The Management of Corporate Distress: Environmental, Social, and Governance (ESG) Strategies for Navigating Value Appropriation Deficits

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Abstract

In this study, I examine the surplus assumption embedded within current studies on stakeholder value-based strategy and whether a corporation's stakeholder management can precipitate or negate corporate distress. By defining corporate distress as a condition of challenged legitimacy arising from the failure to satisfy the minimum appropriation demands of powerful stakeholders, I create a perspective for managing corporate distress that's complementary to existing studies on organizational decline, corporate failure, and financial distress, yet extends their findings to better capture why corporations with similar financial and economic characteristics may have differing probabilities of experiencing corporate distress. Specifically, using panel regression, difference-in-difference, and machine learning statistical methods on a sample of 8,256 publicly traded corporations, I find cultivating *ex ante* relational capital with a corporation's more powerful stakeholders, as measured by stakeholder sentiment across 26 distinct environmental, social, and governance (ESG) issues, is associated with a lower probability of entering corporate distress, particularly when environmental uncertainty is high.

Keywords: Corporate distress; Environmental, social & governance (ESG); Value-based Strategy; Stakeholder Strategy; Relational Capital

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Increasing interest in the relationship between stakeholder strategy and value-based strategy (Amit & Zott, 2001; Blair, 1998; Bowman & Ambrosini, 2000; Brandenburger & Stuart, 1996; Coff, 1999; Lepak, Smith, & Taylor, 2007), particularly as it relates to models of value creation and appropriation (Garcia-Castro & Aguilera, 2014; Lieberman, Garcia-Castro, & Balasubramanian, 2017; Lieberman, Balasubramanian, & Garcia-Castro, 2017), has given rise to a stream of research described as stakeholder value-based strategy (Bacq & Aguilera, 2021; McGlinch & Henisz, 2021). Conceptualizing the corporation as a nexus of stakeholder contracts (Hill & Jones, 1992), stakeholder value-based strategy emphasizes that corporations can generate rents, and ensure the persistence of those rents, by effectively allocating surplus value appropriated by the firm toward stakeholders' most pressing issues (Bacq & Aguilera, 2021; Jourdan, Kivleniece, & McGahan, 2021). Such surplus value allocation generates relational capital (Gil, Kim, & Zanarone, 2021; McGlinch & Henisz, 2021) that not only increases stakeholder commitment to future value creation but also produces future rents for stakeholders as well as the corporation (Asher, Mahoney, & Mahoney, 2005).

Not yet considered in these studies is the potential for there to be periods during which created value falls short of stakeholders' appropriation demands and there's no surplus to be allocated. As such, not only could surplus value not be available for managers to allocate toward stakeholder issues, but the total created value may be less than stakeholders' aggregate opportunity cost. The current assumption is that when such a value appropriation deficit occurs, stakeholders would defect from the value chain for one where appropriated value is at least equal to their opportunity cost of participation (Gans, MacDonald, & Ryall, 2005; MacDonald & Ryall, 2004). Although this assumption is built upon earlier studies in value-based strategy where suppliers, buyers, and firms bargain over appropriated value in one-time interactions

governed by utility maximizing self-interest (Brandenburger & Stuart, 1996; Costa & Zemsky, 2021; Grennan, 2014), the differentiating assumptions of stakeholder value-based strategy, including self-interest bounded by reciprocity and repeated instead of one-time exchange (Bosse et al., 2009; Jourdan et al., 2021), make such an outcome less plausible given stakeholders typically have much more at stake in this context (Clarkson, 1995; Daily & Dalton, 1995; Gelman & Salop, 1983; Klemperer, 1987; 1990; Sutton & Callahan, 1987). Provided this, it then becomes necessary to view a value appropriation deficit as a process to be managed as opposed to an outcome against which management influence is too late.

While guidance for managing value appropriation deficits has been limited based on existing assumptions, herein I investigate not only whether such appropriation deficits occur, but also how managers can reduce the likelihood that stakeholders that are most critical to a firm's value creating activities, and whose absence would materially increase the risk of corporate failure, defect from the value chain. I accomplish this in multiple ways. First, because not all stakeholder defection is a threat to the nexus of contracts upon which the firm is based, I differentiate between those whose defection could precipitate corporate failure and those that would not. I do so by drawing upon stakeholder power, or "the difference between total value created, appropriated, and distributed in a system with the cooperation of a given stakeholder as compared to that when the same stakeholder undermines value creation, appropriation, or distribution with conflictual actions" (McGlinch & Henisz, 2021) that has been previously used in the stakeholder value-based strategy literature to differentiate between those stakeholders that are likely to impact a corporation's financial performance and those that are not. Specifically, it has been previously shown that addressing stakeholder issues most relevant to powerful stakeholders create benefits that outweigh their costs, addressing the issues of less powerful

stakeholders can impose costs that don't create an associated benefit (Cheema-Fox, LaPerla, Serafeim, & Wang, 2020; Kim & Yoon, 2020, McGlinch & Henisz, 2021).

Second, whereas value appropriation deficits have previously been conceptualized as corporate failure – "when the systems upon which interactions are based cease their functioning in a critical way, essential coalitions abandon the organization and important goals cannot be achieved because the environment does not grant the resources necessary for survival" (Sheppard, 1994, p. 796), I introduce the concept of *corporate distress*. Building on the heterogeneous impact of powerful stakeholders, as well as their importance to value creation, I define corporate distress as a condition of challenged legitimacy arising from the failure to satisfy the minimum appropriation demands of powerful stakeholders. This allows for the analysis of value appropriation deficits to be process instead of outcome oriented, reintroducing the discretion of managers to the management of distressed and troubled companies.

Third, I hypothesize relational capital as an *ex ante* mechanism through which managers can increase the legitimacy of the corporation as an exchange partner and reduce the *ex post* likelihood powerful stakeholders would defect upon a value appropriation deficit. While *ex ante* relational capital has been shown to be positive for future value creation in current stakeholder value-based studies (McGlinch & Henisz, 2021), it hasn't been examined as a means to ensuring the persistence of stakeholder commitment during challenging periods. Moreover, I evaluate the dynamic nature of relational capital, including the role stakeholder urgency plays in its cultivation, in addition to its increasing importance during periods of environmental uncertainty when exchange partner reliability can be particularly high.

I evaluate these hypotheses through both panel regression and difference-in-difference statistical models using a novel dataset of environmental, social, and governance issues (ESG)

relevant to a firm's stakeholders, as well as an extensive dataset of corporate distress and failure. What I find is that *ex ante* value allocation to those issues most relevant to a firm's more powerful stakeholders is not only associated with a declining likelihood of future corporate distress, but it can be directly responsible for that decline. I also find that not only are powerful stakeholder issues dynamic, with action on more urgent issues more influential, but the strength of the relationship increases during periods of environmental uncertainty when stakeholder reliability typically declines.

THEORY AND HYPOTHESES

The surplus assumption of stakeholder value-based strategy

Value-based strategy identifies distinct ways through which corporations create value and then bargain over its appropriation in their interactions with buyers and suppliers (Brandenburger & Stuart, 1996). According to this perspective, corporations, buyers, and suppliers are faced with the dual task of contributing to joint value creation, as well as capturing a share of that value through an appropriation process (Gans & Ryall, 2017; Ross, 2018; Ryall, 2013). Defined as the difference between willingness-to-pay (WTP) and opportunity cost, value is created through the cooperative transformation of costly inputs into valuable outputs by agents in a value chain (MacDonald & Ryall, 2004). It is then the responsibility of each actor – the corporation, buyers, and suppliers – to capture a portion of that value through an appropriation process determined by the bargaining abilities (i.e., negotiating abilities and tactics) of each (Brandenburger & Stuart, 1996; Costa & Zemsky, 2021; Grennan, 2014). Added value or "the value created by all the players in the vertical chain minus the value created by all the players in the vertical chain except the one in question" (Brandenburger & Stuart, 1996, p. 13) serves as an upper bound to what each actor appropriates through their unique bargaining abilities. Although typically not directly

addressed, implicit in this theory is the assumption of a non-negative surplus. Value created is equal to, or in excess, of the opportunity cost of the value chain participants. If created value falls short of appropriation demands – an *appropriation deficit* – these actors are expected defect from the exchange relationship (Gans et al., 2005), increasing the likelihood of corporate failure to the extent access to critical resources in negated (Sheppard, 1994).

The non-negative surplus assumption has become a cornerstone assumption for stakeholder value-based strategy. Positioned at the intersection of value-based strategy and stakeholder theory, these studies extend value-based strategy by adopting a framework of value creation and appropriation within the context of multiple stakeholders (e.g., Bacq & Aguilera, 2021; Garcia-Castro & Aguilera, 2015; Lieberman et al., 2017; McGlinch & Henisz, 2021). While maintaining the non-negative surplus assumption, these studies do extend multiple assumptions of value-based strategy in their integration with stakeholder theory. First, these studies envision the corporation as a nexus of contracts (Hill & Jones, 1992) between multiple stakeholders, including employees, senior managers, and capital providers (Coff, 1999), that contribute uniquely to value creation. As such, they expand the value chain from a vertical exchange between three actors – firm, buyers, and suppliers – to a nonlinear exchange between multiple stakeholders.

Second, whereas value-based strategy emphasizes negotiating abilities and tactics as the mechanism through which stakeholders capture value during the appropriation process, stakeholder value-based strategy identifies stakeholder power, or "the difference between total value created, appropriated, and distributed in a system with the cooperation of a given stakeholder as compared to that when the same stakeholder undermines value creation, appropriation, or distribution with conflictual actions" (McGlinch & Henisz, 2021). It arises

from stakeholders' possession of key resources, capacity for unified action, cost of exit, the replacement cost of that stakeholder to the firm (Coff, 1999; Ozmel, Yavuz, Reuer & Zenger, 2017), as well as the external regulatory or political environment (Kern & Gospel, 2020). As such, stakeholder groups possess heterogeneous contributions to current and future value creation (Bacq & Aguilera, 2021; McGlinch & Henisz, 2021), with more powerful stakeholders being those whose cooperation is most critical.

Third, these studies relax assumptions regarding stakeholder self-interest and the time horizon of stakeholder interactions. To begin with, unlike value-based strategy's focus on utility maximizing self-interest (Brandenburger & Stuart, 1996; Costa & Zemsky, 2021; Grennan, 2014), stakeholder value-based strategy relies upon a bounded conceptualization of self-interest (Jourdan et al., 2021). From this perspective, "people seek to maximize their utility while conforming to the norm of reciprocity" (Bosse et al., 2009, p. 449). Additionally, stakeholder approaches to value creation and appropriation emphasize repeated interactions as opposed to fixed-term interactions (Bosse et al., 2009). This is important to the assumption of bounded self-interest as well given reciprocity may not be a necessary condition under fixed-term interactions. Consequently, actor behavior, including the pursuit of self-interest, is bound by reciprocal ties, influenced by past exchange, and attention to the cultivation of relational capital (Asher et al., 2005).

Fourth, these studies extend the appropriation process to consider how any surplus appropriated by the corporation is then subject to distribution, or voluntary investment, by a corporation's managers (Harrison et al., 2010) as a way to develop relational capital that contributes to the persistence of that value surplus (McGlinch & Henisz, 2021). As a result, unlike value-based strategy where value appropriation is limited to those stakeholders that

directly contribute to value creation, these studies also account for potential discretionary investment (Hambrick & Finkelstein, 1987; Shen & Cho, 2005) by a firm's managers toward stakeholder groups directly (i.e., primary stakeholders) and indirectly (i.e., secondary stakeholders) involved in value creation process (Bacq & Aguilera, 2021).

The result of these differentiating assumptions is a conceptualization of value creation and appropriation where stakeholders' contributions to future value creation are dependent upon past value appropriated by those same stakeholders (Garcia-Castro & Aguilera, 2016; Jourdan et al., 2021). Maintaining the assumption of a non-negative surplus is convenient to this conceptualization of value creation and appropriation in that it doesn't make it necessary to consider how managers should engage with their stakeholders when the value available to be appropriated is insufficient to meet stakeholders' minimum opportunity costs. However, this assumption is more difficult to import from value-based strategy when the underlying assumptions of self-interest and fixed time horizons are modified to allow for the inclusion of reciprocity and repeated exchange.

From the perspective of reciprocity, there are complexities that accompany moving from one value chain to another. Such complexities could be related to switchover costs, retraining of staff, and the negotiation of new contracts (Gelman & Salop, 1983; Klemperer, 1987; 1990) that are now negotiated without the same reciprocal trust and mutual understanding between parties (Gil, Kim, & Zanarone, 2021; McGlinch & Henisz, 2021). There could also be difficult to value benefits stakeholders receive from continued interaction with the firm (Clarkson, 1995), as well as negative reputational effects of being previously associated with a failing firm (Daily & Dalton, 1995; Sutton & Callahan, 1987). From a temporal perspective, because repeated exchange may require relationship specific investments (Clarkson, 1995), stakeholders may be

hesitant to switch to a new value chain upon an appropriation deficit if there's a probability that the *ex ante* exchange relationship could be salvaged.

In combination, these factors suggest that an appropriation deficit doesn't necessarily equate to stakeholder abandonment of the value chain or corporate failure driven by the inability to access critical resources. Not only are there reasons for these stakeholder exchange relationships to persist for some time upon an appropriation deficit under the assumptions of reciprocity and repeated exchange, but the persistence of such exchange relationships could be dependent upon the nature of a corporation's *ex ante* relationship with those stakeholders, particularly relational capital accumulated through repeated exchange. As such, appropriation deficits are not solely corporate failure outcomes, but processes subject to managers' discretion.

Appropriation deficits as *corporate distress* and not *corporate failure*

Corporate failure, which occurs "when the systems upon which interactions are based cease their functioning in a critical way, essential coalitions abandon the organization and important goals cannot be achieved because the environment does not grant the resources necessary for survival" (Sheppard, 1994, p. 796), is characterized by two key components. The first is the ceasing of exchange interactions in a critical way. This references when existing stakeholders terminate their exchange relationship with the firm, potentially reducing the corporation's access to the resources necessary for its value creating activities. The second concept is that some coalitions are essential. This suggests a heterogeneous importance of stakeholder groups to value creation.

An important symptom of an appropriation deficit is declining legitimacy arising from the failure to provide an economic benefit to stakeholders exceeding their cost of exchange – a defining norm of the stakeholder value chain (Mitchell, Agle, & Wood, 1997). Although

legitimacy can be defined as either pragmatic, moral, or cognitive, the focus on contributing direct value to a legitimacy-conferring stakeholder "rests on the self-interested calculations of an organization's most immediate audiences" (Suchman, 1995: 578). Corporations earn legitimacy within their system of stakeholder exchange partners by creating favorable perceptions among those same exchange partners in their capacity as evaluators (Heybels, 1995). To the degree perceptions of the corporation fit into the norms and standards of the stakeholder exchange system, the more likely it is to occupy a legitimate place. Moreover, because the legitimation process is one of continuous testing and redefining (Kostova & Zaheer, 1999), legitimation isn't episodic but an ongoing back and forth between the organization and its environment. Aligning with powerful stakeholders would be expected to appear rational and prudent, while creating congruence between the corporation and its environment (Zimmerman & Zeitz, 2002). It also increases perceived legitimacy as a member of the system (Fligstein, 1991; Tolbert & Zucker, 1983), and persistent access to vital resources (Certo, Daily, & Dalton, 2001). In sum, legitimation occurs by convincing stakeholders of a firm's right to resource access through adherence to norms of the system (Levine & White, 1961). A shortfall in appropriated value represents a violation of these norms that can threaten a corporation's position as a legitimate member of the exchange system (Deephouse & Carter, 2005; Dowling & Pfeffer,1975).

Importantly, however, as pointed out in the second definitional component of corporate failure, not all stakeholders are considered essential to the system. While prior studies have referred to the importance of exchange partner consensus as the key to maintaining legitimacy (Evan, 1996), with the loss of consensus, or "domain dissensus" (Thompson, 1967), identified as a threat to legitimacy, the definition of corporate failure in its reference to essential coalitions suggests that consensus may not be a necessary condition for survival. The withdrawal of

support from any individual stakeholder, or even multiple stakeholders, involved in the system of value creation doesn't necessarily increase the likelihood of failure if they're not essential (Sheppard, 1994). There could be other suppliers in the market willing to take their place, new employees willing to be hired at the firm, new creditors willing to lend money, or substitute inputs or customer bases available. Therefore, it's not consensus that confers legitimacy but powerful stakeholders – those stakeholders whose cooperation is most critical to current and future value creation (McGlinch & Henisz, 2021; Pfeffer & Salancik, 1978; Peffer, 1992).

Taking these points into consideration, I differentiate *corporate failure* from *corporate distress* by defining corporate distress as the condition of challenged legitimacy arising from the failure to satisfy the minimum appropriation demands of powerful stakeholders. Although wary to add to the cacophony of terms used to describe organizational decline, corporate failure, or financial distress, this definition fills an important gap in understanding of managing the corporation. Moreover, this definition is complementary, and not a replacement for, prior concepts utilized when examining corporate failure. Corporate distress can be the result of organizational decline, defined as a "protracted period of decreasing internal resources" (Cameron, Sutton & Whetten, 1988). It also incorporates the financial perspective of those studies within management that have previously equated bankruptcy with failure. These studies often refer to financial distress, which is defined as the inability of the firm to meet its obligations to creditors (Altman, 1968), narrowing the scope of failure to a single powerful stakeholder. However, not accounted for in these studies on financial distress is that the inability to meet creditors' appropriation demands is often a symptom of an inability to meet the appropriation demands of another powerful stakeholder as opposed to the cause of distress in and of itself.

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Preserving legitimacy by cultivating relational capital

Managers focused on ensuring value shortfalls associated with corporate distress don't advance to corporate failures will seek to preserve the corporation's standing as a legitimate exchange partner. As such, cementing a legitimate position within an exchange system would be expected to increase a firm's propensity of avoiding corporate distress, even if appropriated value were to fall short in a given period. Prior studies have highlighted specific mechanisms corporations, including those experiencing financial hardship, may undertake to maintain legitimacy with powerful stakeholders. However, these mechanisms most often involve direct collaboration with the powerful stakeholder in question, such as the appointment of outside directors (Daily, 1994), hiring managers with certain educational backgrounds (D'Aveni, 1990), or socializing certain means of production through industry groups or other professional associations (Ozcan & Eisenhardt, 2009). While these efforts can certainly increase legitimacy, a challenge to these mechanisms is that they often require bilateral agreements with powerful stakeholders. Because powerful stakeholders can be hesitant to concede their power, and subsequent legitimation authority (Davis & Cobb, 2010), such mechanisms may not always be feasible, making unilateral strategies attractive as well.

A unilateral strategy under the control of managers is allocating value appropriated by the corporation in ways that build relational capital with powerful stakeholders (Elfenbein & Zenger, 2017; McGlinch & Henisz, 2021). Relational capital has not only been shown to increase stakeholder commitment to future value creation (Bridoux, Coeurderoy, & Durand, 2011; Cabral et al., 2019; Chatain & Plaksenkova, 2019; de Bakker & den Hond, 2008), but also decrease the probability of opportunistic uses of power (Lioukas & Reuer, 2015). However, as "dividing

profits among multiple stakeholders will always be difficult" (Barney, 2018) and such strategies can be associated with substantial expense (Berchicci & King, 2020; McGlinch & Henisz, 2021), legitimacy is not achieved through solely allocating appropriated value to stakeholder issues. It is necessary to target the issues of legitimacy conferring stakeholders specifically. As such, because legitimacy is strengthened through the cultivation of relational capital with a corporation's most powerful and legitimating stakeholders, higher *ex ante* relational capital between a corporation and its powerful stakeholders should reduce the likelihood of corporate distress upon an appropriation deficit.

> *H1: Corporations that better address their most powerful stakeholders' issues are less likely to enter into corporate distress than corporations that do not address their most powerful stakeholders' issues, all else equal*

The contingent cultivation of relational capital

A second dimension of power is the likelihood that power is used during a given period of time. Stakeholders that possess power do not always intend to use that power during a given period, particularly if there is no pressing issue toward which they'd like to see value appropriated by the firm allocated to (Eesley & Lenox, 2006). As such, it is also necessary to consider urgency, or "the degree to which stakeholder claims call for immediate attention" (Mitchell et al., 1997, p. 864) in the cultivation of relational capital with powerful stakeholders. If powerful stakeholders believe a corporation is responsive to their most pressing concerns in a timely manner, this would be expected to increase relational capital beyond solely addressing a wider spectrum of potential issues (Eesley & Lenox, 2006; Kim & Yoon, 2020; McGlinch & Henisz, 2021).

Attending to stakeholders' more urgent issues has been previously associated with increased engagement during the value appropriation process and decreased disruption during the appropriation process. For example, prior evidence suggests that attending to stakeholders more urgent issues can increase employee productivity (McGlinch & Henisz, 2021) and strengthen relationships with suppliers (Gil, Kim, & Zanarone, 2021). However, not addressing more urgent issues can result in conflictual actions that disrupt the appropriation process through actions such as boycotts (Frooman, 1999; McDonnell & King, 2013) or proxy battles with activist stakeholders (Mitchell et al., 1997). When these disruptions occur during periods of corporate distress and there's a shortfall of value available, they increase the potential that a powerful stakeholder defects from the exchange relationship as appropriated value mitigated by relational capital. However, if powerful stakeholders feel their most pressing issues have been attended to in the past, signaling the potential for them to also be attended to in the future (Tantalo & Priem, 2016), they may be less likely to defect.

H2: Corporations that better address their most powerful stakeholders' more urgent issues are less likely to enter into corporate distress than corporations that do not address their most powerful stakeholders' more urgent issues, all else equal

The contingent value of relational capital

The cultivation of relational capital to strengthen a corporation's network of exchange reflects a method of governance dependent upon on the expectation that exchange partners will act ways that serve, or are at least non-conflictual to, the interests of the other partner (Barney & Hansen,1994). However, while such non-conflictual actions are less likely under conditions in which the exchange relationship was formed (Fynes, de Burca, & Voss, 2004; Krishnan, Martin, & Noorderhaven, 2006), the possibility for conflictual actions increases when the degree to

which the corporation's external environment is characterized by an absence of pattern, unpredictability, and unexpected change (Fynes et al., 2004). When confronted with uncertainty exogenous to the stakeholder exchange relationship, such as regulatory policy change (Sutcliffe & Zaheer, 1998), stakeholders often seek to mitigate uncertainty by reducing their reliance on external actors (Heide & Miner, 1992). Such actions potentially include hoarding capital (Pfeffer & Salancik, 1978), producing fewer outputs (Pfeffer & Salancik, 1978), or tightening payment terms (Yang et al., 2015). When the withdrawal of support from stakeholders seeking to address their own uncertainty in these ways is coupled with a value appropriation deficit, the likelihood of corporate distress increases.

Despite this possibility, the cultivation of ex ante relational capital, particularly with those stakeholders most important to the value creation and appropriation process, would be expected to reduce the likelihood such stakeholders withdraw support under uncertainty. The first reason is that relational capital, founded upon the principal of reciprocal behavior (Bosse et al., 2009; Jourdan et al., 2021), is likely to serve to reduce opportunistic behavior by one stakeholder at the expense the corporation. The value of past repeated exchange translated into relational capital essentially insulates the nexus of exchange, at least partially, from environmental uncertainty. The second reason is that by reducing their exposure to the corporation's nexus of exchange, stakeholders would be forfeiting their existing stock of relational capital (Bosse et al., 2009), serving as an important incentive to maintain the exchange-based relationship. In the absence of such relational capital, powerful stakeholders would not only be expected to behave opportunistically when faced with elevated environmental uncertainty, but they would also be expected to reduce their reliance on other exchange partners

(Heide & Miner, 1992). Such withdrawal of support during these periods could increase the likelihood value appropriation deficits ultimately translate into corporate distress.

H3: The hypothesized negative association between effectively addressing powerful stakeholders' more urgent issues and the likelihood of experiencing corporate distress is expected to strengthen when environmental uncertainty is high, all else equal

METHODS

Sample and data

To test my hypotheses, I created a sample of 8,256 foreign and U.S. based corporations that trade on U.S. equity exchanges and had at least $500 million in assets and $100 million in long-term debt outstanding during at least one quarter between the years 2007-2020 according COMPUSTAT. Data on these firms were gathered from multiple archival sources. All data related to stakeholder sentiment were gathered from TruValue Labs – a data-driven resource provider of environmental, social, and governance (ESG) metrics specifically tailored to capture stakeholder sentiment. Company reported financial information was gathered from COMPUSTAT, while data on company-specific equity performance and volatility were gathered from CRSP. Data on environmental uncertainty were gathered from the Economic Policy Uncertainty Index[1] (Bloom & Davis, 2016).

Variables

Dependent variables: Corporate distress

As my hypotheses are principally concerned with examining the role stakeholder management plays in precipitating corporate distress, I employ two sets of variables meant to capture corporate distress. The first set of dependent variables is concerned with distance to

[1] https://www.policyuncertainty.com/

default. Distance to default, which is used in the finance and economics literatures (Bharath & Shumway, 2008; Merton, 1974) literatures, as well as by investment professionals and credit rating agencies (i.e., Moody's KMV Model), is a market-based measure of corporate default risk. I use Merton's distance to default (Merton, 1971) as computed by Bharath's & Shumway (2008). Unlike other measures of default such as credit ratings or liquidity and solvency ratios, distance to default is constantly updated given its reliance on real-time market data. Moreover, it allows for a universe of firms well beyond the number followed by credit rating agencies. It's defined as:

$$DD = \frac{(log\frac{V}{F}) + (r_{i,y-1} - \sigma_V^2 / 2)T}{\sigma_V \sqrt{T}}$$

where, $\sigma_V = \frac{E}{V}\sigma_E + \frac{F}{V}(0.05 + 0.25\sigma_E)$, V is the firm's total value, F is the face value of debt, E is the market value of equity, $r_{i,y-1}$ is the past year's stock returns, σ_E is the stock return volatility estimated over the past year, and T is the number of years set to 1. Distance to default should be interpreted as the number of standard deviations the market value of a corporation's assets is above the total value of a firm's liabilities. I employ two measures for distance to default. The first is a continuous variable named *Distance to default*. The second is a binary variable named *Negative distance to default*. It's coded as 1 if *Distance to default* is negative and 0 if *Distance to Default* is positive. While evidence suggests that a firm won't default just because the expected market value of the firm falls below the value of liabilities, distance to default is a valuable measure for corporate distress. Not only does it capture whether a corporation is expected to appropriate rents during the period, but it also incorporates past allocations (accumulations) of resources to meet prior appropriation deficits (surpluses). Compared to other measures used to measure financial distress, such as binary bankruptcy variables or credit ratings, this variable

more directly captures a corporation's history of value creation and appropriation outcomes relevant to the present likelihood of corporate distress.

The second set of dependent variables are concerned with probability of default – the expected default frequency (EDF) according to the distance to default variable calculated above. It's calculated as: $EDF = \Phi(-Distance\ to\ default)$, with Φ referencing the normal distribution. I create two variables for probability of default. The first is a continuous measure (*Probability of default*), while the second is a binary variable (*Probability of default above 90%*) coded as 1 if *Probability of default* is greater than 90% and 0 if it's less than 90%.

Independent variable: Stakeholder sentiment percentile

As my hypotheses are principally concerned with a corporation's ability to cultivate relational capital with powerful stakeholders, I utilize a measure of stakeholder sentiment toward the corporation that allows for the differentiation of powerful vs. nonpowerful stakeholders, urgent vs. nonurgent stakeholder issues, and the ability to map stakeholder issues to stakeholder groups according to their power. While relational capital is difficult to measure, the sentiment of stakeholder groups toward the corporation has been used as a proxy in the past (Harrison et al., 2010; Henisz, Dorobantu, & Nartey, 2014; Tantalo & Priem, 2016). Although measures of stakeholder sentiment have evolved over time, more recent studies in the strategic management literature have typically measured stakeholder sentiment across environmental (e.g., air quality, energy management), social (e.g., customer privacy, data security), and governance (e.g., business ethics, competitive behavior) issues, commonly referred to as ESG. Earlier studies employed measures calculated using survey instruments (Wolfe & Aupperle, 1991), content analysis (Wolfe, 1991), and reputational scales and rankings (Bowman & Haire, 1975; McGuire,

Schneeweis, & Hill, 1986) that relied upon corporate disclosures as opposed to opinions voice directly by stakeholders themselves.

ESG data for this study is sourced from TruValue Labs which measures a firm's environmental, social, and governance performance across twenty-six distinct categories.[2] TruValue Labs is the first big data provider of ESG data, collecting data on over 17,000 companies as of 2019 from over 100,000 vetted sources, including media outlets, think tanks, nongovernment organizations (NGOs), analyst reports, and paywall sources like LexisNexis which provide indicators of a firm's activities across these 26 distinct issue categories, as well as aggregate ESG performance measures that combine scores across all categories into a single score. To derive performance across all these categories, TruValue Labs employs a natural language processing (NLP) algorithm to read each information source and categorize it by ESG issue as positive or negative sentiment across three different scores, including "pulse" (short-term), "momentum" (trajectory of performance – up or down), and "insight" (long-term), according to its positive or negative sentiment. Each score ranges from 0-100, with scores over 50 reflecting positive sentiment and scores below 50 reflecting negative sentiment. Existing academic literature has drawn on TruValue Labs ESG data to examine the relationship between public sentiment and the value placed on corporate sustainability practices by investors (Serafeim, 2020; Cheema-Fox et al., 2020), stakeholders' satisfaction with a firm's value appropriation practices (McGlinch & Henisz, 2021), the mechanisms linking ESG performance to credit risk (Henisz & McGlinch, 2019), and the ESG performance of active investor signatories to the UN's Principles for Responsible Investment (Kim & Yoon, 2020).

[2] See https://www.truvaluelabs.com/products/data.

There are two additional advantages to using the TruValue data. First, it is the only large-scale ESG data provider to categorize ESG issues according to categories set forth by the Sustainability Accounting Standards Board (SASB) – a nonprofit standard setting body focused on establishing disclosure standards across ESG topics that enable better and more consistent communication between investors and companies about financially material ESG issues.[3] The second benefit to using the TruValue data is that using the SASB categories allows ESG issues to be categorized as financially material or immaterial by industry membership of the firm, with materiality referring to those ESG issues which could affect the financial statements in a way that would influence the decision-making of financial statement users. To illustrate materiality versus immateriality with an example, "GHG emissions" is a material ESG issue for ExxonMobil, an integrated energy company which produces GHG emissions as byproduct of its operations, but not for Wells Fargo, a large commercial and consumer bank which produces no such externality directly as a result of its operations. However, "Data security and customer privacy" is a material category for Wells Fargo but not ExxonMobil as ExxonMobil doesn't possess the personal banking and identity information of millions of consumers.

Integrating this ESG data into our empirical analysis, I begin by taking a quarterly measure (to align with frequency of financial reporting) of each TruValue Labs Insight Category Score for each firm in the sample to create a panel dataset with firm-quarter units of observation. These insight scores range from 0-100 across all 26 categories. As a long-term "stock" measure of a firm's ESG performance, the Insight score is less sensitive to daily events, allowing for a better representation of stakeholder sentiment. Thereafter, these 26 scores are then converted into

[3] As of 2019, over 100 companies have reported with SASB standards and investors representing $33 trillion in assets under management (AUM) are members of its Investor Advisory Group, including institutional asset managers like BlackRock and pension systems like the California State Teachers' Retirement System (CalSTERS).

percentile rankings by industry for each quarter. The industry percentiles are calculated according to the SASB's Sustainability Industry Classifications system to determine ESG materiality scores. Within this industry classification framework employed by the SASB, companies are grouped into 11 sectors and 77 industries according to their business model attributes, resource intensity, sustainability impacts, and sustainability innovation potential.[4,5] Applying a relative measure of ESG performance like industry percentiles is consistent with prior studies in the strategic management literature which utilize industry relative ESG scores to account for not only heterogeneity in strategic approaches to addressing these issues but also the competitive forces that shape those responses (e.g. Luo, Wang, Raithel, & Zheng, 2015).

I next weight these variables by proxies for stakeholder power, referring to the stakeholders' ability to either get the firm to do something it otherwise would not do (Etzioni, 1964; Mitchell et al., 1997) or disrupt value creation and appropriation (McGlinch & Henisz, 2021). It has historically been associated with stakeholders' ability to impact the financial performance of a company. Prior studies examining stakeholder power have explicitly discussed how stakeholders seeking managers' attention exercise power in ways that directly impact the earnings prospects of the firm through the withholding of necessary resources (Frooman, 1999; Lenox & Eesley, 2009). Such actions range from customer boycotts (McDonnell & King, 2013) to more stringent financing covenants (Hite & Owers, 1983). To code the potential of stakeholders to withhold resources that impact the earnings prospects of the firm because of a certain issue, I create the variable *Power* to represent power derived from financially material issues. Using the SASB financial materiality framework as guide, I code this variable as 1 for

[4] See https://www.sasb.org/find-your-industry.

[5] I also tested industry percentiles calculated at the four-digit GIC code level to which results remained robust.

financially material ESG issues defined at the SASB industry level and a value of 0 if the issue is not material at the SASB industry level (Khan, Serafeim, & Yoon, 2015).

Although certain stakeholder issues may have the potential to be financially material, as mentioned in the theoretical development, possessing power is no indication of a desire to use power. As such, I also develop a weight to reflect urgency, or degree to which these claims pertaining to an issue warrant immediate managerial attention (Mitchell et al., 1997). I create this weight by looking at media intensity of each financially material ESG issue relative to all other financially material ESG issues during the TTM period. I calculate this media intensity implied urgency by looking at the share of each ESG issue as fraction of all media coverage of ESG issues relevant to a firm. I label this media intensity variable as *Urgency*. It is calculated as:

$$Urgency = \frac{ESG\ category\ TTM\ article\ count_{i,j,t}}{\sum ESG\ category\ TTM\ article\ count_{i,j,t}} \Leftrightarrow\ Power_{i,j,t} \equiv 1$$

where, *i* is defined as the ESG issue category for company *j* during the TTM period ended *t*. For example, if firm *j* has a total of 10,000 articles related to its 10 financially material ESG categories during the TTM period ended *t* and 500 are related to the financially material ESG issue category "GHG emissions", the urgency weighting for "GHG emissions" would be 5%.

I then take each ESG category percentile and multiply it the *Urgency* weighting to arrive at a weighted category score. I then sum these individual ESG issue scores to arrive at a weighted measure of stakeholder sentiment calculated as:

$$Stakeholder\ sentiment\ percentile_{j,t} = \sum ESG\ category\ industry\ percentile_{j,t} Power_{j,t} Urgency_{j,t}.$$

Lastly, the *Stakeholder sentiment percentile* variable is lagged two years. This is done for two reasons. First, looking at stakeholder sentiment conterminously limits any predictive value regarding managers' behavior and the likelihood of distress. Second, the remaining hypotheses are concerned with how the corporation met stakeholder appropriation expectations prior to

entering distress. This requires looking at a time period in advance of when the dependent variables are being measured.[6]

Independent variable: Environmental uncertainty

To proxy for environmental uncertainty, I use the Global Economic Policy Uncertainty Index from Davis and Bloom (Davis, 2016). This variable is a GDP-weighted average of national economic policy uncertainty for 21 countries. It reflects the frequency of own-country newspaper articles that discuss economic policy uncertainty. I use the global, as opposed to U.S. index given the sample is composed of corporations that are both domestic and foreign but have the option to access to the U.S. bankruptcy system.

Control variables

I draw control variables from prior studies examining the predictors of financial distress and corporate failure. Specifically, I incorporate all predictor variables used by the seminal works to predict distress and default risk (Campbell, Hilscher, Szilagyi, 2008; Chava & Jarro, 2004; Shumway, 2001). These variables include the natural logarithm of total assets (*Ln total assets)*; leverage measured as the total liabilities to the book value of assets (*Liabilities to book value of assets)*; the natural logarithm of market capitalization (*Ln market capitalization)*; Current ratio calculated as current assets divided by current liabilities (*Current ratio)*; profitability (*Return on book value of assets)*; capital intensity measured as capex divided by property, plant and equipment (*Capex/PPE)*; reliance on research and development expense scaled by total assets (*R&D expense/book value of total assets);* last twelve months (LTM) sales growth percentage (*LTM sales growth %); Tobin's Q*; firm age in years (*Firm age)*; Market-to-book value of equity (*Market-to-book ratio)*; the *Return on market value of assets*; leverage as

[6] I also ran results with shorter one year lagged independent and control variables to which results remained robust.

the *Book value of liabilities*/*market value of assets;* liquidity as the *cash & equivalents/market value of assets*; and *Share price*. It's particularly notable that many of variables include both book value as well as market value variables for multiple variables, with market value of total assets calculated as the book value of liabilities and preferred (or other hybrid) shares plus the market value of equity (Campbell et al., 2008). This is meant to provide a more accurate assessment of a corporation's financial condition. All control variables are lagged two years to align with the key independent variables.

---*Table 1 here*---

Methodology

To evaluate *Hypotheses 1 and 2*, which propose that cultivating relational capital among more powerful stakeholders is associated with lower likelihood of future corporate distress, I employ two methods. The first is a panel regression using data from the 8,256 corporations in my sample. For those models with continuous dependent variables that utilize the *xtreg* function in STATA 16.0, firm and year fixed effects are used. For those models with binary dependent variables year and industry fixed effects at the four-digit GIC code are used.

To evaluate *Hypotheses 1 and 2*, I also employ difference-in-difference models to address endogeneity concerns between stakeholder sentiment measures of relational capital and my dependent variables. To construct the difference-in-difference, I use two specific exogenous shocks to the economic system that have also been applied elsewhere in the strategy literature. The first exogenous shock is the collapse of Lehman Brothers in 2008. For this shock I exclude corporations with a four-digit SIC code that align with Lehman Brothers' industry classification given endogeneity issues. The second is the implementation of lockdown for COVID-19 in the spring of 2020. No industries are excluded for this exogenous shock. For each model I create a

binary variable named *Post* that takes a value of 1 for those observations after the event and 0 before.

I test *Hypotheses 3* using OLS or logit regressions (dependent upon whether the dependent variable is binary or continuous) to examine the association between the interaction term of *Stakeholder sentiment percentile* and *Uncertainty* and the dependent variables for corporate distress, bankruptcy, and investor support. For the OLS regressions I use firm and year fixed effects, while I use industry and year fixed effects for the logit regressions at the four-digit SIC code.

RESULTS

Beginning with *Hypothesis 1*, which examines the association between the ability of corporations to effectively address stakeholder issues relevant to powerful stakeholders and the likelihood of experiencing corporate distress, I turn to Models 1-4 of Table 3. Results here show that higher *Stakeholder sentiment percentile* is associated with a lower risk of default (higher distance to default and lower probability of default). Moreover, for the logit models in Models 3-4, better stakeholder sentiment among powerful stakeholders is associated with a decreased likelihood of having a negative distance to default.

---*Table 3 here*---

In *Hypothesis 2*, which examines the association between the ability of corporations to effectively address the most urgent issues of powerful stakeholders and the likelihood of experiencing corporate distress, I turn to Models 1-4 of Table 4. Results also show that higher *Stakeholder sentiment percentile* is associated with a lower risk of default (higher distance to default and lower probability of default). Moreover, for the logit models in Models 3-4, better stakeholder sentiment among powerful stakeholders is associated with a decreased likelihood of

having a negative distance to default. Importantly, the association between *stakeholder sentiment percentile* and the measures of corporate distress strengthen across all models compared to those where issue urgency, or the desire for immediate action, isn't taken into consideration.

---*Table 4 here*---

Turning next to *Hypothesis 3* and the interaction terms between *Stakeholder sentiment percentile* and *Uncertainty* in Table 3, it appears that while *Uncertainty* is negatively associated with *Distance to default* and positively associated with *Probability of default*, the interaction term is positively associated with *Distance to default* and negatively associated with *Probability of default*. This suggests that the relative importance of powerful stakeholder sentiment is higher in periods of elevated environmental uncertainty, lending support to *Hypothesis 1b*.

---*Table 5 here*---

Difference-in-difference models

To evaluate Hypotheses 1 and 2, which suggests that the association between powerful stakeholder sentiment and corporate distress will strengthen with environmental uncertainty, I also undertook a difference-in-difference approach using the closing of the global economy during March 2020 because of COVID-19 and the failing of Lehman Brothers during the financial crisis of 2008 as exogenous shocks to environmental uncertainty.

---*Table 6 here*---

The results for the difference-in-difference models can be found in Table 6 and Table 7. The results in Table 6 use stakeholder sentiment percentiles that are weighted by Power but not urgency, while those in Table 7 use those weighted by both power and urgency. Beginning with the COVID-19 models in Models 1-4 of Table 7, it appears that corporations became more distressed following the closing of the economy as expected, with *Post* showing a positive

association with *Probability of default*, *Negative distance to default*, and *Probability of default above 90%*. It's also negatively associated with *Distance to default* as expected. Meanwhile, the interaction term between *Post* and *Stakeholder sentiment percentile* possesses a negative coefficient for *Probability of default*, *Negative distance to default*, and *Probability of default above 90%*, and a positive coefficient for *Distance to default*, suggesting better powerful stakeholder sentiment is increasing in importance during periods of elevated uncertainty. Moreover, the financial crisis results evaluated in Models 5-8 of Table 7 exhibit similar results as well, suggesting support for *Hypotheses 1 and 2*. Importantly, the results overall appear to be stronger when Stakeholder sentiment percentile is weighted by both power and urgency as opposed to solely power.

SUPPLEMENTARY ANALYSIS

Using unweighted stakeholder sentiment percentiles

The models employed for the primary analysis applied weights to each stakeholder sentiment issue based on the power, measured as financial materiality, and urgency, measured as intensity of media coverage, to test each hypothesis. However, this warrants a comparison to unweighted stakeholder sentiment percentiles to see if such weightings are worthwhile. To address this, I reran each model in Tables 2-7 using unweighted stakeholder sentiment percentiles – the simple average of stakeholder sentiment industry percentiles across all 26 ESG issue categories. The results are available in the online appendix. Overall, it appears that unweighted stakeholder sentiment percentiles are less correlated with the outcome variables across hypotheses, lending further support to the importance of considering stakeholder issue heterogeneity by both power and urgency.

Machine learning applications for financial distress prediction

Weighted vs. unweighted stakeholder sentiment

Prior work on corporate failure and financial distress has been closely interested in predicting default (e.g., Altman, 1968; Altman, 1983; Bharath & Shumway, 2008; Campbell et al., 2008). However, such models often rely upon financial ratios to predict default without building in considerations of managers' agency in affecting these outcomes through their interactions with key resource providers and stakeholders. Because of the immense interest in the relative explanatory power of the models used to identify financial distress, I build on the logit models in my primary analysis by employing various weightings of stakeholder sentiment used to predict distress. While the hypotheses examined in this study weighted ESG issues by power and urgency to arrive at a score of stakeholder sentiment, this is only useful in practical terms to the extent it possesses the ability to explain the occurrence of distress better than models that use unweighted stakeholder sentiment (Dumitrescu, El Hefnawy, & Zakriya, 2019) or no stakeholder sentiment variable. For this portion of the analysis, I turn to machine learning techniques previously used within the artificial intelligence, statistics, and computing literatures to predict bankruptcy model strength (e.g., Atiya, 2001; Atunes, Ribeiro, & Pereira, 2017; Jardin, 2010; Kirkos, 2012). There are multiple benefits to employing this method. First, these techniques utilize training data and validation data. As such, predictions aren't being made on the same data as which the model is fitted. Second, these models allow for varying relationships between independent variables, which allows for better identification of the influence of stakeholder sentiment on the dependent variable of predicting distress. Prior studies indicate that these techniques are more accurate than traditional statistical models, such as multiple discriminant (Altman, 1968) or logistic (Ohlson, 1980) analyses, particularly as it relates to prediction accuracy and error frequency (Barboza, Kimura, & Altman, 2017; Nanni, & Lumini, 2009).

Lastly, it allows for a visual representation of the influence (i.e., feature importance) of individual ESG scores on the prediction of corporate distress.

--- *Table 8 here*---

I employ *XGBoost*, which is a form of decision tree analysis, that classifies a corporation into a distress and non-distressed binary category each period based on the independent and control variables (Son, Hyun, Phan, & Hwang, 2019). For this model I use a negative distance to default to represent distress, while utilizing all control variables from my primary analysis. From *XGBoost* I am able to undertake "sHapley Additive exPlanations" (SHAP) analysis, which is a game theoretic approach to explain the output of machine learning models according to the relative importance of each feature (i.e., predictor variable).[7] The comparison of model strength based on varying weightings of power and urgency can be found in Table 8. This two-by-two matrix compares the power of models that include stakeholder sentiment percentiles weighted by power and urgency, power only, urgency only, and no weights (simple average). According to these results, the fully weighted sentiment score is the best regressor with an F-score (measure of accuracy) of 0.60. It's also important to note that the strength of the models weighting only by power or urgency possess lower F-scores than the unweighted models, suggesting the importance of combining accounting for both factors. Lastly, the F-score for the model including no stakeholder sentiment variables is 0.45 – below the model with a fully weighted stakeholder sentiment percentile.

DISCUSSION AND CONCLUSION

This study investigates how a corporation's *ex ante* ability to address the issues most relevant to powerful stakeholders impacts its propensity for future corporate distress upon an

[7] https://arxiv.org/abs/1705.07874

appropriation deficit. Specifically, by questioning the non-negative surplus assumption of prior studies in stakeholder value-based strategy, I present a theory for managing corporate distress contingent upon the cultivation of relational capital. Not only can relational capital increase a corporation's standing as a legitimate exchange partner, especially when such capital is cultivated with powerful stakeholders, and reduce the likelihood of corporate distress, but it possesses increasing importance during periods of elevated environmental uncertainty when exchange partner dependability is least predictable.

This study makes multiple important contributions to the strategic management literature. First, this study makes direct contributions to emerging perspectives in stakeholder value-based strategy (e.g., Bacq & Aguilera, 2021; Garcia-Castro & Aguilera, 2015; Lieberman et al., 2017; 2017; McGlinch & Henisz, 2021). Current applications of value creation and appropriation assume that stakeholders co-creating value alongside corporations only do so to the extent the value they appropriate exceeds their opportunity costs (Brandenburger & Stuart, 1996). When appropriated value falls below opportunity costs it's assumed those stakeholders find a new value chain. However, this study provides evidence that stakeholders may continue their exchange relationship with the corporation even if there's value appropriation challenges, with legitimacy and mutual dependence identified as potential mechanisms.

Second, it creates a context through which scholars can more clearly study the management of troubled corporations that are in financial or economic distress. Prior studies have either tended to focus on organizational decline, identified as an extended decrease in resource munificence (Cameron, Sutton & Whetten, 1988), or failure, with failure often equated to a binary bankruptcy variable (e.g., Hambrick & D'Aveni, 1988). However, this study examines corporate distress as a condition as well as an outcome. This allows it to be something

that can be either sudden or slow, while also allowing for multiple outcomes that can occur beyond bankruptcy, including capital issuances. It also integrates the financial consideration of value creation and appropriation with importance of legitimacy and dependence, of which a combination appears to contribute to corporate distress.

Fourth, this study utilizes environmental, social, and governance (ESG) sentiment data to measure stakeholder perceptions of a corporation, but it doesn't say anything about the expectations against which perception is judged. As such, it's agnostic to the normative desirability of powerful stakeholders' expectations. This represents a less utilized perspective on ESG data. Traditionally, ESG data are employed to measure corporate social responsibility in the management literature (e.g., Cheng et al., 2014; Ramchander et al., 2012), with higher ESG scores equating to better corporate social performance. However, this study illustrates that its sentiment applications can also be used to measure a corporation's ability to meet stakeholder expectations independent of whether those expectations would be considered better corporate social performance outcomes.

Lastly, this study contributes to the literatures on predicting financial distress and corporate failure using machine learning techniques. While machine learning applications have been used since the 1990s to examine financial distress (e.g., Atiya, 2001; Jardin, 2010; Antunes, Ribeiro, & Pereira, 2017), this study introduces those methodologies to the management literature in a way that allows for direct comparison to the regression-based models that have dominated predicting financial distress. Moreover, this study contributes to prior methods in statistical computing and artificial intelligence (Barboza, Kimura, & Altman, 2017; Nanni, & Lumini, 2009; Wang, Ma, & Yang, 2014; Zięba, Tomczak, & Tomczak, 2016) that often rely solely on financial ratios by introducing stakeholder sentiment variables as predictors. As these

artificial intelligence methods are often developed with industry in mind, continued growth of stakeholder and ESG variables in these types of models could ease barriers banks, lenders, ans investors face in effectively incorporating these factors into their underwriting or investment decisions.

Limitations and extensions

There are multiple limitations to this study as well. The first is that while stakeholder sentiment among powerful stakeholders is operationalized as sentiment applied to ESG issues, the findings here say nothing about whether those powerful stakeholder demands are normatively desirable. The assumption is that if they display positive sentiment, it means their expectations are being met without saying anything about the ethical implications of those expectations. Future research can draw on studies in stakeholder theory to examine under what conditions powerful stakeholders may make demands under which congruence would create competing demands or sanctioning from other stakeholders (Eesley & Lenox, 2006), potentially reducing the benefits of powerful stakeholder sentiment provides.

A second limitation is the independent variable as a measure of stakeholder sentiment. It doesn't measure actual dollar amounts of rent appropriation to powerful stakeholders. Although the sentiment measure is aligned with the principal concern of the study around powerful stakeholder perception, direct tracking of value to stakeholders would be beneficial. While this may not be feasible across a wide sample of industries as in this study due to reporting constraints, future studies can attempt to recreate other industry-based studies in value creation and appropriation that allow for closer tracking of rent allocation (e.g., airlines in Lieberman et al., 2017).

A third limitation of this study is that stakeholder power is viewed as a binary variable either possessed or not possessed. Although urgency helps direct attention to relevant stakeholder issues, next steps would be to consider how addressing the demands of one powerful stakeholder impacts the sentiment of another powerful stakeholder. There's both corporation-stakeholder and stakeholder-stakeholder dyads at play under corporate distress, but the theoretical and empirical development of this paper emphasizes the corporation-stakeholder relationship.

A fourth limitation is that this study doesn't analyze specific actions powerful stakeholders can take to corporations experiencing distress. While there's studies on the types of concessions certain stakeholders, such as suppliers, may make prior to bankruptcy (Yang et al., 2015), evidence is still light. As such, future research should take the empirical results found in this study and extend them to better capture specific ways powerful stakeholders support struggling corporations prior to declaring bankruptcy.

A final limitation is that although corporations that better meet the expectations of powerful stakeholders appear to avoid corporate distress, it's not clear if this is an economically desirable outcome (Moulton & Thomas, 1993). This is relevant for two reasons. First, corporations fail so the resources they possess can be repurposed to their next best use (Flynn & Farid, 1991). Keeping struggling corporations alive through actions of powerful stakeholders may not be economically advantageous over the long-term. Second, there's a strategic component to corporate failure, especially if that failure is followed by a public bankruptcy filing (Moulton & Thomas, 1993). Corporations in Chapter 11 or Chapter 15 reorganization are often able to renegotiate contracts with key stakeholders, lowering their long-term cost base and generating a competitive advantage going forward. For example, American Airlines declared

bankruptcy in 2011 because as the only major U.S. carrier to not reorganize through bankruptcy at that time its seat cost per passenger mile was much higher than competitors (Esterl, 2010). Under circumstances such as this avoiding reorganization may preclude economically beneficial options.

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Table 1. The appropriation deficit and corporate distress

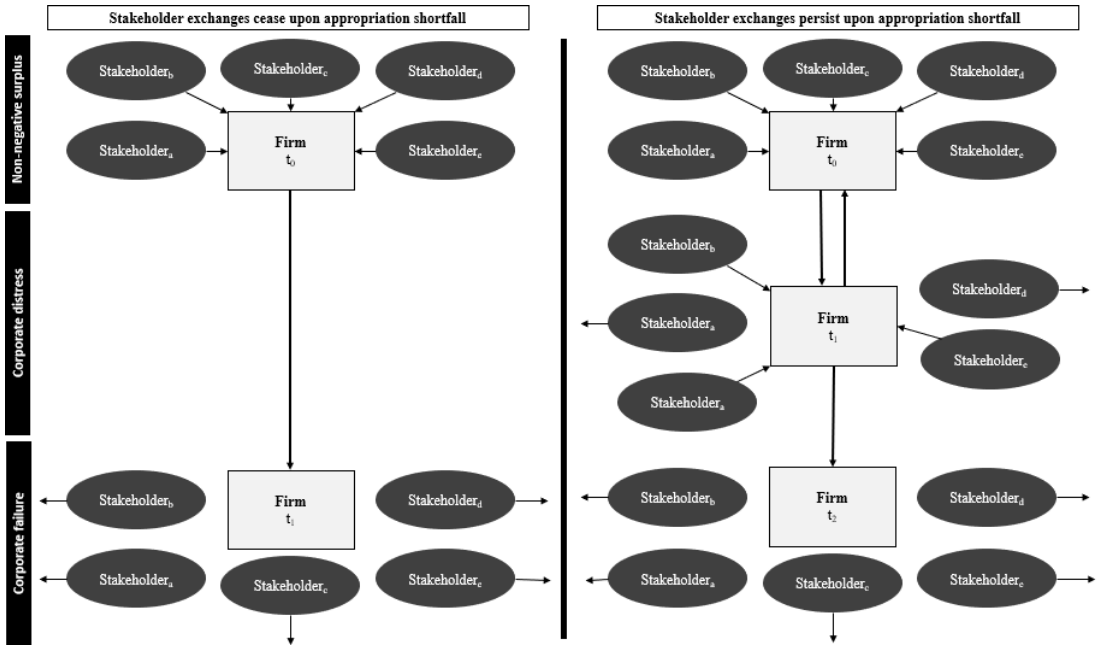

Table 2. Summary statistics and correlations

Variable	Obs	Mean	Std. Dev.	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]	[9]	[10]	[11]	[12]	[13]	[14]	[15]	[16]	[17]	[18]	[19]	[20]	[21]	[22]
[1] Distance to default	252,463	49.00	1363.06	1.00																					
[2] Probability of default	252,463	0.12	0.31	-0.34	1.00																				
[3] Negative distance to default	252,463	0.12	0.32	-0.33	0.98	1.00																			
[4] Probability of defualt above 90%	252,463	0.10	0.30	-0.30	0.94	0.91	1.00																		
[5] Stakeholder sentiment percentile	161,731	49.47	28.52	0.02	-0.03	-0.02	-0.03	1.00																	
[6] Ln(total assets)	331,319	7.16	2.04	-0.13	0.00	0.00	0.00	-0.03	1.00																
[7] Liabilities to book value of assets	328,311	8.40	835.48	-0.01	0.01	0.01	0.01	0.00	0.00	1.00															
[8] Ln(market capitalization)	318,242	6.45	2.50	0.17	-0.17	-0.16	-0.15	-0.03	0.86	0.00	1.00														
[9] Current ratio	250,227	3.00	50.98	0.23	-0.08	-0.08	-0.07	0.00	-0.27	0.00	-0.15	1.00													
[10] Return on book value of assets	303,014	0.03	16.30	0.10	-0.07	-0.06	-0.06	-0.02	0.20	0.00	0.23	-0.06	1.00												
[11] Capex/total assets	317,189	2.62	1412.17	-0.06	0.07	0.07	0.07	0.00	0.04	0.00	0.03	-0.10	0.00	1.00											
[12] LTM sales growth %	331,015	0.04	0.63	0.17	-0.07	-0.07	-0.06	0.01	-0.31	0.00	-0.12	0.22	-0.36	-0.14	1.00										
[13] Tobins Q	268,027	0.87	94.54	0.01	0.00	0.00	0.00	-0.01	-0.03	0.00	-0.01	0.04	-0.02	-0.01	0.06	1.00									
[14] Firm age	295,392	3.94	302.62	0.30	-0.06	-0.05	-0.05	0.02	-0.04	0.00	0.15	0.05	0.01	0.02	0.10	0.03	1.00								
[15] Share price volatility	533,006	15.23	16.37	-0.07	-0.05	-0.05	-0.05	0.01	0.37	0.00	0.31	-0.13	0.11	-0.05	-0.17	-0.02	-0.06	1.00							
[16] Market-to-book ratio	281,970	0.22	0.25	-0.10	0.15	0.14	0.14	-0.01	-0.23	0.00	-0.32	0.07	-0.17	0.03	0.13	0.02	0.00	-0.20	1.00						
[17] Return on market value of assets	297,721	8.05	973.03	0.00	0.01	0.01	0.01	0.00	0.00	0.95	0.00	0.00	0.00	0.00	0.00	0.00	0.02	0.00	0.00	1.00					
[18] Book value of liabilities/market value of asset	277,062	0.01	6.55	0.06	-0.10	-0.09	-0.08	-0.01	0.21	0.00	0.26	-0.06	0.71	0.01	-0.25	-0.01	0.01	0.13	-0.20	0.00	1.00				
[19] Cash & equivalents/market value of assets	297,745	0.47	0.29	-0.59	0.35	0.34	0.32	-0.01	0.26	0.01	-0.23	-0.34	-0.08	0.02	-0.28	-0.03	-0.22	0.12	0.18	0.00	-0.12	1.00			
[20] Share price	291,276	0.12	14.25	0.07	-0.04	-0.04	-0.04	-0.02	-0.28	0.00	-0.28	0.42	-0.14	-0.14	0.30	0.02	-0.03	-0.18	0.15	0.00	-0.18	-0.13	1.00		
[21] Secured debt in capital structure	327,209	68.84	2496.53	0.12	-0.08	-0.08	-0.07	0.01	0.20	0.00	0.29	-0.02	0.10	-0.01	-0.04	0.00	0.04	0.11	-0.14	0.00	0.09	-0.15	-0.08	1.00	
[22] Economic policy uncertainty	571,098	137.17	63.32	-0.13	0.16	0.15	0.15	-0.01	0.00	0.00	0.00	0.00	-0.01	-0.04	0.02	0.00	0.00	0.00	0.05	0.00	0.00	0.01	-0.01	0.04	1.00

Table 3. Powerful stakeholder sentiment and the likelihood of corporate distress[8]

	(1) Distance to default	(2) Probability of default	(3) Negative distance to default	(4) Probability of default above 90%
Stakeholder sentiment percentile	0.009	-0.000	-0.002	-0.001
	(0.040)	(0.025)	(0.022)	(0.041)
Ln(total assets)	-0.453	-0.421	-0.419	-0.436
	(0.290)	(0.315)	(0.313)	(0.025)
Liabilities to book value of assets	-0.001	-0.001	0.000	0.029
	(0.903)	(0.741)	(0.990)	(0.106)
Ln(market capitalization)	0.832	0.803	0.801	0.304
	(0.070)	(0.074)	(0.073)	(0.139)
Current ratio	-0.048	-0.043	-0.038	0.050
	(0.737)	(0.764)	(0.785)	(0.153)
Return on book value of assets	0.310	0.214	0.180	-1.021
	(0.558)	(0.691)	(0.736)	(0.148)
Capex/total assets	2.097	2.034	2.060	-0.680
	(0.222)	(0.243)	(0.237)	(0.557)
R&D expense/total assets	-119.600	-120.800	-119.200	-1.285
	(0.046)	(0.050)	(0.041)	(0.127)
LTM sales growth %	-0.001	-0.001	-0.001	-0.315
	(0.825)	(0.872)	(0.856)	(0.023)
Tobins Q	0.052	0.058	0.058	0.158
	(0.518)	(0.461)	(0.470)	(0.211)
Firm age	0.025	0.025	0.025	-0.002
	(0.020)	(0.022)	(0.019)	(0.652)
Share price volatility	0.371	0.331	0.412	0.325
	(0.477)	(0.525)	(0.398)	(0.125)
Market-to-book ratio	-0.002	-0.002	-0.003	-0.023
	(0.389)	(0.404)	(0.371)	(0.303)
Return on market value of assets	-1.373	-1.390	-1.384	-0.044
	(0.108)	(0.103)	(0.130)	(0.961)
Book value of liabilities/market value of assets	7.130	7.051	7.101	2.266
	(0.002)	(0.002)	(0.002)	(0.002)
Cash & equivalents/market value of assets	-0.971	-1.081	-0.868	1.458
	(0.721)	(0.694)	(0.753)	(0.008)
Share price	-0.032	-0.032	-0.030	-0.003
	(0.123)	(0.120)	(0.137)	(0.000)
Constant	-10.410	-11.490	-11.180	-3.215
	(0.000)	(0.000)	(0.000)	(0.000)
Year fixed effects	Y	Y	Y	Y
Industry fixed effects	N	N	Y	Y
Firm fixed effects	Y	Y	N	N
N	72,452	72,452	72,452	72,452
R-sq	0.092	0.055		

p-values in parentheses

[8] Independent variables lagged 2 years

Table 4. Powerful stakeholder sentiment, urgency weighted, and likelihood of corporate distress[9]

	(1) Distance to default	(2) Probability of default	(3) Negative distance to default	(4) Probability of default above 90%
Stakeholder sentiment percentile	0.011	-0.000	-0.002	-0.002
	(0.029)	(0.017)	(0.020)	(0.011)
Ln(total assets)	-7.119	-0.008	-0.426	-0.501
	(0.000)	(0.081)	(0.000)	(0.000)
Liabilities to book value of assets	0.004	-0.000	-0.000	-0.000
	(0.251)	(0.868)	(0.539)	(0.691)
Ln(market capitalization)	-5.134	0.027	0.540	0.583
	(0.000)	(0.000)	(0.000)	(0.000)
Current ratio	-0.121	0.001	-0.002	0.000
	(0.045)	(0.185)	(0.901)	(0.979)
Return on book value of assets	7.196	-0.020	-0.292	-0.216
	(0.000)	(0.000)	(0.005)	(0.022)
Capex/total assets	-17.430	0.057	2.698	3.053
	(0.000)	(0.012)	(0.000)	(0.000)
R&D expense/total assets	5.917	-0.0109	-0.950	-0.630
	(0.005)	(0.511)	(0.037)	(0.185)
LTM sales growth %	-0.014	0.000	0.003	0.004
	(0.163)	(0.064)	(0.039)	(0.015)
Tobins Q	-0.216	-0.000	-0.385	-0.544
	(0.000)	(0.012)	(0.000)	(0.000)
Firm age	-0.032	0.012	-0.020	-0.019
	(0.624)	(0.000)	(0.000)	(0.000)
Share price volatility	1.446	-0.055	-0.258	-0.340
	(0.046)	(0.000)	(0.008)	(0.001)
Market-to-book ratio	-0.001	0.000	0.000	0.000
	(0.173)	(0.898)	(0.658)	(0.748)
Return on market value of assets	-3.889	0.032	0.478	0.414
	(0.004)	(0.002)	(0.004)	(0.014)
Book value of liabilities/market value o	-32.240	0.204	3.893	3.934
	(0.000)	(0.000)	(0.000)	(0.000)
Cash & equivalents/market value of as	-10.980	0.032	0.285	0.329
	(0.000)	(0.007)	(0.253)	(0.211)
Share price	0.010	-0.000	-0.006	-0.006
	(0.003)	(0.000)	(0.000)	(0.000)
Constant	133.900	-0.348	-3.171	-3.071
	(0.000)	(0.000)	(0.000)	(0.000)
Year fixed effects	Y	Y	Y	Y
Industry fixed effects	N	N	Y	Y
Firm fixed effects	Y	Y	N	N
N	72,452	72,452	72,452	72,452
R-sq	0.118	0.060		

p-values in parentheses

[9] Independent variables lagged 2 years

Table 5. Powerful stakeholder sentiment, corporate distress, and uncertainty

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Distance to default	**Distance to default**	**Probability of default**	**Probability of default**	**Negative distance to default**	**Negative distance to default**	**Probability of default above 90%**	**Probability of default above 90%**
Stakeholder sentiment percentile	0.011	0.026	0.000	0.000	-0.002	-0.002	-0.002	-0.001
	(0.030)	(0.020)	(0.018)	(0.090)	(0.025)	(0.030)	(0.014)	(0.648)
Uncertainty	-0.124	-0.119	0.001	0.001	0.012	0.012	0.012	0.012
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Stakeholder sentiment percentile*uncertainty		0.082		-0.000		-0.000		-0.000
		0.005		(0.002)		(0.042)		(0.038)
Ln(total assets)	-7.481	-7.488	-0.006	-0.006	-0.387	-0.387	-0.464	-0.464
	(0.000)	(0.000)	(0.167)	(0.159)	(0.000)	(0.000)	(0.000)	(0.000)
Liabilities to book value of assets	0.003	0.003	0.000	0.000	0.000	0.000	0.000	0.000
	(0.307)	(0.304)	(0.927)	(0.936)	(0.448)	(0.448)	(0.603)	(0.605)
Ln(market capitalization)	-4.575	-4.574	0.025	0.025	0.499	0.499	0.545	0.545
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Current ratio	-0.129	-0.128	0.001	0.001	-0.001	-0.001	0.002	0.002
	(0.031)	(0.031)	(0.160)	(0.156)	(0.968)	(0.968)	(0.904)	(0.906)
Return on book value of assets	7.047	7.049	-0.020	-0.020	-0.295	-0.295	-0.215	-0.215
	(0.000)	(0.000)	(0.000)	(0.000)	(0.007)	(0.007)	(0.033)	(0.033)
Capex/book value total assets	-19.570	-19.570	0.067	0.067	2.862	2.862	3.209	3.204
	(0.000)	(0.000)	(0.003)	(0.003)	(0.000)	(0.000)	(0.000)	(0.000)
R&D expense/total assets	6.248	6.241	-0.012	-0.012	-0.967	-0.967	-0.627	-0.627
	(0.003)	(0.003)	(0.455)	(0.451)	(0.035)	(0.035)	(0.188)	(0.188)
LTM sales growth %	-0.011	-0.011	0.000	0.000	0.003	0.003	0.003	0.003
	(0.272)	(0.271)	(0.092)	(0.093)	(0.060)	(0.060)	(0.026)	(0.026)
Tobins Q	-0.221	-0.220	-0.001	-0.001	-0.374	-0.374	-0.532	-0.532
	(0.000)	(0.000)	(0.014)	(0.016)	(0.000)	(0.000)	(0.000)	(0.000)
Firm age	2.627	2.627	0.000	0.000	-0.020	-0.020	-0.019	-0.019
	(0.000)	(0.000)	(0.766)	(0.768)	(0.000)	(0.000)	(0.000)	(0.000)
Share price volatility	1.084	1.085	-0.053	-0.053	-0.238	-0.238	-0.326	-0.326
	(0.132)	(0.132)	(0.000)	(0.000)	(0.014)	(0.014)	(0.001)	(0.001)
Market-to-book ratio	-0.001	-0.001	0.000	0.000	0.000	0.000	0.000	0.000
	(0.197)	(0.195)	(0.935)	(0.946)	(0.543)	(0.543)	(0.654)	(0.656)
Return on market value of assets	-3.358	-3.361	0.030	0.030	0.424	0.424	0.357	0.356
	(0.011)	(0.011)	(0.005)	(0.005)	(0.012)	(0.012)	(0.036)	(0.036)
Book value of liabilities/market value of assets	-32.150	-32.180	0.204	0.203	3.911	3.911	3.955	3.950
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash & equivalents/market value of assets	-9.878	-9.897	0.027	0.027	0.205	0.205	0.246	0.246
	(0.000)	(0.000)	(0.022)	(0.024)	(0.412)	(0.412)	(0.351)	(0.351)
Share price	0.010	0.010	0.000	0.000	-0.007	-0.007	-0.007	-0.007
	(0.002)	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Constant	88.830	88.100	-0.149	-0.161	-4.476	-4.484	-4.403	-4.464
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	N	N	N	N	Y	Y	Y	Y
Firm fixed effects	Y	Y	Y	Y	N	N	N	N
N	72,452	72,452	72,452	72,452	72,452	72,452	72,452	72,452
R-sq	0.132	0.132	0.065	0.065				

p-values in parentheses

Table 6. Diff-in-diff: Powerful stakeholder sentiment and the likelihood of corporate distress[10]

	COVID-19 shutdown				Financial crisis			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Distance to default	**Probability of default**	**Negative distance to default**	**Probability of default above 90%**	**Distance to default**	**Probability of default**	**Negative distance to default**	**Probability of default above 90%**
Stakeholder sentiment percentile	0.050	0.000	-0.001	0.000	4.172	0.000	0.000	-0.003
	(0.055)	(0.044)	(0.767)	(0.982)	(0.029)	(0.010)	(0.975)	(0.840)
Post	-3.100	0.197	4.114	4.340	-294.000	0.223	5.100	4.097
	(0.000)	(0.000)	(0.000)	(0.000)	(0.008)	(0.000)	(0.000)	(0.000)
Stakeholder sentiment percentile*Post	0.003	0.000	-0.002	-0.011	1.000	0.000	-0.015	-0.016
	(0.054)	(0.000)	(0.027)	(0.017)	(0.042)	(0.029)	(0.050)	(0.095)
Ln(total assets)	-1.074	-10.860	-0.357	-1.157	-19.440	0.157	-0.557	-0.219
	(0.000)	(0.062)	(0.001)	(0.000)	(0.088)	(0.513)	(0.425)	(0.734)
Liabilities to book value of assets	-0.001	0.063	0.001	0.001	-0.025	0.000	-0.019	-0.012
	(0.945)	(0.189)	(0.159)	(0.919)	(0.493)	(0.926)	(0.411)	(0.522)
Ln(market capitalization)	0.974	-22.040	0.518	1.008	-16.150	0.227	0.578	0.250
	(0.000)	(0.000)	(0.000)	(0.000)	(0.038)	(0.167)	(0.399)	(0.693)
Current ratio	-0.032	0.542	-0.004	-0.001	-0.843	-0.003	0.081	0.094
	(0.608)	(0.155)	(0.545)	(0.983)	(0.117)	(0.803)	(0.396)	(0.305)
Return on book value of assets	-0.423	17.820	-0.002	-0.339	6.966	-0.485	-5.785	-3.279
	(0.654)	(0.095)	(0.990)	(0.723)	(0.697)	(0.199)	(0.017)	(0.160)
Capex/book value total assets	4.221	-4.707	-0.711	3.872	-62.960	2.410	8.869	8.915
	(0.005)	(0.720)	(0.004)	(0.013)	(0.508)	(0.229)	(0.008)	(0.004)
R&D expense/total assets	-3.191	0.884	0.163	-2.974	-11.320	0.197	-1.727	-0.217
	(0.037)	(0.904)	(0.233)	(0.046)	(0.408)	(0.495)	(0.556)	(0.938)
LTM sales growth %	0.013	-0.011	-0.001	0.013	-4.252	-0.056	0.008	0.024
	(0.036)	(0.912)	(0.758)	(0.047)	(0.148)	(0.365)	(0.950)	(0.857)
Tobins Q	-0.968	-8.309	-0.136	-1.152	-0.977	-0.010	0.011	-0.053
	(0.000)	(0.000)	(0.000)	(0.000)	(0.449)	(0.702)	(0.921)	(0.680)
Firm age	-0.003	0.000	0.000	-0.003	0.000	0.000	-0.040	-0.036
	(0.574)	(0.000)	(0.000)	(0.611)	(0.000)	(0.000)	(0.002)	(0.002)
Share price volatility	2.476	7.928	0.145	2.483	9.466	0.403	2.461	2.758
	(0.000)	(0.262)	(0.273)	(0.000)	(0.222)	(0.014)	(0.033)	(0.018)
Market-to-book ratio	0.004	-0.010	0.000	0.004	-0.004	0.001	0.011	0.009
	(0.035)	(0.201)	(0.329)	(0.046)	(0.745)	(0.061)	(0.169)	(0.162)
Return on market value of assets	-0.408	4.816	-0.299	-0.748	-6.881	0.320	5.279	-0.155
	(0.715)	(0.547)	(0.046)	(0.504)	(0.775)	(0.528)	(0.152)	(0.968)
Book value of liabilities/market value of assets	9.708	4.539	0.615	10.260	30.890	0.706	18.250	14.640
	(0.000)	(0.803)	(0.071)	(0.000)	(0.281)	(0.242)	(0.000)	(0.000)
Cash & equivalents/market value of assets	-0.276	-23.450	0.090	-0.182	-34.750	1.240	1.216	1.236
	(0.762)	(0.000)	(0.443)	(0.840)	(0.442)	(0.194)	(0.608)	(0.586)
Share price	-0.014	-0.098	-0.002	-0.014	-0.139	0.000	0.002	0.002
	(0.000)	(0.000)	(0.000)	(0.000)	(0.026)	(0.883)	(0.710)	(0.592)
Constant	311.800	-0.983	-5.227	-5.628	321.900	-3.564	-10.820	-9.780
	(0.000)	(0.089)	(0.000)	(0.000)	(0.000)	(0.044)	(0.000)	(0.000)
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
N	3,900	3,900	3,900	3,900	2,167	2,167	2,167	2,167
R-sq	0.200	0.151	-	-	0.221	0.268	-	-

p-values in parentheses

[10] Independent variables lagged 2 years

Table 7. Diff-in-diff: Powerful stakeholder sentiment, urgency weighted, and the likelihood of corporate distress[11]

	COVID-19 shutdown				Financial crisis			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Distance to default	**Probability of default**	**Negative distance to default**	**Probability of default above 90%**	**Distance to default**	**Probability of default**	**Negative distance to default**	**Probability of default above 90%**
Stakeholder sentiment percentile	0.050	0.000	-0.003	0.000	7.018	0.000	0.001	-0.003
	(0.047)	(0.040)	(0.437)	(0.978)	(0.022)	(0.005)	(0.952)	(0.713)
Post	-24.660	0.208	4.060	4.360	-240.000	0.215	3.512	3.307
	(0.000)	(0.000)	(0.000)	(0.000)	(0.015)	(0.000)	(0.000)	(0.000)
Stakeholder sentiment percentile*Post	0.003	0.000	-0.007	-0.012	1.206	0.000	-0.015	-0.0158
	(0.049)	(0.000)	(0.016)	(0.012)	(0.039)	(0.027)	(0.048)	(0.090)
Ln(total assets)	0.267	0.016	-0.396	-0.439	9086.700	-0.098	-0.245	0.056
	(0.869)	(0.287)	(0.177)	(0.136)	(0.000)	(0.000)	(0.735)	(0.933)
Liabilities to book value of assets	0.005	0.001	0.005	0.008	-12.890	-0.003	-0.025	-0.017
	(0.796)	(0.064)	(0.470)	(0.390)	(0.701)	(0.121)	(0.343)	(0.452)
Ln(market capitalization)	1.644	-0.033	0.211	0.288	-9312.400	0.092	0.243	-0.072
	(0.285)	(0.024)	(0.459)	(0.314)	(0.000)	(0.000)	(0.732)	(0.913)
Current ratio	0.792	0.000	-0.025	-0.079	-235.800	0.012	0.050	0.043
	(0.001)	(0.977)	(0.664)	(0.266)	(0.005)	(0.005)	(0.614)	(0.669)
Return on book value of assets	28.470	0.032	-0.702	-0.228	-3496.000	0.107	-4.039	-1.224
	(0.000)	(0.525)	(0.476)	(0.826)	(0.001)	(0.037)	(0.094)	(0.601)
Capex/book value total assets	-44.620	0.915	12.020	12.300	-553.100	0.360	8.546	8.752
	(0.000)	(0.000)	(0.000)	(0.000)	(0.809)	(0.001)	(0.006)	(0.003)
R&D expense/total assets	34.640	-0.087	-2.844	-2.504	5178.100	-0.045	-3.648	-3.081
	(0.000)	(0.246)	(0.073)	(0.139)	(0.002)	(0.586)	(0.206)	(0.262)
LTM sales growth %	-0.098	0.000	-0.010	-0.003	-0.055	0.000	-0.014	-0.010
	(0.004)	(0.870)	(0.770)	(0.916)	(0.998)	(0.614)	(0.920)	(0.951)
Tobins Q	2.133	0.002	-0.718	-0.745	332.700	-0.003	-0.008	-0.065
	(0.000)	(0.211)	(0.001)	(0.002)	(0.000)	(0.253)	(0.949)	(0.631)
Firm age	-0.078	-0.001	-0.010	-0.011	-19.050	-0.003	-0.060	-0.051
	(0.052)	(0.005)	(0.103)	(0.073)	(0.044)	(0.000)	(0.000)	(0.000)
Share price volatility	-15.260	0.164	1.899	2.341	-4064.400	0.160	3.161	3.416
	(0.000)	(0.000)	(0.005)	(0.001)	(0.000)	(0.003)	(0.009)	(0.006)
Market-to-book ratio	-0.002	0.000	0.001	0.000	1.947	0.000	0.013	0.011
	(0.923)	(0.920)	(0.852)	(0.992)	(0.908)	(0.681)	(0.198)	(0.200)
Return on market value of assets	-19.770	-0.184	-1.721	-1.175	15271.500	-0.303	2.269	-3.843
	(0.017)	(0.021)	(0.231)	(0.405)	(0.000)	(0.028)	(0.537)	(0.343)
Book value of liabilities/market value of assets	-71.030	0.587	8.349	8.174	-31639.900	1.264	16.790	13.430
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Cash & equivalents/market value of assets	-9.893	-0.027	0.076	-0.108	917.300	0.355	2.462	2.055
	(0.049)	(0.618)	(0.938)	(0.918)	(0.612)	(0.000)	(0.302)	(0.367)
Share price	0.012	0.000	-0.013	-0.013	19.530	0.000	0.003	0.004
	(0.028)	(0.269)	(0.000)	(0.000)	(0.001)	(0.292)	(0.562)	(0.401)
Constant	55.500	-0.017	-6.362	-7.035	14344.200	-0.304	-10.870	-9.625
	(0.000)	(0.687)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Year fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
Industry fixed effects	Y	Y	Y	Y	Y	Y	Y	Y
N	3,900	3,900	3,900	3,900	2,167	2,167	2,167	2,167
R-sq	0.239	0.221	-	-	0.233	0.277	-	-

p-values in parentheses

[11] Independent variables lagged 2 years

Table 8. Comparison of model strength for different stakeholder sentiment weightings[12]

		Urgency	
		Yes	No
Power	Yes	0.60*	0.37
	No	0.37	0.48

**Best model based on F-score*

[12] F-score for model with no stakeholder sentiment variable: 0.45