeant's performance. Had Valeant not been so aggressive and kept drug price increases within the range of (still misaligned) industry pricing practices, it would have been harder for stakeholders to isolate their behavior. When a single company increases their own degree of societal misalignment, such that their actions can be isolated from industry norms, the issue will likely first become material to the deviating firm. The issue could subsequently become material for the entire industry, but that is driven more by the results of stakeholder action. For example, the actions of a single firm could result in regulatory changes or draw attention to industry norms resulting in a reassessment of societal expectations. In the case where changes in societal expectations drive increased misalignment, if a company's performance is close to its peers, the whole industry could be indicted by stakeholders. But if a company's performance on the issue in question can be meaningfully differentiated, the issue may become material only for low performers.

To avoid industry-wide indictment, an industry may attempt to distance itself from a deviating company. For example, in February 2017 Marathon Pharmaceuticals received FDA approval for a muscular dystrophy drug Emflaza. Marathon listed the price tag for Emflaza at \$89,000 a year, despite long being available outside of the United States and currently being imported by some Americans for as little as \$1,200 annually.¹⁹ The Emflaza price sparked public outrage and rebuke

¹⁹ <https://www.chicagotribune.com/business/ct-marathon-lobbying-group-muscular-dystrophy-drug-price-0217-biz-20170216-story.html>

from the Pharmaceutical Research and Manufacturers of America (PhRMA), the top industry lobbying group. PhRMA threatened Marathon with removal from the group, despite Marathon's CEO being a board member of the group. Marathon quickly "paused" the launch of Emflaza, and, in March, quickly sold the drug to PTC Pharmaceuticals for \$140 million in cash and stock. The following month the company left PhRMA.²⁰ With no drugs on the market, Marathon signaled a shutdown of operations.²¹

PhRMA took a public stance against price gouging in the case of Marathon and Emflaza, attempting to distance industry norms from the practices of one company. However, PhRMA at the same time fought legislative action aimed at reducing drug prices and increasing pricing transparency. In Oregon PhRMA filed suit against House Bill 4005, which requires pharmaceutical companies "report annually information to Department of Consumer and Business Services regarding prices of prescription drugs and costs associated with developing and marketing prescription drugs," and House Bill 2658,²² which requires companies to report to the Department of Consumer and Business Services 60 days prior to a substantial prescription drug price increase.²³

JUUL's marketing practices also resulted in a similar distancing attempt in the tobacco industry. Altria Group and Philip Morris International, two giants of the tobacco industry, were in talks of a potential merger in September 2019. However, the public backlash from JUUL's marketing practices, of which Altria held a 35% stake, caused Philip Morris to be concerned about the costs associated with potential regulatory changes, ending merger discussions.²⁴ Some have

²⁰ <https://khn.org/news/marathon-pharmaceutical-drops-out-of-phrma-following-drug-price-controversy/>

²¹ <https://endpts.com/marathon-pharmaceuticals-signals-it-will-wind-down-after-stirring-a-hornets-nest-with-89000-duchenne-treatment/>

²² <https://olis.leg.state.or.us/liz/2018R1/Measures/Overview/HB4005>

²³ <https://www.opb.org/news/article/phrma-prescription-drug-costs-oregon-laws-lawsuit/>

²⁴ <https://www.wsj.com/articles/juul-ceo-kevin-burns-to-step-down-11569411372?mod=searchresults&page=1&pos=6>

noted a comparison of JUUL's marketing practices and those of big tobacco's \$27.5 billion settlement agreement with the US government in the late 90's.²⁵ Philip Morris' concerns appeared to be well-based as later that year Altria devalued their \$12.8 billion investment in JUUL by \$4.5 billion, as regulatory change appeared imminent.²⁶

Activism from stakeholders can push targeted firms to converge or diverge on certain practices deemed positive or negative by activists. A divergence of practices in an industry could result if the activism is directed towards one or a few firms that can be isolated from peers with respect to their performance. If the offending firm is clearly misaligned with industry norms and its performance on the focal ESG issue can be identified as an outlier, then usually the company is singled out by stakeholders and the issue may become material only for the focal company and not the whole industry. Divergence is accentuated if competitor firms can deflect activism or defect during attempted industry self-regulation. If activism can successfully influence an entire industry, potentially through shaming the whole industry or inspiring successful self-regulation, a convergence of practices could occur. Furthermore, if the activism results in a convergence of practices, the issue becomes an industry norm and stakeholders may assume a certain standard of compliance/performance on the issue in question. Conversely, a divergence of practices can create an issue by which "best in class" performance can be measured.

Many of the issues championed by activists are not new issues, some having been discussed by proponents of the issues for decades. The timeframe of stakeholder pressure as a materiality pathway can vary across a set of issues. Markman, Waldron, and Panagopoulos (2016) discuss how the ideological views of NGOs, activists, environmentalists, and other non-market players (NMPs) affect the speed and nature of stakeholder pressure. Radical NMPs – those that view firms'

²⁵ <https://techcrunch.com/2019/07/26/using-the-same-tactics-as-big-tobacco-juul-may-have-intentionally-targeted-teens/>

²⁶ <https://www.nytimes.com/2019/10/31/business/altria-juul.html>

commercial endeavors as selfish and damaging to society – are more likely to engage without warning and with public attacks. Conversely, reformative NMPs build pressure on firms slowly and send warning signals before attacking firms, attempting to entice action from other stakeholders and regulators and induce sustained changes to industry norms. For example, over the past couple of years climate activists have made large, highly publicized, strides in engaging with oil and gas companies, after decades of attempted engagements with little to no success. In 2018, ExxonMobil management was defeated in a proxy vote asking management to report on how climate change scenarios would impact business operations. The passing shareholder proposal had been submitted for proxy voting in previous years, but 2018 marked an inflection point – the growing group of climate conscious investors were joined by large institutional investors, such as BlackRock, resulting in a majority vote for the proposal.

On the other hand, stakeholder pressure on an issue can accumulate seemingly overnight. In response to several high profile women coming forward with their stories of sexual assault, the #MeToo movement rapidly took shape, changing the dynamic around how firms were expected to deal with sexual assault and harassment allegations in the work place and leading firms to attempt to actively curtail the culture which was propagating sexual assault and harassment.

Another movement which rapidly gained widespread support was the rejection of plastic straws due to environmental pollution. Public attention to the issue can, in part, be traced backed to an estimation that 500 million straws are used in the US every day. While the accuracy of this number has been called into question by experts, scientists estimate there are approximately 7.5 million straws laying on beaches across the US and between 437 million and 8.3 billion plastics straws on beaches across the globe.²⁷ The dissemination of these figures throughout the media led

²⁷ <https://phys.org/news/2018-04-science-amount-straws-plastic-pollution.html>

to a public backlash against single-use plastic straws and support for campaigns advocating a ban of their use. Responding to public opinion, Seattle became the first U.S. city to ban plastic straws in July 2018. Other cities have followed Seattle's example, include Washington D.C. Companies have also joined in, announcing voluntary bans on plastic straws.

Company and Industry Reaction

In the face of stakeholder reaction, companies attempt to respond and regain public trust. However, attempts to regain public trust do not necessarily equate to actions being taken to address the underlying issue of misalignment. Company reactions can vary between the two extremes of actively working to maintain the existing degree of misalignment by dismissing stakeholder concerns and genuine attempts to address and correct the underlying misalignment.

Stakeholders expect companies to make operational or organizational changes in response to their concerns. To companies, these changes could require new investments or represent cost structure increases. Companies are, therefore, more likely to voluntarily implement these changes when the costs to do so are low. While absolute cost increases are important, when stakeholder action is not directed at a single company, but rather at an entire industry or widespread practice, cost increases relative to peer firms are perhaps of greater importance. In such cases, not all firms may have equal exposure to the issue being raised by stakeholders. As such, companies with relatively better performance on the issue can attempt to signal their types. By doing so high performing companies apply pressure to companies with poor performance on/ high risk exposure to the respective issue, forcing these companies to incur relatively higher costs to address stakeholder demands.

Consider ExxonMobil's resistance to accepting the link between fossil fuels and climate change. ExxonMobil has a long history of supporting climate change deniers. Internal company

communications show the firm's scientists knew about the relation between fossil fuels and climate change as early as 1981, but proceeded to fund climate change deniers for nearly another three decades over fears carbon-reduction legislation could hurt bottom line performance.²⁸ Efforts to mitigate climate change have included calls for carbon taxation and investments into renewable energy sources to reduce oil demand. In the context of how such efforts would negatively impact ExxonMobil's profits, ExxonMobil's donations to climate change deniers are miniscule.

Plastic straws provide another example. Some companies have responded to the actions taken by certain cities and announced voluntary bans on plastic straws. For example, McDonald's is banning plastic straws across its U.K. and Ireland stores and Starbucks will phase out plastic straws by 2020. Packing giant Tetra Pak has pushed back on the bans. Despite announcing it will begin production of paper straw alternatives, Tetra Pak is lobbying politicians and regulators against banning plastic straws, claiming "from an environmental perspective, their [plastic straws] impact is significantly lower than most liquid food packaging alternatives."²⁹ For McDonalds and Starbucks, the good will and reputational gains likely far outweigh the cost increase these operational changes will incur. However, for Tetra Pak, concerns of an economy-wide transition away from plastic straws likely represents a more meaningful financial concern and expenditures to slow or mitigate this process make financial sense.

The true costs of attempting to dismiss stakeholder engagements are hard to fully predict, and such actions may stigmatize firms and irreparably damage brand value. For example, Facebook had long dismissed stakeholder pressure to more actively police hate speech and the spread of disinformation on its platform.³⁰ Pressure grew and a campaign to boycott Facebook gained

²⁸ <https://www.theguardian.com/environment/2015/jul/08/exxon-climate-change-1981-climate-denier-funding>

²⁹ <https://www.ft.com/content/ee6b50d8-5f6a-11e8-9334-2218e7146b04>

³⁰ <https://www.bloomberg.com/news/articles/2020-06-27/mark-zuckerberg-loses-7-billion-as-companies-drop-facebook-ads>

momentum. As a result, major advertisers, including Unilever, pulled their advertisements from the platform, sending Facebook's share price falling 8.3% in a single day – a \$56 billion loss of market value.

Therefore, unless the costs of addressing the stakeholder claims are astronomic, companies will likely choose to actively address the issue raised by stakeholders in some capacity. Such responses can be company-specific or involve broader industry efforts to self-regulate. However, all share a common characteristic: initiatives with small cost increases (or relative cost increases in instances of collective industry efforts to self-regulate) to assuage stakeholders and win back public trust. Through such efforts companies attempt to actively shape the public discourse, with the key objective of stopping future regulatory changes. Mylan did offer some insured patients a \$300 discount card and promised to introduce a generic version of the EpiPen. However, the discount cards only brought the price down to \$300, were not available to everyone, and simply shifted the costs to the insurance companies who would recoup those losses by increasing their premiums the following year.

The debate around tech companies and individual data privacy provides another example. Numerous reports of how tech companies collect, sell or use consumer data have become public knowledge over recent years, leading to numerous high-profile scandals. For example, the Facebook-Cambridge Analytica scandal during the 2016 U.S. President elections, perhaps the most publicized of such events, led to public outrage and a congressional hearing for CEO Mark Zuckerberg (Table 1). Tech companies have attempted to respond to demands of accountability by stakeholders and to preempt possible legislation by improving data privacy and security. It should be noted, the threat of regulation is particularly salient, as the European Union has already taken regulatory steps beyond what currently exists in the US to ensure tech companies improve data

privacy standards.³¹ Many tech companies have generated significant revenues by collecting and selling user data, making the practice core to their business strategy. As the public becomes more conscious of data privacy it may become harder for firms to continue collecting and selling data as is currently commonplace, forcing tech firms to come up with innovative strategies for protecting user's privacy and data while still capitalizing on data collection.

Regulation and Innovation

A new equilibrium is formed at the degree of misalignment realized after the company/industry response unless one of two things happen. The first is regulation that changes business practices, cost structures, etc. resulting in a new equilibrium. The second, is industry disruption through innovation. In both cases, the change in industry dynamics is no longer incremental and the changes in stock prices and business fundamentals are much more substantial. Furthermore, the misalignment between societal and business interests shrinks in both scenarios (Figure 1).

Regulation

In some cases, when company reaction is not seen as legitimate or satisfactory and where stakeholders have enough power to mobilize political reaction, we see new regulation that forces a new equilibrium in which misalignment is lessened. Stakeholder pressure is often insufficient to make an issue financially material. For such issues, increased regulation can increase the materiality of an issue. For example, after the 2010 Upper Big Branch Mine disaster involving Massey Energy, the Securities and Exchange Committee (SEC) introduced new required mine safety disclosures, part of the Dodd-Frank Act (Table 1). The increased SEC disclosure requirements, in addition to corrective actions taken by the Mine Safety and Health Administration (MSHA) helped drive mining fatality rates to an all-time low. From 2006 to 2010, the average

³¹ https://edps.europa.eu/data-protection/data-protection_en

fatality rate per 1,000 mine workers was 0.16. From 2011 to 2018, that average fell to 0.09.³² In addition to record low fatality and accident rates, MSHA also noted record low respirable-dust exposure levels and substantially fewer mines with chronic-violation records.³³ The introduction of new regulation increased the materiality of mine safety, despite the importance of mine safety by no means being a new issue.

While increased regulation can increase the materiality of an issue, relaxing or the lack of regulation can decrease the materiality of an issue. Carbon emissions are a material issue for many industries and global agreements to cut carbon emissions to fight climate change have been almost universally agreed upon. However, the lack of carbon pricing legislation has lessened the materiality of carbon emissions. The materiality of drug price increases has been similarly lessened due to the lack of action by congress to limit drug price gouging or to address the inability of the government to negotiate prices. In part due to lack of regulation, excessive drug price increases appear to still be commonplace. In the first week of 2020, non-profit group Patients for Affordable Drugs identified 524 drug price spikes averaging 5.6%, more than twice the rate of inflation.³⁴ Similarly, there has been little legislative action regarding the role pharmaceutical companies played in the opioid crisis. Overwhelming legal action against opioid manufactures appears to be driving the materiality of the issue, as Purdue Pharma filed for bankruptcy in September 2019.³⁵ Perhaps unsurprisingly, ESG issues are more likely to become financially material when new regulations are effectively enforced.

Innovation

³² Data available from MSHA at: <https://arlweb.msha.gov/stats/centurystats/coalstats.asp> & <https://arlweb.msha.gov/stats/centurystats/mnmstats.asp>

³³ <https://www.ehstoday.com/safety/article/21916083/msha-has-implemented-recommendations-made-after-upper-big-branch-mine-disaster>

³⁴ <https://www.patientsforaffordabledrugs.org/2020/01/08/500-drug-price-hikes/>

³⁵ <https://www.nytimes.com/2019/09/15/health/purdue-pharma-bankruptcy-opioids-settlement.html>

Regulation is a powerful force for increasing the materiality of an issue (or stymieing materiality when lacking regulation). However, regulation is, in general, slow moving and reactive. Regulation often is enacted in response to an event which potentially could have been prevented (or predicted) if proper legislation was already in place. However, reactive legislation is still important as it helps cement the adapted firm practices as industry norms and acts as a mechanism to prevent firms from slowly reverting to their prior practices after media focus wanes.

In the absence of regulatory action, innovation can also be the impetus which makes an issue material. A firm can disrupt an industry through innovating and developing a competitive advantage, forcing competing firms to improve their performance on certain issues or develop new capabilities in order to compete with the innovating firm.

Given innovation requires a firm to develop novel capabilities which result in a competitive advantage for the innovating firm over competitors, innovation usually results in an initial divergence of practices. This is most notably the case during the first few years as the leader is pursuing a differentiated strategy. Eventually some competitors will attempt to adopt, while other will not. After a period of time, idiosyncratic to the specific innovation and conditional on competitors attempting to adapt in response to innovation, consumer preferences changing or regulation catching up to innovation, a convergence of practices may occur and firms will compete on the issue which drove innovation.

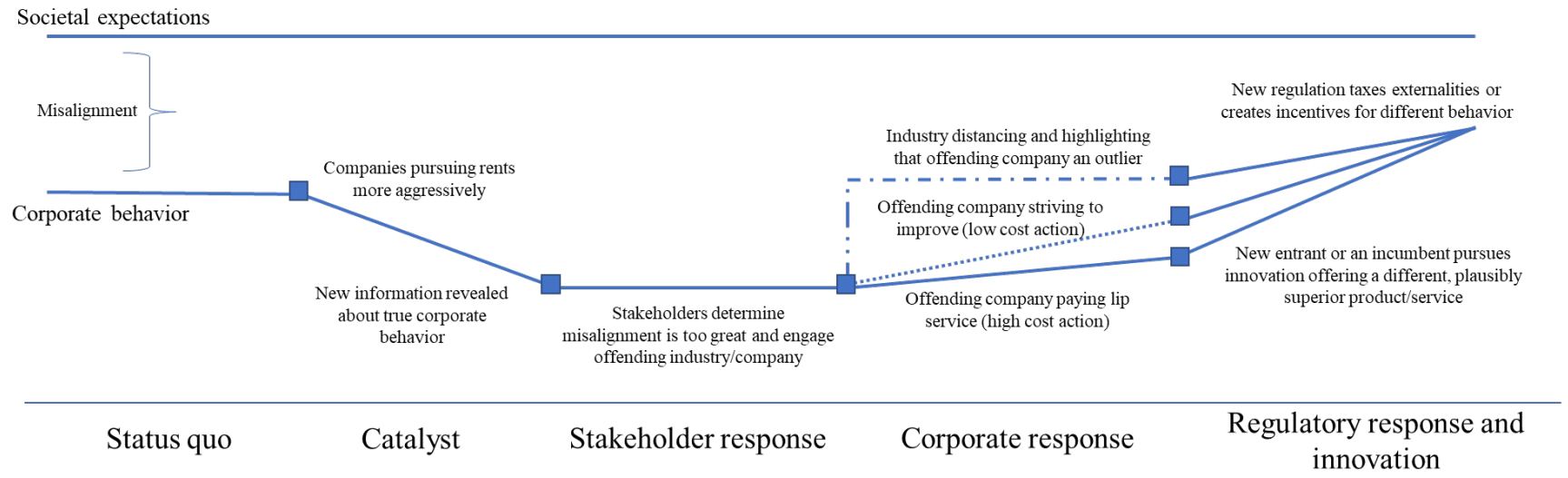
Take for example the introduction of electric vehicles as a viable alternative to internal combustion engine vehicles to lower carbon emissions in the transportation industry and mitigate the effects of climate change. Prior to Tesla, electric vehicles were rarely, if ever, discussed by automobile manufacturers. Despite beginning in the luxury vehicle market and slowly progressing to economy vehicle markets (e.g. Tesla Model 3), as Tesla was able to lower its battery production

costs it was able to attract an excited customer base and substantial amounts of capital. Tesla's actions shifted industry demand towards electric vehicles, forcing automobile manufacturers to respond. Over the course of few years, automobile manufacturers went from treating electric as a niche product to almost every major manufacturer promising to electrify a significant portion of their fleet within the next 5-10 years. Automobile manufacturers now compete over the material issue of their electric vehicle (and hybrid vehicles) offerings. ESG issues are more likely to become financially material when companies have a higher capacity for innovation that addresses the inherent misalignment, either through incumbent companies offering differentiated products or new entrants disrupting the existing competitive landscape.

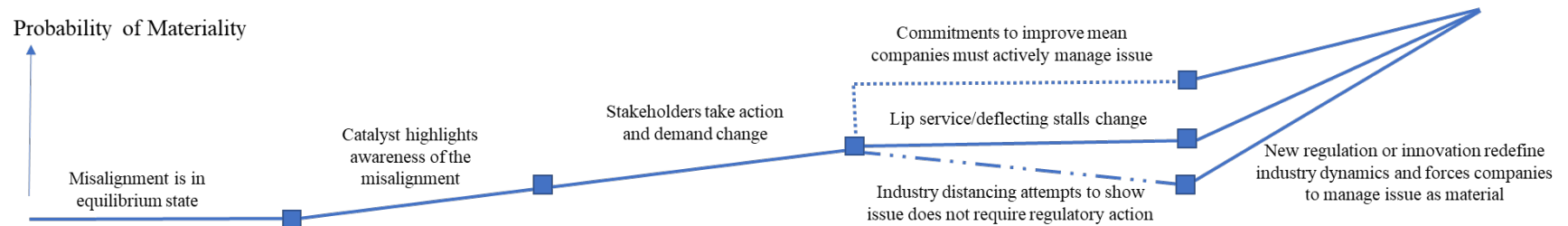
An important element of the innovation pathway is the speed at which it can occur. Relative to other forces changing industry dynamics, innovation moves quickly. Innovating firms may spend years developing the technology or capabilities necessary for innovation, however once an innovative product, technology, etc. goes to market, the divergence of practices occur rapidly.

Figure 1: The Dynamic Nature of Financial Materiality

Misalignment of Societal Expectations and Corporate Behavior



Probability an Issue will become Financial Material



Note: Figure 1 visually describes an example of an issue's process to materiality across the five stages of materiality: status quo, catalyst, stakeholder response, corporate response and regulatory response/innovation. The top portion of Figure 1 describes the degree of misalignment between societal expectations of corporate behavior and corporate behavior as understood by society. The bottom portion of Figure 1 describes the probability an issue will become material for the respective industry. Changes in the degree of misalignment and the probability and materiality for each step are described. This example is for an issue in which changing corporate behavior exacerbates the degree of misalignment. As such, the line that describes societal expectations is constant across the five stages of materiality in this example. If changing societal expectations were to drive increasing misalignment, the line describing societal expectations would move up in the catalyst stage and remain constant thereafter. In this case, the line describing corporate behavior would be constant until the corporate response stage where it would move upwards to reduce the degree of misalignment conditional on the specific corporate response.

DISCUSSION

Our work provides a framework for understanding the evolving nature of financial materiality of ESG issues. As Figure 1 shows, several steps and mechanisms are likely to be necessary in order for an issue to become financially material. Knowledge of these steps can enable individuals and organizations that focus on social impact to become more effective. Within this context, our framework offers a theory of change, focusing on how social progress prioritizing actors (governments and regulators, NGOs and impact first investors) can create incentives for business institutions to behave more socially responsible. The success of these actors could be determined by their ability to effectively engage their relevant stakeholders to make an issue financially material.

The theory of change highlights the fact that financial materiality is an important consideration outside of the context of financial performance. Governments and regulators, NGOs and impact first investors are not return seeking actors in the same manner as companies and return first investors. Much of these actors' work seeks to systemically influence outcomes with an emphasis on social impact, work that can range from active engagements intended to elevate the materiality of issues to corrective actions that seek to stabilize economic activity towards a new equilibrium. In short, the theory of change could be described as a process of correcting market failures.

For example, our theory of change posits understanding materiality pathways can help impact first investors maximize the impact of their investments. By first identifying issues that are in the process of becoming material, impact first investors can next identify an investment universe of firms that are creating solutions or are innovating on an issue. Impact first investors may accept below market returns in order to accelerate the innovation process and therefore can be a source

of transitional funding for firms with high impact potential, but are not currently attractive investments for returns focused investors. Think about plant-based protein entrants that have disrupted meat-based products, which in the case of beef is a major source of carbon emissions. The theory of change identifies impact first investors as key contributors to innovation that solidifies the materiality of issues.

Our framework also offers a theory of action. The theory of action, in the context of socially minded entities, provides guidance on how to predict corporate responses to their engagements and clarity on the conditions under which their engagements are likely to change corporate behavior. For example, an NGO may seek to elevate the materiality of an issue and unlock for-profit capital to address issues aligned with their theory of change. Our framework of materiality states firms are more likely to cooperate with stakeholders when the cost of attempting to dismiss societal claims is high. Therefore, the theory of action recommends an NGO could attempt to raise the costs of noncooperation for firms targeted by engagement and to educate firms of these costs.

Returns first investors and companies traditionally do not strive to elevate the materiality of issues. However, because material issues are, by definition, impactful to their financial performance, the theory of action posits returns first investors and companies will seek to monitor and manage the emergence of nascent material issues as means of driving returns or securing a competitive advantage over competitors.

As noted regarding the theory of change, impact first investors can provide funding for companies elevating the materiality of an issue through innovation, but that might not yet be attractive investments for returns first investors. As innovative companies grow and develop more stable revenue streams, they quickly become attractive investments that align with the risk preferences of returns first investors. Active monitoring of the materiality of nascent issues allows

return first investors to identify investment opportunities not currently priced into capital markets. Moreover, innovation on newly material issues is not limited to startups. Established companies often make investments into new capabilities. Understanding materiality pathways provides returns first investors a framework for assessing the potential future financial impact of company investments into new capabilities by determining if these capabilities address issues likely to become material.

This point highlights companies' role of both monitoring and managing emerging material issues. Under the theory of action, companies monitor the materiality of issues and make investments into developing capacities to effectively manage issues that become material. First movers in identifying and developing capabilities to address material issues may develop a competitive advantage, forcing competitors to develop their own capabilities and thus defining a new competitive issue within an industry. For example, Tesla developed capabilities allowing them to produce electric vehicles that could compete with traditional internal combustion engine vehicles on price. Tesla success has subsequently forced all other car manufacturers to invest heavily into producing their own fleet of electric vehicles.

FUTURE RESEARCH

The limited existing research on how ESG issues become financially material calls for the development of a forward looking (Edgley, Jones and Atkins 2015) and stakeholder-inclusive (Calabrese, Costa and Rosati 2015) framework to determine which issues are likely to become material. Our research answers this call and provides a framework that can be used by corporate managers, industry analyst and academic researchers to proactively identify specific issues which

are likely to become material. Moreover, as our framework describes in detail *how* issues become material, it invites future empirical testing of how each stage in the materiality process is connected to changes in stock price performance or other financial metrics. We articulate hypotheses, in the description of the five stages, that could serve as the basis for future empirical research. Moreover, recent prominent social movements, such as #MeToo or Black Lives Matter could be studied in detail to understand how they might elevate the financial materiality of gender and racial diversity and inclusion, respectively.

CONCLUSION

There are a few issues that we want to highlight in the conclusion of this article. First, understanding which ESG issues are material and how they become so is increasingly important for corporate management, governance, investment management and regulatory effectiveness. Second, materiality is a dynamic concept evolving over time and as a result scenario analysis, forward looking assessments, alternative, industry specific data sets and new ways of measuring impacts are all helpful tools in identifying emerging issues. Third, because of its dynamic nature we feel that ESG disclosure will be more difficult to regulate compared to financial disclosure. Regulators will need to be ready for a new more flexible, principles-based approach to regulating ESG disclosure and measurement. Comparability might be more difficult to achieve as the dynamic nature of materiality will manifest at different points in time and with different intensity across companies and industries.

However, as this article illustrates there are some predictable pathways and an emerging framework that could guide our thinking on how ESG issues become financially material for companies and their investors. Misalignment of corporate behavior with societal needs is a critical

initial condition for materiality. With early attention to certain catalysts, it is possible that emerging issues can be addressed before they become financially material, which is the best possible outcome for all stakeholders.

References

- Calabrese, A., Costa, R. and Rosati, F., 2015. A feedback-based model for CSR assessment and materiality analysis. *Accounting Forum* 39(4), pp. 312-327.
- Cicero, T.J., Inciardi, J.A. and Muñoz, A., 2005. Trends in abuse of OxyContin® and other opioid analgesics in the United States: 2002-2004. *The Journal of Pain*, 6(10), pp.662-672.
- Edgley, C., Jones, M.J. and Atkins, J., 2015. The adoption of the materiality concept in social and environmental reporting assurance: A field study approach. *The British Accounting Review*, 47(1), pp.1-18.
- Fick, J., Söderström, H., Lindberg, R.H., Phan, C., Tysklind, M. and Larsson, D.J., 2009. Contamination of surface, ground, and drinking water from pharmaceutical production. *Environmental Toxicology and Chemistry*, 28(12), pp.2522-2527.
- Florence, C., Luo, F., Xu, L. and Zhou, C., 2016. The economic burden of prescription opioid overdose, abuse and dependence in the United States, 2013. *Medical care*, 54(10), p.901.
- Grewal, J., Hauptmann, C. and Serafeim, G., 2020. Material sustainability information and stock price informativeness. *Journal of Business Ethics*, forthcoming.
- Grewal, J., Riedl, E. and Serafeim, G. 2019. Market reaction to mandatory nonfinancial disclosure. *Management Science* 65(7), pp.3061–3084.
- Ioannou, I., Li, S.X. and Serafeim, G., 2015. The effect of target difficulty on target completion: The case of reducing carbon emissions. *The Accounting Review*, 91(5), pp.1467-1492.
- Ioannou, I. and Serafeim, G. 2019. The consequences of mandatory corporate sustainability reporting. In *The Oxford Handbook of Corporate Social Responsibility*. 2nd ed. Oxford University Press.
- Khan, M., Serafeim, G. and Yoon, A., 2016. Corporate sustainability: First evidence on materiality. *The Accounting Review*, 91(6), pp.1697-1724.
- Khot, U.N., Vogan, E.D. and Militello, M.A., 2017. Nitroprusside and isoproterenol use after major price increases. *New England Journal of Medicine*, 377(6), pp.594-595.

Markman, G.D., Waldron, T.L. and Panagopoulos, A., 2016. Organizational hostility: Why and how nonmarket players compete with firms. *Academy of Management Perspectives*, 30(1), pp.74-92.

Sustainability Accounting Standards Board (SASB), 2017. Staff Bulletin SB002-07062017 SASB's Approach to Materiality for the Purpose of Standards Development, www.sasb.org

Sustainability Accounting Standards Board (SASB), 2018. Sustainability Accounting Standards for 77 Industries, www.sasb.org

Waldron, T.L., Navis, C., Karam, E.P. and Markman, G., Toward a theory of activist-driven responsible innovation: How activists pressure firms to adopt more responsible practices. *Journal of Management Studies*, forthcoming.