Capability Reputation, Character Reputation, and Exchange Partners' Reactions to Adverse Events

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ABSTRACT

To investigate when a firm's reputation affects its exchange partners' responses to adverse events, we distinguish between two types of reputation identified in prior work, *capability reputation* and *character reputation*, and present arguments for differences in their effects on exchange with potential and current exchange partners. Building on theory regarding uncertainty in exchange, we propose that potential exchange partners pay more attention to a firm's capability reputation than its character reputation in the wake of adverse events. Thus, capability reputation has a buffering effect on relationship formation. In contrast, current exchange partners attend more to the firm's character reputation than its capability reputation following adverse events. Hence, they are less likely to dissolve their relationships to organizations with high character reputations. Furthermore, we propose that the buffering effects of capability reputation and character reputation will be significantly reduced when the adverse events are caused by factors within the firm's control. We find support for our arguments in an analysis of interstate gas transmission pipeline accidents in the United States from 2004 to 2013.

Keywords: organizational reputation, capability reputation, character reputation, adverse events, accidents, sensemaking, exchange partners, exchange networks, inter-organizational relationships, gas pipelines

Adverse events, such as industrial accidents, occur in great number in the modern business landscape (Bundy, Pfarrer, Short, & Coombs, 2017; Leveson, Dulac, Marais, & Carroll, 2009; Perrow, 2011). In many cases, they are judged as organizational wrongdoing (Palmer, 2012) or misconduct (Greve, Palmer, & Pozner, 2010; Vaughan, 1999) and lead to a decline in performance (Davidson & Worrel, 1988; Iii, Worrell, & Lee, 1994) or reputation (Basdeo, Smith, Grimm, Rindova, & Derfus, 2006). Yet in other cases, they are overlooked, considered "normal" or attributed to causes beyond the organization's control (Perrow, 2011).

Adverse events are particularly salient to a firm's exchange partners because affiliations with a firm that violates norms can lead to penalties for its partners, even when they are not directly involved (Bruyaka, Philippe, & Castañer, 2018; Pontikes, Negro, & Rao, 2010; Yu, Sengul, & Lester, 2008). If exchange partners perceive an adverse event, such as an organizational accident, to be an inevitable outcome of a complex system, then they may not react negatively to it (Perrow, 2011; Tomlinson & Mryer, 2009). However, if they believe that it is due to misconduct or incompetence, then they could be motivated to reduce their interactions with the organization (Devers, Dewett, Mishina & Belsito, 2009; Jensen, 2006; Sullivan, Haunschild & Page, 2007).

Exchange partners' reactions to adverse events depend not only on the nature of the events, but also on their existing beliefs about the focal organization. Prior research has emphasized organizational reputation as an important cue for exchange partners following negative events (Rhee & Haunschild, 2006). Often, it serves as a buffer reducing the negative reactions of stakeholders (Pfarrer, Pollock, & Rindova, 2010; Zavyalova, Pfarrer, Reger, & Hubbard, 2016). However, in some cases it may be a liability. High reputation firms are more closely monitored by stakeholders (Brooks, Highhouse, Russell, & Mohr, 2003), and may suffer greater market penalties than low reputation firms following adverse events (Rhee & Haunschild, 2006). Thus, although scholars agree that reputation is a critical factor for explaining reactions to adverse events, contradictory findings point to the need for further research.

One reason for these contradictory findings could be that in prior work different types of reputation have been studied (Dowling & Gardberg, 2012; Lange, Lee, & Dai, 2011; Rindova & Martins, 2012). Lange and colleagues (2011) in a review of organizational reputation research note that multiple definitions, conceptualizations and operationalizations have emerged across studies of organizational reputation. Similarly, Jensen, Kim and Kim (2012) point out that reputation research has taken different pathways across economics, sociology and management. While a number of studies have focused on reputation as a signal of organizational capabilities (Rindova, Williamson, Petkova, & Sever, 2005) or quality (Allen, 1984; Shapiro, 1983), others have highlighted reputation as a predictor of future behaviors (Basdeo et al., 2006; Kreps & Wilson, 1982). Rather than attempting to converge on a single definition of reputation, scholars have begun to investigate different dimensions of organizational reputation and recognize that firms can have multiple reputations (e.g., Boivie, Graffin, & Gentry, 2016; Wei, Ouyang, & Chen, 2017). Attention to different types of reputation can provide greater theoretical clarity regarding the antecedents and consequences of reputation.

In this study, we investigate how different types of organizational reputation affect exchange relationships following adverse events. We define reputation as "a collective social judgment regarding the quality or capabilities of a focal actor within a specific domain" (Boivie et al., 2016: 188). In line with recent work recognizing that firms have multiple reputations, we consider two types of reputation—a firm's *capability reputation* and its *character reputation* (Mishina, Block & Mannor, 2012). Building on research into social perception and judgment in social psychology (e.g., Fiske, Cuddy, Glick, & Xu, 2002; Judd, James-Hawkins, Yzerbyt, & Kashima, 2005), Mishina and colleagues (2012) propose that stakeholders make distinctions between a firm's capabilities (i.e., capability reputation) and its character (i.e., character reputation). Capability reputation describes "collective evaluations about the quality and performance characteristics of a particular firm," whereas character reputation refers to "collective judgments regarding a firm's incentive structures and behavioral tendencies based on observations of its prior actions" (Mishina et al., 2012: 460). An important insight of their work is that stakeholders, including exchange partners, value each type of reputation differently depending on the nature of uncertainty they face.

We propose that capability reputation and character reputation can buffer firms from negative outcomes following adverse events, but that their effects differ for potential and current exchange partners. Prior research on exchange networks has shown that the factors that affect current exchange partners' decisions to withdraw from exchange are different from the factors that affect potential exchange partners' decisions to enter into exchange with the firm (e.g., Greve, Baum, Mitsuhashi, & Rowley, 2010; Polidoro, Ahuja, & Mitchell, 2011). Exchange partners all face some degree of uncertainty about quality (i.e., lemons problem) (Akerlof, 1970) and opportunism (i.e., moral hazard) (Arrow, 1971; Williamson, 1975) but the salience of each type of uncertainty differs for potential and current partners. Because capability reputation and character reputation help exchange partners cope with different types of uncertainty, they also are likely to differ in their importance for potential and current exchange partners' decisions to form or dissolve their relationships with the focal organization following adverse events. At the same time, the buffering effects of capability and character reputations following adverse events may be limited, in particular if the event is perceived to have been controllable (Bundy & Pfarrer, 2015; Wei et al., 2017). If a firm with a high capability or character reputation experiences a severe and controllable adverse event, exchange partners may suspect that the reputation is overrated. Yet, if the event is not controllable, they are less likely to change their beliefs about the firm's reputation, and high reputation would still serve as a buffer following the event.

To test our arguments, we examine the reactions of gas shippers to interstate gas transmission pipeline accidents experienced by 57 pipeline operators in the United States from 2004 to 2013 (423 firm-years). Gas shippers represent the main exchange partners and a key stakeholder group for operators. The performance and survival of the operator's business depends upon the contracts signed with shippers to transport their gas to market. These contracts are on average relatively large ($2 million per contract in our data) and long-term (9.5 years in our data). In our context, the adverse events are pipeline accidents, which are clearly documented by the Pipeline and Hazardous Materials Safety Administration (PHMSA), the regulatory organization responsible for pipeline safety in the United States. Pipeline accidents vary from minor leaks to large ruptures that result in property damage, casualties or deaths. As an indication of shippers' reactions to operators' accidents, we observe the number of shipper relationships each pipeline operator gains and loses (i.e., ties formed and dissolved) following pipeline accidents. Analyses of tie formation and dissolution following accidents provide support for our arguments.

Our study extends prior research into the effects of organizational reputation on firm performance (e.g., Boivie et al., 2016; Mishina et al., 2012; Rindova et al., 2005) by taking a multi-dimensional view of reputation and developing novel arguments for the different roles capability reputation and character reputation play in exchange partners’ reactions to adverse events. In line with recent research into the dynamics of exchange networks (Greve et al., 2010; Polidoro et al., 2011; Rowley, Greve, Rao, Baum, & Shipilov, 2005), our findings suggest that relationship formation and relationship dissolution are asymmetric processes affected differently by a firm’s capability and character reputation. Relatedly, we extend prior research into exchange dynamics following adverse events (Sullivan, Haunschild, & Page, 2007) by providing evidence of more nuanced buffering effects of reputation. Lastly, our study begins to clarify contradictory findings regarding the consequences of adverse events (Palmer, 2012; Perrow, 2011; Rhee & Haunschild, 2006). Reputation can buffer organizations after adverse events, but the strength of the effect depends on the type of reputation, the type of stakeholder and the controllability of the event.

THEORY AND HYPOTHESIS

When a firm experiences an adverse event, the event not only hurts the firm, but also potentially affects its exchange partners (Sullivan et al., 2007; Yu et al., 2008). An adverse event with severe consequences, such as death or injury, is more likely to increase the salience of the event to stakeholders (Hoffman & Ocasio, 2001; Shrivastava, Mitroff, Miller, & Miclani, 1988), to arouse negative emotions (Pearson & Clair, 1998) and to induce social disapproval of the organization involved (Bundy & Pfarrer, 2015; Zavyalova, Pfarrer, Reger, & Shapiro, 2012). Accordingly, it is likely that some exchange partners would reduce their economic interactions with the organization (Jensen, 2006; Jonsson, Greve, & Fujiwara-Greve, 2009; Yu et al., 2008). However, whether all exchange partners would do so is not clear. Consider the Deepwater Horizon oil spill in the Gulf of Mexico. It was driven by the combination of various causes including valve failure, an overwhelmed separator, a misinterpreted pressure test, no gas alarm, and no battery for the blowout preventer (Mullins, 2010). Under such complicated circumstances, exchange partners lack a clear understanding of the causes and consequences of the accident and, it is difficult to predict how they would respond.

Reputation Effects on Exchange Following Adverse Events: The Role of Uncertainty

To develop arguments for exchange partners' reactions to adverse events, we begin with existing theory regarding exchange relationships. A firm's performance and survival depend greatly on its ability to access resources and information through exchange (Pfeffer & Salancik, 2003). Research in both sociology and economics has identified uncertainty as a central factor to exchange relationships (Akerlof, 1970; Gulati & Gargiulo, 1999; Podolny, 1994; Williamson, 1975) classifying it into two main categories. The first type, the lemons problem (Akerlof, 1970), stems from an inability to directly observe the quality of the firm or its products before entering into any type of exchange. The second type is a moral hazard problem in which exchange partners face the possibility of being exploited or treated unfairly if the firm engages in opportunistic behavior (Arrow, 1971; Williamson, 1991). Both can affect the formation and dissolution of exchange relationships. For example, a firm may decide not to form a relationship with another firm because ex ante uncertainty about the others' competence is high (Beckman, Haunschild, & Phillips, 2004; Podolny, 1994). Similarly, it might decide to sever a relationship to an existing firm if circumstances change such that the other could do it harm, for example by leaking sensitive information (Rogan, 2014).

When exchange partners consider exchange under uncertainty, they look to their potential partner's reputation to decide whether to start a new exchange or continue to exchange with another firm (Jensen & Roy, 2008; Kollock, 1994). Adverse events further increase uncertainty; thus, reputation is particularly useful to exchange partners trying to make sense of a firm's adverse events. Attribution theory predicts that when a high reputation firm experiences an adverse event, exchange partners make attributions consistent with their prior beliefs to resolve cognitive inconsistencies between the firm's good reputation and its bad event (Kelley & Michela, 1980; Weiner, 1985; Zuckerman, 1979). In this case, exchange partners would be less likely to judge the event as resulting from a firm's actions, and reputation buffers the firm from negative outcomes.

Several empirical studies provide evidence consistent with a buffering effect of high reputation (e.g., Coombs & Holladay, 2006; Decker, 2012; Love & Kraatz, 2009; Pfarrer et al., 2010; Schnietz & Epstein, 2005). For example, in Pfarrer and colleagues' (2010) study, after announcements of negative earnings surprises, high reputation firms were punished less than low reputation firms. Similarly, Love and Kraatz (2009) showed that higher reputation firms experienced less damage to their reputations after downsizing. Yet, suggesting limitations to the buffering effect, Zavyalova and colleagues (2016) found that although high reputation universities were more likely to receive donations than low reputation ones following NCAA sports infractions, the buffering effect of high reputation was conditional upon strong alumni identification with their university and a low number of infractions. Furthermore, in other situations, rather than buffering, high reputation has been shown to be a liability. For example, Rhee and Haunschild (2006) found that after product recalls, high reputation automobile manufacturers were penalized more than low reputation ones, and in particular when substitutes were available.

These observed differences in reputation's effects could be explained in part by the argument that firms have more than one reputation. In a review of the organizational reputation literature, Lange and colleagues (2011: 155) propose a categorization of reputation across three dimensions: "being known" (i.e., familiarity or awareness of the firm), "being known for something" (i.e., perceptions that the firm has a particular attribute) and "generalized favorability" (i.e., judgments of the goodness or attractiveness of the firm). Emphasizing the second dimension, Boivie and colleagues (2016: 191) note that "for a given audience, a reputation based on specific attributes or dimensions will be more influential than a more general reputation."

In this study, because we are interested in the reactions of exchange partners, we focus on the dimension of reputation as "being known for something." Scholars have recognized that firms have multiple reputations that vary in their relevance to different audiences (Ertug, Yogev, Lee, & Hedström, 2016; Jensen et al., 2012; Rindova et al., 2005). For example, a firm could have a reputation for generating consistently reliable products and services (Rindova, Williamson, & Petkova, 2010), and also a reputation for behaving in a trustworthy or desirable manner (Basdeo et al., 2006; Standifird, 2001). In an analysis of exchange partner choices, Jensen and Roy (2008) considered a firm's reputation for its technical skills and its integrity. Graffin and Ward (2010) propose that reputation consists of two types of assessments: the assessment of capability and social desirability. In conceptual work, Mishina and colleagues (2012: 460) also make a clear distinction between capability reputation and character reputation whereby the former represents an overall capability related to performance enhancement (*what it can do*) and the latter is indicative of the collective judgments of a firm's behavioral tendencies (*what it is likely to do*). Furthermore, because audiences' primary sources of concern and uncertainty differ, reputations can have audience-specific effects on firm performance (Ertug et al., 2016; Jensen et al., 2012). Taken together, prior research suggests that firms have (at least) two types of reputation – one pertaining to competence or capability and the other pertaining to integrity or character – and that the effects of reputation may vary with the audience or stakeholder group considered.

We propose that this distinction between the two types of reputation, i.e., capability and character, is critical to arguments regarding the effect of adverse events on exchange relationship formation and dissolution. Within the dimension of reputation as "being known for something" (Lange et al., 2011), capability reputation reflects the degree to which a firm is known for competence and quality, and character reputation reflects the degree to which a firm is known for integrity and trustworthiness. According to Mishina and colleagues (2012), each type of reputation helps stakeholders deal with the two main uncertainties they face in their interactions with a firm. When firms face a lemons problem, capability reputation serves as a proxy for underlying firm or product characteristics such as quality, and therefore provides guidance to an exchange partner on whether it should exchange with the focal firm or if it should consider a different partner. When firms face a moral hazard problem, character reputation is important "because character reputations involve imputations of an organization's goals, preferences, and values (e.g., Love & Kraatz, 2009) [and] stakeholder groups use character reputations to predict not only opportunistic behavior but also a host of other behaviors" (Mishina et al., 2012: 461). For example, an exchange partner may use the firm's character reputation to gauge the likelihood that the firm would engage in practices that violate environmental regulations or fix mistakes at its own expense.

As noted above, adverse events further increase uncertainty for exchange partners, in turn affecting their decisions to exchange with the firm. For example, in a study of U.S. manufacturing and service firms by Sullivan, Haunschild, and Page (2007), following revelations of a firm's unethical acts such as environmental violations or tax evasion, the firm's exchange partners were more likely to sever their relationships and its new exchange partners were lower quality. Adverse events raise questions about the firm's competence (i.e., its ability to deliver goods and services) and its culpability (i.e., whether the event could have been prevented). Thus, we expect that the increase in uncertainty following adverse events will increase the salience of both capability and character reputation for relationship formation and dissolution decisions. Yet, the size of the effect of each type of reputation depends on how the event affects the level and type of uncertainty confronting the exchange partner.

Relationship Formation and Dissolution Following Adverse Events

Most empirical research into exchange networks to date has focused on the formation of relationships (e.g., Chung, Singh, & Lee, 2000; Gulati, 1995; Kenis & Knoke, 2002; Podolny, 1994; Sorenson & Stuart, 2008) with less attention to their dissolution (e.g., Baker, Faulkner, &

Fisher, 1998; Broschak, 2004; Rogan, 2014). As a consequence, earlier theories of exchange networks largely assumed that the processes of formation and dissolution were symmetric: i.e., that the factors that increase the likelihood of the relationship formation also reduce the likelihood of dissolution. Increasingly scholars have recognized that formation and dissolution are distinct processes that occur in different contexts and draw on different informational cues (Beckman et al., 2004; Dahlander & McFarland, 2013; Greve et al., 2010; Polidoro et al., 2011; Shipilov, Rowley, & Aharonson, 2006). For example, Beckman and colleagues (2004) argue and find that market uncertainty increases relationship continuity but not relationship formation. Research by Shipilov and colleagues (2006) shows that third-party ties between partners are significantly discounted once first-hand experience is available. Relationship formation is significantly related to the presence of third party ties, but dissolution is not. Thus, in exchange networks, the inverse of the factors that predict relationship formation does not necessarily predict relationship dissolution.

The observed asymmetry in relationship formation and dissolution processes could stem from differences in the type of uncertainty most salient to exchange partners during relationship formation versus dissolution. In general, a key uncertainty at relationship formation is whether the firm will be able to provide quality services or goods, i.e., the lemons problem (Akerlof, 1970; Shipilov et al., 2006). If the quality is known only after use, then uncertainty prior to the exchange is high. Lacking information from direct experience with the firm, potential partners rely on the quality evaluations made by others, i.e., the firm's capability reputation, when deciding whether to exchange with the firm. In contrast, a firm's current partners have first-hand information about the firm's quality (Dirks & Ferrin, 2001; Uzzi, 1999), and the lemons problem is likely to be of less concern for current partners (Andersen & Sørensen, 1999). Accordingly, the value of a third-party signal of quality, i.e., capability reputation, is likely to be higher for a firm's potential partners than its current partners (Podolny, 1994; Polidoro et al., 2011).

Potential partners do also have moral hazard concerns given their lack of experience with the focal firm, and these could increase following an adverse event. However, their primary concern will be whether the focal firm can provide resources of a certain quality level. Only after uncertainty about quality is reduced would potential partners consider the moral hazard of the exchange. This argument is consistent with Katila, Rosenberger and Eisenhardt's (2008) finding that firms have a strong tendency to work with partners with high-quality resources even when the partners have a high potential for misappropriation. This finding suggests that potential partners put more attention to resolving the lemons problem than addressing the moral hazard issue. Thus, we expect that following an adverse event, the focal firm's capability reputation is a more relevant cue for potential partners given the greater ex ante quality uncertainty they have. In this situation, capability reputation serves as a buffer such that high capability reputation firms will be less likely to suffer a decrease in relationship formation than low capability reputation firms.

For the firm's current partners, although they are certainly concerned about the quality of the firm, third party evaluations of quality, i.e., the firm's capability reputation, are less useful because current exchange partners' direct experience with the firm already provides in-depth information about the firm's capability. Rather, they are more concerned about uncertainty regarding an organization's future behavior (Parkhe, 1993). In the context of an adverse event, current exchange partners use the firm's reputation to evaluate their vulnerability to at least two negative consequences of the event – blame shifting (Oexl & Grossman, 2012; Park, Park, &

Ramanujam, 2018) and stigma anxiety (Bruyaka et al., 2018). Both of these could affect their decisions to continue to exchange with the firm following an adverse event.

Blame shifting presents a moral hazard to exchange partners. It occurs when a firm attempts to shift the blame for an accident or misconduct to its partners, akin to scapegoating individual members of a firm (e.g., Pozner, 2008). It may be used to prove guiltlessness following adverse events, in particular when information on the cause of the event is not known. Blame shifting is a form of self-serving attribution bias (Aquino, Tripp, & Bies, 2001; Ross, Greene, & House, 1977), in which "attributions for failure are usually relatively external" (Kelley & Michela, 1980: 474). Though not commonly studied by strategy and management scholars, economics and political science researchers have identified blame shifting as a strategic action used in politics, for example when a legislature delegates the implementation of an unfavorable policy to an agency, in order to soften the blame that it will face (e.g., Bressman, 2003; Hill, 2015; Oexl & Grossman, 2012). Similarly, following adverse events, firms may attempt to shift blame to avoid penalties associated with the events (Noggle & Palmer, 2005).

Because a firm can shift blame only to other firms partnered with it at the time of the adverse event, its current partners have good reason to be concerned. In this situation, the focal firm's character reputation serves as a cue in current partners' assessment of the potential for blame shifting by providing insight into what a firm is likely to do in a particular situation. It helps firms avoid opportunistic transaction partners and identify circumstances that require additional monitoring (Mishina et al., 2012).

Though research on firm reputation and blame shifting is lacking, related studies on reputation and risk suggest that firms with high reputations tend to engage in risk reduction strategies (Petkova, Wadhwa, Yao, & Jain, 2014). Although blame shifting could appear to reduce risk for firms, the consequences of being found out are often much greater than bearing the penalties for taking responsibility for their actions (Moynihan, 2012). The reputational losses associated with exposure of blame shifting mean that high character reputation firms may be less likely to shift blame. In line with this argument, in an analysis of financial statements, Bundy (2014) found that firms with higher social reputations, defined as positive evaluations of their corporate accountability and responsibility, employed more accommodative response strategies (i.e., repairing the damage rather than avoiding blame) following financial and environmental violations. Similarly, Atanasov, Ivanov, and Litvak (2012) found that more reputable venture capital firms were less likely to act opportunistically, and those that did suffered a significantly greater decline in future deals. Hence, we propose that current partners of firms with high character reputations have less fear that the firms will shift blame, and therefore they will be less likely to dissolve their relationships with the firm after an adverse event.

The second factor that affects current partners' responses to the firm's adverse event is stigma anxiety. In recent conceptual work, Bruyaka and colleagues (2018: 446) propose that exchange partners of a firm experiencing an adverse event are likely to develop stigma anxiety, defined as "the nonstricken partner's fear of being stigmatized by association." Such anxiety is merited. Stigma transfer has been well documented in prior work. For example, Pontikes and colleagues (2010) show how the stigma associated with Hollywood actors' communist party memberships during the red scare transferred to actors who were cast in the same films as the stigmatized actors. At the firm level, Jensen (2006) illustrates how exchange partners of Arthur Andersen disassociated themselves from the firm following the Enron scandal to protect their own status positions and avoid being stigmatized.

Given the risk of stigma transfer, when the focal firm experiences an adverse event, its exchange partners assess the likelihood that the firm will be stigmatized. Although all firms are at risk of stigmatization after an adverse event, not all are stigmatized. As noted by Godfrey (2005: 788), "when a firm engages in a bad act, the more positive moral capital it has accrued, the better it is protected from stakeholder sanction, as stakeholders account for this capital when imputing a sort of "culpability score" for the bad act." Whether a focal firm will actually be stigmatized depends in large part on its character reputation because an organization with a less favorable character reputation is likely to be viewed with suspicion and distrust by others (Mishina et al., 2012). Thus, the firm's partners are likely to use the firm's character reputation as a cue in their interpretations of the event. Importantly, stigma anxiety can arise prior to actual stigmatization of the focal firm. Indeed, separating from the focal firm before it is stigmatized provides greater insurance against stigma transfer (Semadeni, Cannella Jr., Fraser, & Lee, 2008). Thus, an exchange partner's fear of potential stigma of the focal firm is sufficient to increase the partner's stigma anxiety.

We expect that the focal firm's character reputation is an important part of sensemaking of adverse events by its current partners who use "reputation as a proxy for knowledge of opportunistic intentions" (Parkhe, 1993: 802). Firms that have higher character reputations are less likely to engage in blame shifting and less likely to be stigmatized, and so their current partners' concerns for blame shifting and stigma transfer will be lower. It is important to note that current partners with direct experience of the focal firm's character will still have reason to consider its character reputation. It is the firm's character reputation that protects it from stigma formation, regardless of the current partner's own assessment of the focal firm's character. Thus, even if they have information on the firm's character, they still will consider its character reputation when deciding whether to dissolve their relationships.

To be sure, potential partners could also be concerned about character reputation after an adverse event. But potential partners were not affiliated with the focal firm at the time of the event and therefore, they are neither subject to blame shifting nor likely to suffer stigma transfer. Given their lower concerns for blame shifting and stigma anxiety, we expect that potential partners will weigh character reputation less heavily than capability reputation when deciding whether they will form an exchange relationship with the focal firm. In summary, we propose that capability reputation will have a greater buffering effect on relationship formation than character reputation and that character reputation will have a greater buffering effect on relationship dissolution than capability reputation. Our arguments are summarized in Figure 1. Formally,

H1: *Capability reputation will have a greater buffering effect on relationship formation than character reputation following adverse events.*

H2: *Character reputation will have a greater buffering effect on relationship dissolution than capability reputation following adverse events.*

Insert Figure 1 about here

Controllability and Limits to the Buffering Effects of Reputation. As argued above, capability reputation and character reputation play different roles for potential and current exchange partners' sensemaking of an adverse event and their subsequent reactions. However, the argument hinges on the assumption that exchange partners' judgments are influenced by their stable beliefs about the organizations. Accordingly, when exchange partners observe an adverse event experienced by a high capability or high character reputation firm, they may speculate that the event was not caused by incompetence or untrustworthy behavior. However, this conjecture is no longer valid when "new information comes to light for observers" (Lange et al., 2011: 178) and exchange partners have information regarding the actual cause of the event. If an adverse event of a high reputation firm is known to be rooted in controllable causes, it can break exchange partners' strongly held beliefs that the firm has a high level of competence or trustworthiness. For example, in a study of corporate crises of public firms in China, Wei and colleagues (2017) found that the buffering effect of reputation was weaker when responsibility for the crisis was high. Once exchange partners know that an adverse event could have been prevented or controlled, they are likely to question the firm's high reputation and suspect that its reputation might have been illusory or manipulated (Wiesenfeld, Wurthmann, & Hambrick, 2008). In this way, information that the event could have been prevented acts as a discrepant cue with respect to exchange partners' prior beliefs about the firm (Mishina et al., 2012). Illustrating this point in a study of investors' reactions to firms' financial restatements, Gomulya and Mishina (2017) argue and find that stakeholders decrease their relative reliance on signals, like reputation, following a violation of expectations.

When a firm's adverse event is known to be caused by controllable factors, an additional sensemaking process is triggered for its potential and current partners. For potential partners considering forming a relationship with the firm, the controllability of the adverse event reduces the weight they will place on the firm's prior capability reputation when making their decision. The firm's capability reputation does not reliably reduce ex ante uncertainty because potential partners suspect that the high reputation was undeserved. Thus, when an adverse event is controllable, we expect that the buffering effect of capability reputation will be lower.

Current partners' reliance on the firm's high character reputation is also likely to be lower when the event is known to be controllable. High character reputation lowers the likelihood that firm will blame shift or be stigmatized, and thus, current partners will be less likely to dissolve their ties. However, when it is known that the event was controllable, the current partners - as well as other stakeholders - are likely to question the high character reputation in light of this discrepant negative cue. As described by Mishina and colleagues (2012: 466), a "negative character cue tends to be jarring and noticeable, and as such will be viewed by evaluators as particularly revealing of the core and essential nature of the target due to their norm discrepant nature." In this case, not only will current partners be more concerned about blame shifting, but because the potential for the focal firm's reputation to protect it from stigmatization by other stakeholders is also lower, current partners' stigma anxiety will be higher. Thus, we expect the buffering effect of character reputation to be lower when the adverse event is controllable. Formally,

H3a: *The buffering effect of capability reputation on relationship formation following adverse events is lower for controllable events than for uncontrollable events.*

H3b: *The buffering effect of character reputation on relationship dissolution following adverse events is lower for controllable events than for uncontrollable events.*

METHODS

Data and Sample

We test our hypotheses on a sample of interstate pipeline operators in the U.S. natural gas transmission pipeline industry. The U.S. natural gas industry is comprised of production companies that explore, develop and produce natural gas, transportation companies (i.e., pipeline operators) that operate the pipelines that link natural gas fields and processing plants to major consumer areas, and local gas distribution (LDC) utilities or other users that receive gas from the operators and deliver it to individual customers. Natural gas pipelines are one of the most important forms of gas transportation in the U.S. with more than 300,000 miles of interstate and intrastate natural gas transmission pipelines across 48 states (See Figure 2). In 2009, natural gas accounted for approximately one quarter of U.S. energy use, and 98% was produced in North America (*Interstate Natural Gas Association of America*, 2009).

Insert Figure 2 about here

Although gas pipelines are deemed to be more efficient natural gas carriers than alternatives like tanker trucks or freight trains, the gas pipeline industry has been criticized for frequent accidents (Groeger, 2012). In response to safety concerns, the U.S. government established the Pipeline and Hazardous Materials Safety Administration (PHMSA) in 2004 to monitor the pipeline transportation system and enforce rigorous safety standards. PHMSA is a U.S. Department of Transportation's regulatory agency that monitors and enforces regulations for the nation's natural gas and crude oil pipelines as well as other transportation systems for hazardous materials.

Our data on natural gas transmission pipeline operators and their exchange relationships with gas shippers cover the time period between 2004 when PHMSA was founded to 2013. We gathered data from multiple sources: PHMSA Annual Reports, Federal Energy Regulatory Commission (FERC) Form filings, and Mastio and Company's survey data. PHMSA Annual Reports include general information on pipelines such as total pipeline mileage and commodities transported as well as annual accident data that cover the impacts and causes of accidents. If a gas pipeline operator has an accident, PHMSA requires the operator to submit a written accident report to PHMSA within 30 days. The report includes a wide array of related information about the damage incurred and the cause of the accident. When additional information is found and obtained after the initial reporting, the pipeline operator is required to provide supplementary reports. Any falsified report or failure to report on time can result in a civil penalty of up to $1 million. Hence, operators have a strong incentive to provide timely and accurate accident reports.

Economic exchange data were obtained from the Federal Energy Regulatory Commission (FERC), an independent regulatory agency in charge of the U.S. energy industry. Gas transmission pipelines are divided into intrastate and interstate gas transmission pipelines. In our sample, we focus on interstate natural gas transmission pipelines as demarcated in Figure 2. According to the Natural Gas Act, an interstate gas transmission pipeline operator in the United States is required to file with FERC an index of all its shippers every quarter (Form 549B Customers Index). The index includes shippers' names and codes, the contract numbers, the first and last dates on which the contract terms are effective, the duration of the natural gas contract, and the maximum amount of natural gas that can be transported/stored per a given contract. The major shippers are the more than 1,300 local distribution companies (LDCs), which deliver natural gas to individual homes and businesses. In addition to the LDCs, interstate gas transmission pipeline operators have other large-volume shippers of natural gas including industrial sites, power generation plants, and commercial sites bypassing LDCs.

Additionally, we obtained financial data for interstate gas pipeline operators from FERC Form 2/2A filing via the SNL financial database (www.snl.com). FERC Form 2/2A is a compilation of financial and operational information of interstate natural gas pipeline operators, which are subject to the jurisdiction of FERC. The data on operators' reputations are from Mastio and Company's (www.mastio.com) annual survey of gas shippers' ratings of their pipeline operator's services. Our final sample included 57 major interstate gas transmission pipeline operators in the U.S. from 2004 to 2013 (423 operator-year observations).

Dependent Variables

We use the FERC Customer index to observe when each interstate gas transmission pipeline operator started and ended its contract with shippers. We measured the *count of shipper* *ties formed* as the number of new shippers each pipeline operator gains and the *count of shipper ties dissolved* as the number of current shippers each pipeline operator loses each year.

Independent Variables

Count of severe accidents. The relevant adverse events in our setting are severe pipeline accidents. PHMSA defines a serious accident as any pipeline accident that leads to any human fatality or injury or the evacuation of 25 or more persons and significant gas loss.[1] This definition is also in line with prior studies of organizational accidents which defined severity by loss or damage to human life or properties (Haunschild & Sullivan, 2002; Madsen, 2009; Shrivastava et al., 1988). Following PHMSA's definition, we considered a severe accident any accident that involved i) any human loss/injury or ii) the evacuation of 25 or more people or iii) gas loss (in dollars) one standard deviation above the mean. We counted the number of severe accidents and took the natural logarithm. To test Hypotheses 1 and 2, we created the interaction terms of the count of severe accidents with capability reputation and character reputation, respectively.

Count of controllable accidents. PHMSA categorizes the major causes of gas pipeline accidents. According to the its classification, the leading causes of pipeline accidents are represented as follows: corrosion failure, natural force damage, excavation damage, outside force

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[1] The standards for severe accidents build on the PHMSA's definition of "serious incidents", which are defined as follows: (1) a fatality or major injury caused by the release of a hazardous material, (2) the evacuation of 25 or more persons as a result of release of a hazardous material or exposure to fire, (3) a release or exposure to fire which results in the closure of a major transportation artery, (4) the alteration of an aircraft flight plan or operation, (5) the release of radioactive materials from Type B packaging, (6) the release of over 11.9 gallons or 88.2 pounds of a severe marine pollutant, or (7) the release of a bulk quantity (over 119 gallons or 882 pounds) of a hazardous material. Our data provide information regarding fatality or injury and evacuations (1, 2), but they do not provide information regarding closures of major transportation arteries (3), alterations of an aircraft flight plans (4), and the release of radioactive materials (5). Regarding points (6) and (7), the data provide information on the amount of gas released in terms of the dollar value of gas, but not gallons of gas lost. Therefore, based on the previous research (e.g., Roberts, 1999), we used one standard deviation above the average gas loss by an accident in the construction of our severe accidents measure.

damage, material failure of pipe or weld, equipment failure, incorrect operation, miscellaneous, and unknown accident causes. We considered an accident induced by obvious force majeure such as "natural forces"[2] or "outside forces"[3] an uncontrollable accident because these causes are clearly beyond the control of the pipeline operator. These causes contrast to other causes such as corrosion, for example, that could have been prevented with regular maintenance and replacement of pipeline. To test Hypothesis 3a and 3b, after categorizing each accident as controllable or uncontrollable, we created counts for each of the four categories of severe and controllable accidents (severe-controllable, severe-uncontrollable, non-severe-controllable and non-severe-uncontrollable). We used the natural logarithms of each of the counts in our estimations. We then constructed interaction terms of the count of severe-controllable accidents and count of severe-uncontrollable accidents with capability reputation and character reputation to test Hypothesis 3a and Hypothesis 3b.

Capability reputation. Our measures of reputation are based on the annual Natural Gas Pipeline Customer Value and Loyalty Study published by Mastio and Company. The survey quantifies shippers' evaluations of their interstate gas transmission pipeline operators. Scores for operators are based on responses of approximately 1,100 North American gas shippers, including large local distribution companies (LDCs), industrial users, independent power producers, gas producers, and gas marketers in the U.S. Respondents rated each operator on a number of items on a 1 to 10 point scale. Thus, our approach is similar to approaches of prior reputation research

[2] *Natural Force Damage*: earth movement, heavy rains/floods, lightening, temperature, high winds, other natural forces damage.
[3] *Outside Force Damage*: nearby industrial, man-made, or other fire/explosion as primary cause of incident, damage by car, truck, or other motorized vehicle/equipment not engaged in excavation, damage by boats, barges, drilling rigs, or other maritime equipment or vessels set adrift or which have otherwise lost their mooring, routine or normal fishing or other maritime activity not engaged in excavation, electrical arcing from other equipment or facility, previous mechanical damage not related to excavation, intentional damage (e.g., vandalism), other outside force damage.

that relied on ratings collected by consumer agencies (e.g. Rhee & Haunschild, 2006).

Capability reputation is an assessment of what the organization can do (Mishina et al., 2012). The key capability of concern to gas shippers is whether the pipeline operator will be able to deliver the full amount of gas needed by the shipper on time. Fluctuations in demand by end customers create problems for shippers if they cannot access sufficient supply of natural gas to meet the demand. For an exchange partner, the operator's direct access to ample and diverse gas supply is a key indicator of its capability. An operator's capability reputation was measured using shippers' responses on a 1 to 10 point scale to the question, "[How well does the operator provide] direct access to ample and diverse gas supply?" Although this measure does not cover all the aspects of an operator's capability reputation, it corresponds well to the capability most critical to shippers – its ability to ship gas to market in sufficient quantities and on time.

Character reputation. Character reputation indicates audiences' perception of whether an organization's behavior complies with social expectations and norms (Mishina et al., 2012). In the gas industry, this corresponds to an operator's "strict adherence to contracts" and its "an honest administration with little or no corruption" (Nasr & Connor, 2014: 331). Furthermore, although contracts are used, gas shippers still have concerns regarding opportunism by their pipeline operator. For example, in 2004, a group of shippers filed a complaint against their pipeline operator for providing certain select shippers with tariff-free services (i.e., kickbacks) that were not disclosed to FERC (Pierson, 2008).

Every year the survey included one item to assess the pipeline operator's character reputation. The wording of the survey item was updated at three points in our observation period. In 2004, the item asked respondents, "[Please rate the] integrity of transportation provider." From 2005 to 2007, the wording was updated to, "[Does the operator] honor contracts and agreements?" A third update occurred in 2008 when the wording was changed to, "[Does the operator] communicate in an honest and forthright manner?" Although the intent of the survey item remained the same, the change in wording could be a concern. To assess the internal consistency of the three versions of the survey item, we computed Cronbach's alpha and inter-item correlations. Cronbach's alpha is sensitive to the number of items in the scale such that when there are very few items (i.e., fewer than 10) it underestimates the internal consistency of the measure (Cortina, 1993). For the character reputation measure, Cronbach's alpha for the standardized items with casewise deletion was 0.62, below the conventional 0.70 cut-off (Nunnally, 1978). However, the average inter-item correlation, an alternative measure of internal consistency, was 0.35 which is within the optimal range of 0.20 to 0.40 (Bollen & Lennox, 1991; Briggs & Cheek, 1986). Given the caution advised when interpreting alpha for scales comprised of only a few items and the high inter-item correlation, the measure has an acceptable level of internal consistency.[4] Furthermore, it is useful to note that the three items are not combined into an aggregate measure of character reputation in the same year, but instead are used independently across the three time periods. All models in our analyses include year fixed effects, which control for differences in the character reputation survey item wording over time.

Control Variables

Count of shipper ties formed in prior year and ***count of shipper ties dissolved in prior year*.** Given that pipeline operators have different levels of capacity and that their existing

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[4] Cronbach's alpha likely underestimates the internal consistency of our items because our items are not Tau-equivalent (i.e., each item contributes equally to the total scale score), a key assumption of alpha. Instead, they are congeneric meaning that the items may measure the same construct but with different degrees of precision (McNeish, 2017). When items are congeneric, alpha underestimates the actual value of reliability by as much as 20% (Green & Yang, 2009). Furthermore, the degree of underestimation is greatest when scales have only a few items (i.e., less than 10) (McNeish, 2018) which is clearly the case with our measure.

contracts with shippers influence their available capacity, we controlled for the *count of shipper ties formed* and *count of shipper ties dissolved in the prior year*.

Operating revenue. We used *operating revenue* as a proxy for an operator's financial performance and took its logarithm to decrease skewness.

Slack resources. As noted above, we used survey ratings to capture capability and character reputation for each pipeline operator. However, there may be an empirical concern that these ratings not only represent shippers' subjective perceptions of an operator's ability, but also reflect operators' objective abilities. To address this concern, we controlled for the operator's slack resources, which are indicative of its ability to reconfigure its resources to buffer itself from accidents (Bourgeois, 1981; Cyert & March, 1963; George, 2005). We measured slack resources by dividing current assets by current liabilities, consistent with the previous research (Chen & Miller, 2007; Iyer & Miller, 2008).

Operator's share of available pipeline. Exchange partners' decision on whether they would change their pipeline operator after an accident will be influenced by the availability of alternative pipeline. Thus, we control for the operator's share of available pipeline. We calculated the ratio of the pipelines operated by the focal operator by the total pipelines in each state, averaged across all states in which the operator had pipeline. For instance, if an operator has 5,000 miles of pipeline in Texas where the total pipeline of all the operators is 100,000 miles and has 2,500 miles in Louisiana whether the total pipeline is 40,000 miles, the operator's average share of available pipeline is 5.62% ([(5,000/100,000) + (2,500/40,000)]/2).

Pipeline lengths. It is axiomatic that larger operators have higher counts of tie formation and tie dissolution as well as more accidents. Thus, to control for the operator's size, we include the logarithm of an operator's *total lengths of pipeline* in our analyses.

Change in pipeline lengths. The more lengths of pipeline an operator adds, the more likely it will be to have new shippers and the less likely it will lose existing shippers. We include percentage change in pipeline lengths in our main model by dividing current pipeline lengths by pipeline lengths of the prior year.

Average relationship duration. Prior studies suggest that trust increases with the duration of a relationship (Gulati, 1995; Uzzi, 1999). To measure the average relationship duration, we identified the first year a contract existed between the operator and each shipper, starting with the year 1954. We tracked the relationships to 2013, the final year in our observation period, coding the end of a relationship if no contract was observed for two years in a row. Duration was calculated as the current year less the start year for each dyad. We averaged the duration of all dyads at the operator level and included it as a control in our estimation.

General reputation. To control for generalized favorability, judgments of the overall goodness or attractiveness of the firm (Lange et al., 2011), we created a measure of *general reputation* based on shippers' responses to a question from the Mastio survey, "How likely would you be to recommend this pipeline company to your peers?" rated on 1 to 10 point scale.

Media attention. Media attention corresponds to the "being known" dimension of organizational reputation (Lange et al., 2011: 155), which can make the operator's accident more salient to its exchange partners (Bednar, 2012). Using similar approaches to previous work (Bednar, 2012; Flammer, 2013), we searched Factiva for articles published in the most widely read newspapers (*New York Times, Washington Post, Wall Street Journal, USA Today, Financial Times*) and magazines (*Fortune, Forbes, Bloomberg BusinessWeek*). *Media attention* is measured as the number of times a pipeline operator was mentioned in the media each year. We took the natural logarithm given the unequal distribution of media attention across the operators in the sample.

Time under repair. An alternative explanation to our main arguments is that shippers switch to a new gas supplier while the operator is repairing a broken pipeline. To address this alternative explanation, we control for *time under repair* for each accident in the sample.[5] PHMSA data for assessing time under repair differ before and after 2010. Before 2010, PHMSA collected data on the "elapsed time until the area was made safe." After 2010, it collected data for the "shutdown time." Because we did not have a consistent measure across all years in our observation period, we constructed a binary variable, *time under repair,* set to 1 if a pipeline operator's average "elapsed time until the area was made safe" or "shutdown time" was greater than all other operators' average times in the same year.

Analysis

We used negative binomial regression analysis because our dependent variables are over-dispersed count data. To account for time-invariant characteristics of each pipeline operator, we used the fixed-effects unconditional negative binomial estimator by including a dummy variable for each pipeline operator and year with robust standard errors clustered by each operator as recommended by Allison and Waterman (2002). We did not use the conditional fixed-effect negative binomial model (Hausman, Hall, & Griliches, 1984) because this model has been criticized for not controlling for stable covariates (Allison & Waterman, 2002; Guimarães, 2008). All control variables were lagged by one year.

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[5] We imputed missing values for 4.9% of the sample using multiple imputation ("uvis" command in Stata) for "elapsed time until the area was made safe" for accidents before 2010 and "shutdown time" for accidents from 2010 onwards. Multiple imputation is preferable to alternative approaches to missing data, for example replacing with the sample mean, because it injects sufficient uncertainty when computing standard errors and confidence intervals (Fichman & Cummings, 2003). Estimating the models without imputation generates a pattern of results consistent with those reported in Tables 2 and 3.

RESULTS

Table 1 presents descriptive statistics and pairwise correlations among the variables. The total number of severe accidents is 63, and 37 operators experienced at least one severe accident. We examined the variance inflation factors (VIF) to assess potential multicollinearity in our data. The VIF ranged from 1.05 to 5.21, well below 10, a common threshold for multicollinearity (Neter, Kunter, Nachtschiem, & Wasserman, 1996).[6]

Insert Table 1 about here

Tables 2 and 3 report the results for the tests of our hypotheses. Model 1 in Table 2 shows that three control variables are significantly related to the count of shipper ties formed: change in pipeline lengths, time under repair, and capability reputation. The positive relationship between a change in pipeline lengths and tie formation is aligned with prior literature arguing resource capacity increases the size of the firm's network (e.g., Koka, Madhavan, & Prescott, 2006). Also, the negative relationships between time under repair and tie formation is not surprising because potential exchange partners are less likely to form a new tie with a pipeline operator with pipeline under repair. Lastly, the positive relationship between capability reputation and tie formation is consistent with findings in previous literature showing that reputation affects partner choices (Jensen & Roy, 2008).

Model 2 in Table 2 tests whether capability reputation moderates the effect of severe accidents on shipper ties formed. The positive significant coefficient for the interaction of the count of severe accidents and capability reputation indicates that operators with high capability

[6] The high correlations in Table 1 occur either when one variable (e.g., count of non-severe and controllable accidents) is a subset of another variable (e.g., count of non-severe accidents) and not included together in the same model or when two control variables are correlated which does not affect the interpretation of the explanatory variables.

reputation have a lower reduction in new shipper ties following severe accidents in the prior year (b= 0.41, $p < 0.05$). Furthermore, model fit improves significantly with the addition of the interaction. In contrast, the interaction of character reputation and severe accidents in Model 3 is not significantly related to the count of shipper ties formed. To test Hypothesis 1, using the coefficients in Model 4, we compared the coefficient of the interaction of the count of severe accidents and capability reputation with that of the count of severe accidents and character reputation and found that that they differ significantly ($p < 0.05$), supporting Hypothesis 1.

Model 5 in Table 2 shows the relationships between the control variables and the count of shipper ties dissolved. Losing more ties in the prior year decreases the count dissolved ties in the current year. However, no other control variables affect tie dissolution, which is not surprising given the inclusion of operator and year fixed effects. In Model 7 in Table 2 the interaction between the count of severe accidents and character reputation is significant and negative (b= -0.31, $p < 0.05$), and model fit also improves significantly. Pipeline operators with high character reputations experienced fewer losses of current exchange partners than operators with low character reputations when they were involved in severe accidents. However, interaction effect of severe accidents and capability reputation on tie dissolutions was not significant (Model 6 in Table 2). We then compared the coefficients of the interaction effects for capability reputation and severe accidents and character reputation and severe accidents in Model 8 to test Hypothesis 2. Although the character reputation and severe accidents interaction term is significant, the coefficients of the two interaction terms are not significantly different from each other by conventional thresholds ($p = 0.12$). Despite the weaker support for Hypothesis 2, the results provide overall support for the argument that potential and current exchange partners selectively attend to different types of organizational reputation after severe accidents.

Table 3 reports results of tests of Hypothesis 3a and 3b. Models 2 to 4 show the results for Hypothesis 3a. In Model 2, the interaction of capability reputation and the count of severe-uncontrollable accidents is weakly significant and positive ($b= 0.69$, $p < 0.1$), consistent with the prediction in Hypothesis 3a. The interaction between capability reputation and the count of severe-controllable accidents in Model 3 is not significant. When we included both interaction terms together in Model 4, the positive interaction effect of severe-uncontrollable accidents and capability reputation becomes insignificant. We also compared the coefficients of the interaction effects (the count of high-severity and low-controllability accidents with capability reputation *v.* the count of high-severity and high-controllability accidents with capability reputation) in Model 4 and found that they are not significantly different. Thus, H3a is not supported.

Models 6 to 8 test Hypothesis 3b. The interaction of character reputation and the count of severe-uncontrollable accidents is significant in Model 6 ($b= -0.68$, $p < 0.01$) whereas the interaction of character reputation and the count of severe-controllable accidents is not significant as shown in Model 7. In Model 8, a comparison of the coefficients of the two interaction terms shows that they are significantly different ($p < 0.05$). The pattern of results provides clear support for Hypothesis 3b.

Insert Tables 2 and 3 about here

Interpretation

As advised when estimating models with limited dependent variables (Wiersema & Bowen, 2009), we estimated and graphed the average marginal effects of severe accidents on tie formation at different levels of capability reputation and tie dissolution at different levels of character reputation. As illustrated in Figure 3, for a pipeline operator with a high capability reputation (i.e., one standard deviation above the mean), there is no significant difference in the number of new shippers before and after a severe accident. However, for a low capability reputation (i.e., one standard deviation below the mean) operator, one severe accident leads to a loss of about 1.48 new shippers in the subsequent period. Although the change in the number of new shipper ties is small, it represents a substantial reduction. The average number of new shipper ties each year in the sample is 4.6, so a drop of 1.48 corresponds to 32% fewer new shipper ties. Furthermore, a change of a single shipper tie is meaningfully large, corresponding to a loss of $2 million to $10 million in revenues for the majority of shipper ties in our data.

Figure 4 shows the buffering effect of character reputation. Pipeline operators with high character reputations lose fewer relationships than low character reputation operators following severe accidents. However, the confidence intervals overlap at the 95% level. Because the test of equality of coefficients for the interaction terms in Model 8 in Table 2 also was not significant at conventional levels, we interpret the result as weakly supporting H2. Figure 5 illustrates the result for Hypothesis 3b. The confidence intervals do not overlap, indicating that the marginal effect of severe and uncontrollable accidents on tie dissolution is significantly stronger when an operator has high character reputation, supporting H3b. This is an important condition to our findings, which we address in the discussion section.

Insert Figures 3, 4 and 5 about here

Robustness Checks

We conducted several robustness checks of our results. Our main tables report estimates from analyses including all 57 pipeline operators. The results are robust to including only the 37 operators experiencing pipeline accidents. Another concern is that controlling for lagged dependent variables (the *counts of shipper ties formed* or *dissolved* in the prior year) introduces bias due its correlation with the operator fixed effects. We estimated our models without these controls, and the results are consistent. We also estimated our models using a two-year lag rather than the one-year lag to examine how long the buffering effects of reputation persist after adverse events. The two-year lag greatly reduces the sample size (*N*=311). Yet, we still find that capability reputation has a significant buffering effect on relationship formation following severe accidents. Likewise, we continue to find a buffering effect of character reputation on relationship dissolution but the significance of the effect decreases.

We performed several checks of our measure of the count of severe accidents. First, we estimated our models with the absolute number of accidents, rather than the logarithm, and obtained similar results. Second, we estimated our models using alternative constructions of our measure of severe accidents. We obtain consistent results excluding gas loss from the measure of severe accidents. Excluding evacuations also yields consistent results for all explanatory variables but the positive effect of the interaction of capability reputation and severe accidents drops in significance. Excluding human loss or injury generates consistent results but the coefficients for the interaction terms for the tests of H1 and H3a reduce in their significance. Taken together, the pattern of results implies that potential exchange partners consider accidents related to human loss or injury more seriously.

Given the change in the items used to measure character reputation during our observation period, it is possible that one of the items contributes more to our observed effects than others. We estimated the interaction effect of character reputation and severe accidents for each period corresponding to the different wording of the character reputation survey item: year 2004, years 2005-2007, and years 2008-2013. We created a dummy variable for each period and interacted it with the count of severe accidents, character reputation and their interaction. Only in period 3 (2008-2013) was the interaction term significant ($b = 3.77$; $p < 0.01$), implying that our result for H2 is driven mainly by the observations in the period 3 where character reputation was measured by the extent to which the operator was perceived to "communicate in an honest and forthright manner." However, this result should be interpreted cautiously because period 1 and period 2 include only 46 and 140 observations relative to the 237 observations in period 3. The lack of significant effects for character reputation measured as integrity or honoring contracts does not indicate that they are not relevant aspects of character reputation, but simply that our data limitations prevent a full investigation of their effects.

Lastly, competition may affect the value of reputation (e.g., Obloj & Obloj, 2006). In our context, if many pipeline operators are available in a region, competition is higher and the value of reputation should be higher because a shipper has a number of alternative options. To test this argument, we split the sample at the median of an operator's share of available pipelines and estimated the effect of reputation under high competition (below the median) or low competition (above the median). Under high competition, high capability reputation operators appear to have higher rates of relationship formation than low capability reputation operators after severe accidents, but not under low competition (Online Appendix A, Table A1). Similarly, high character reputation operators have lower rates of relationship dissolution compared with low character reputation operators when competition is high, but not when it is low. However, a test of a comparison of coefficients across models using seemingly unrelated estimations (*suest* in Stata) indicates that the coefficients on the interaction terms do not differ significantly. Although the effect of reputation does not vary significantly under high and low competition in our sample, competition may be muted due to the high level of regulation in the pipeline industry.

DISCUSSION

In this paper, we developed arguments for how a firm's capability and character reputations affect its exchange partners' reactions to its adverse events in line with a growing stream of research examining an organization's multiple types of reputation (Boivie et al., 2016; Wei et al., 2017). We argue and find support for buffering effects of both types of reputation, but our study also reveals important nuances in their effects. Capability reputation acts as a buffer for exchange with potential partners, and character reputation acts as a buffer for exchange with current partners. We theorize that these different responses arise from differences in the uncertainty experienced by each group of partner, which lead them to pay attention to different types of reputation. Potential partners lack direct experience with the organization, and have uncertainty regarding the organization's competence. They weigh capability reputation more heavily after adverse events. Current exchange partners have direct experience with the organization and so they have less uncertainty regarding the organization's competence. Instead, the accident heightens their uncertainty regarding blame-shifting and stigma transfer, and thus they pay more attention to the firm's character reputation when making sense of an adverse event. We also show that the buffering effects of reputation are limited. If an adverse event was caused by factors within the firm's control, such as inadequate maintenance, the buffering effects of character reputation diminish.

In contrast to previous work (Rhee & Haunschild, 2006), we did not find evidence of a liability of good reputation for capability reputation and character reputation. According to expectancy violation theory (Shapiro, 1983), a liability of good reputation arises whereby high reputation firms are penalized more than low reputation firms because their stakeholders are more sensitive to misconduct, product defects or other adverse events (Heath & Chatterjee, 1995). In exploratory analyses, we investigated the dimension of reputation as "being known" (Lange et al., 2011: 174) by examining the effect of the interaction of severe accidents and a firm's media attention (Online Appendix A, Table A2). Indeed, firms with high media attention gain fewer potential exchange partners ($b = -0.45$, $p < 0.01$) and lose more current exchange partners ($b = 0.48$, $p < 0.1$) after adverse events. This result is consistent with the "the burden of celebrity" (Fombrun, 1996; Graffin, Bundy, Porac, Wade, & Quinn, 2013; Wade, Porac, Pollock, & Graffin, 2006) whereby a highly salient or visible organization is more likely to be scrutinized, targeted and punished after a negative event (King, 2008). Regarding the third dimension of reputation, "generalized favorability" (Lange et al., 2011: 174), we did not find a significant effect of severe accidents and general reputation on exchange networks after a severe accident. This result is consistent with recent studies that also do not find an effect of generalized favorability on relationships (e.g., Sullivan et al., 2007) and supports Boivie and colleagues (2016) argument that reputation based on specific attributes will be more influential than general reputation. Whether reputation works as a buffer or liability may depend on how it is defined and for which stakeholder group.

Contributions

Our study offers several contributions. First, in contrast to research that has focused on actor-level aggregated reputation overlooking different dimensions of reputation, we approached organizational reputation as an "attribute-specific and audience-specific assessment" (Jensen et al., 2012: 144). Our findings contribute to the stream of recent research that has begun to take into consideration organizations' multiple reputations (Boivie et al., 2016) and multiple interpretations of a single organizational reputation from different stakeholder groups (Zavyalova et al., 2016). We extend this work by building on the distinction between capability reputation and character reputation forwarded by Mishina and colleagues (2012: 460) and empirically investigating their effects on exchange.

We also contribute to research on exchange networks by investigating the impact of adverse events on the dynamics of exchange relationships. Given that the different motives exist for tie formation and continuity (Beckman et al., 2004; Dahlander & McFarland, 2013), we argue that exchange partners rely on different types of reputation to determine whether to form or dissolve relationships with the firm after the event. In particular, our study also has important implications for tie dissolution research. Organization scholars have suggested that exchange networks are relatively stable and that this stability has significant strategic importance for firms (Gulati & Gargiulo, 1999; Stokman, Van Der Knoop, & Wasseur, 1988). In our study, however, we show evidence that adverse events can disrupt the stability of exchange networks (Sullivan et al., 2007). In our study, reputation did contribute to exchange stability following adverse events but within limits. If a firm could have prevented the event, then stabilizing effects of reputation were significantly reduced, or in the case of character reputation, insignificant.

Lastly, we contribute to research on organizational accidents. Researchers have two different perspectives on organizational accidents. While one stream of research conceives of an accident as an inevitable outcome of high complexities in the modern business landscape (Perrow, 1984), some scholars recognize that organizations can prevent accidents by taking proactive measures (Roberts, Bea, & Bartles, 2001). Our findings suggest that judgment of an accident is not purely driven by the objective nature of the accident (e.g., the amount of human loss), but also affected by stakeholders' subjective beliefs regarding the organization (Weick, 1995; Zuckerman, 1979). Our study also adds to recent research demonstrating that the buffering effects of organizational reputation are conditional (Zavyalova et al., 2016) by showing that they depend on the accident's controllability.

Our study provides practical implications for managers as well. Although it is widely expected that reputation will serve as a buffer when a firm has an adverse event, we have little systematic understanding of which type of reputation actually protects a firm from losing its partners. Our results suggest that managers should manage their capability reputations if they do not want to miss opportunities to form new relationships. However, they should focus on character reputation for their existing partners. Our study also shows the importance of controllability. Although many adverse events occur unintentionally, some could have been controlled or prevented. Because reputations may not work as buffers if events are controllable, managers should both manage their reputations and minimize the risk of controllable adverse events. Furthermore, our study suggests that effective management of exchange relationships requires awareness that capability reputation and character reputation affect evaluations of current and potential exchange partners differently.

Limitations and Future Research

Although our study offers several contributions, it also has limitations, which suggest the need for future research. First, we employed single-item measures for each type of reputation due to data limitations. While we believe that the measures are reasonable proxies for capability and character reputation, they capture only one dimension of the broader constructs. Future research would benefit from multiple and aggregated measures for capability and character reputation when these are available. Moreover, although we focused on capability reputation and character reputation as moderators of the effect of the adverse event on exchange relationships, adverse events are also likely to affect the firm's reputation (Basdeo et al., 2006; Love & Kraatz, 2009).

In our sample, we found no significant effects of accidents on the capability reputations, character reputations or general reputations of pipeline operators suggesting that reputation is not easily changed or influenced by a negative event itself (Ang & Wight, 2009; Schultz, Mouritsen, & Gabrielsen, 2001). Future research could consider nuanced effects of negative and positive events on different types of organizational reputation. Due to data limitations, we were not able to observe the mechanisms theorized to underlie the buffering effect of character reputation, i. e., the lower likelihood of blame shifting or stigma anxiety. Further research in field settings or experimental settings where these mechanisms are observable is needed. Lastly, because we conceptualized reputation as an attribute-specific and audience-specific assessment (Jensen et al., 2012), we limited our analysis to reactions of the firms' exchange partners. Organizational reputation can be interpreted differently by multiple actors, and the same attribute can be interpreted differently by stakeholder groups. It would be valuable to investigate how other stakeholder groups—regulators, consumers, social movement activists, and the general public—respond to adverse events and which type of reputation they value most when making sense of the accident.

Conclusion

Answering Jensen and colleagues' (2012: 144) call for research defining reputation "in terms of *attribute- and audience-specific* assessments," we have provided novel arguments for the effects of capability and character reputation on exchange with potential v. current exchange partners following accidents. By showing how each type of reputation buffers exchange for different audiences, our study underlines the need for further research adopting a multi-dimensional approach to the study of organizational reputation. Furthermore, the limits to the buffering effects of reputation following controllable accidents we observed suggest that reputation plays an important role not only in shaping the competitive advantage of firms, but also in the social control of organizations.

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TABLE 1. Descriptive Statistics and Correlations

	Variables	Mean	S.D.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
1	Ct. shipper ties formed at *t+1*	4.61	4.89																				
2	Ct. shipper ties dissolved at *t+1*	5.16	6.71	.43*																			
3	Ct. shipper ties formed at *t* (ln)	1.24	0.98	.47*	.41*																		
4	Ct. shipper ties dissolved at *t* (ln)	1.22	0.97	.41*	.39*	.71*																	
5	Operating revenue (ln)	11.84	1.37	.52*	.40*	.52*	.49*																
6	Slack resources	2.13	6.95	-.09	-.05	-.09	-.07	-.15*															
7	Operator's share available pipeline	0.08	0.11	-.06	-.02	-.02	-.01	-.01	-.07														
8	Pipeline lengths (miles, ln)	7.26	1.42	.64*	.50*	.57*	.56*	.83*	-.10*	-.06													
9	Change in pipeline lengths (percentage)	1.01	0.15	-.02	-.05	.00	-.10*	-.01	.00	-.02	-.03												
10	Average relationship duration	8.65	2.72	.14*	.22*	.21*	.31*	.37*	-.02	.14*	.39*	-.10*											
11	General reputation	7.73	1.11	.05	.09	.16*	.19*	.24*	-.13*	.02	.19*	.05	.16*										
12	Media attention (ln)	0.09	0.27	.15*	.12*	.05	.00	.20*	-.03	.03	.19*	-.03	.03	-.02									
13	Time under repair	0.22	0.42	.29*	.29*	.24*	.24*	.32*	-.06	-.06	.45*	.02	.12*	.03	.17*								
14	Ct. severe accidents (ln)	0.09	0.27	.22*	.21*	.23*	.20*	.27*	-.05	-.06	.36*	-.02	.10*	.07	.15*	.31*							
15	Ct. non-severe accidents (ln)	0.45	0.69	.51*	.40*	.43*	.41*	.48*	-.09	-.10*	.66*	-.05	.19*	.09	.19*	.54*	.42*						
16	Ct. severe, controllable accidents (ln)	0.07	0.23	.19*	.18*	.19*	.17*	.23*	-.04	-.05	.32*	-.02	.07	.07	.14*	.30*	.90*	.39*					
17	Ct. severe, uncontrollable accidents (ln)	0.03	0.14	.14*	.12*	.14*	.12*	.17*	-.03	-.05	.22*	-.01	.09	.04	.07	.14*	.59*	.26*	.20*				
18	Ct. non-severe, control. accidents (ln)	0.36	058	.47*	.39*	.41*	.40*	.48*	-.08	-.05	.63*	-.03	.22*	.09	.17*	.50*	.35*	.92*	.32*	.20*			
19	Ct. non-severe, uncontrol. accidents (ln)	0.16	0.42	.37*	.22*	.30*	.25*	.29*	-.05	-.12*	.42*	-.07	.07	.03	.19*	.34*	.38*	.71*	.36*	.27*	.41*		
20	Capability reputation	7.12	1.2	.27*	.27*	.34*	.30*	.43*	.03	-.06	.45*	.00	.24*	.41*	.07	.19*	.17*	.27*	.15*	.13*	.27*	.14*	
21	Character reputation	8.16	0.78	-.02	-.03	.05	.07	.00	.17*	.12*	.00	-.12*	.03	.37*	-.10*	-.07	.02	-.03	.03	.01	-.04	-.03	.28*

N=423. $^*p < 0.05$

TABLE 2. Negative Binomial Regression:
The Effect of Accidents and Reputation on Shipper Ties Formed/Dissolved at t+1[*]

	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Ct. shipper ties formed at t+1				*Ct. shipper ties dissolved at t+1*			
Ct. shipper ties formed at *t* (ln)	-0.08	-0.08	-0.08	-0.08				
	(0.06)	(0.05)	(0.05)	(0.05)				
Ct. shipper ties dissolved at *t* (ln)					-0.31***	-0.31***	-0.30***	-0.29***
					(0.07)	(0.07)	(0.07)	(0.07)
Operating revenue (ln)	-0.25	-0.29	-0.25	-0.30	-0.34	-0.34	-0.35	-0.39
	(0.25)	(0.24)	(0.24)	(0.23)	(0.36)	(0.36)	(0.36)	(0.36)
Slack resources	-0.01	-0.01	-0.01	-0.01	0.02	0.02	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Operator's share of available pipeline	0.09	0.05	0.09	0.02	0.56	0.55	0.53	0.50
	(0.58)	(0.59)	(0.58)	(0.60)	(0.69)	(0.69)	(0.69)	(0.71)
Pipeline lengths (miles, ln)	-0.05	0.11	-0.05	0.14	0.16	0.17	0.19	0.31
	(0.40)	(0.42)	(0.40)	(0.42)	(0.83)	(0.83)	(0.83)	(0.83)
Change in pipeline lengths	0.36**	0.38**	0.36**	0.39**	-0.30	-0.30	-0.31	-0.29
(percentage)	(0.14)	(0.14)	(0.14)	(0.14)	(0.20)	(0.21)	(0.20)	(0.20)
Average relationship duration	0.03	0.02	0.02	0.02	-0.11	-0.11	-0.11	-0.10
	(0.12)	(0.12)	(0.12)	(0.12)	(0.09)	(0.09)	(0.10)	(0.09)
General reputation	-0.11	-0.11	-0.11	-0.10	0.01	0.01	0.02	0.02
	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)	(0.10)	(0.10)	(0.10)
Media attention (ln)	-0.01	0.01	-0.01	0.02	-0.01	-0.01	0.02	0.05
	(0.16)	(0.15)	(0.16)	(0.16)	(0.14)	(0.15)	(0.14)	(0.15)
Time under repair	-0.18*	-0.19*	-0.18*	-0.19*	0.07	0.07	0.07	0.06
	(0.08)	(0.08)	(0.08)	(0.08)	(0.11)	(0.11)	(0.10)	(0.10)
Ct. of severe accidents (ln)	-0.16	-3.29*	-0.55	-2.95*	-0.04	-0.15	2.49*	0.90
	(0.14)	(1.45)	(0.91)	(1.43)	(0.12)	(2.33)	(1.23)	(2.06)
Ct. of non-severe accidents (ln)	-0.05	-0.04	-0.04	-0.05	-0.02	-0.02	-0.03	-0.04
	(0.07)	(0.08)	(0.08)	(0.08)	(0.09)	(0.09)	(0.09)	(0.09)
Capability reputation	0.17*	0.15+	0.17*	0.14+	0.14	0.14	0.15	0.14
	(0.08)	(0.08)	(0.08)	(0.08)	(0.11)	(0.11)	(0.11)	(0.11)
Character reputation	0.07	0.04	0.06	0.05	-0.05	-0.05	-0.00	-0.01
	(0.11)	(0.11)	(0.11)	(0.11)	(0.10)	(0.10)	(0.10)	(0.10)
Ct. of severe accidents (ln) x		0.41*		0.50*		0.01		0.37
Capability reputation		(0.19)		(0.22)		(0.31)		(0.37)
Ct. of severe accidents (ln) x			0.05	-0.13			-0.31*	-0.46*
Character reputation			(0.11)	(0.12)			(0.15)	(0.22)
Constant	3.50	3.20	3.53	3.05	4.45	4.44	3.87	3.43
	(3.99)	(4.18)	(4.02)	(4.17)	(6.21)	(6.21)	(6.29)	(6.28)
Observations	423	423	423	423	423	423	423	423
Number of pipeline operators	57	57	57	57	57	57	57	57
df	14	15	15	16	14	15	15	16
Log pseudo-likelihood	-838.03	-835.86	-837.97	-835.50	-933.57	-933.57	-932.09	-931.32
-2(*LL*1-*LL*2)		4.35*	0.12	5.07*		0.004	2.97+	4.49*

[*]Coefficients are reported with robust standard errors clustered by each firm in parentheses. All models include firm and year fixed effects. All variables are lagged one year. Log-pseudo likelihood comparisons based on Model 1 for Models 2, 3 and 4; and Model 5 for Models 6, 7 and 8. $+p < 0.1$, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$

TABLE 3. Negative Binomial Regression:
The Effect of Accidents and Reputation on Shipper Ties Formed/Dissolved at t+1*

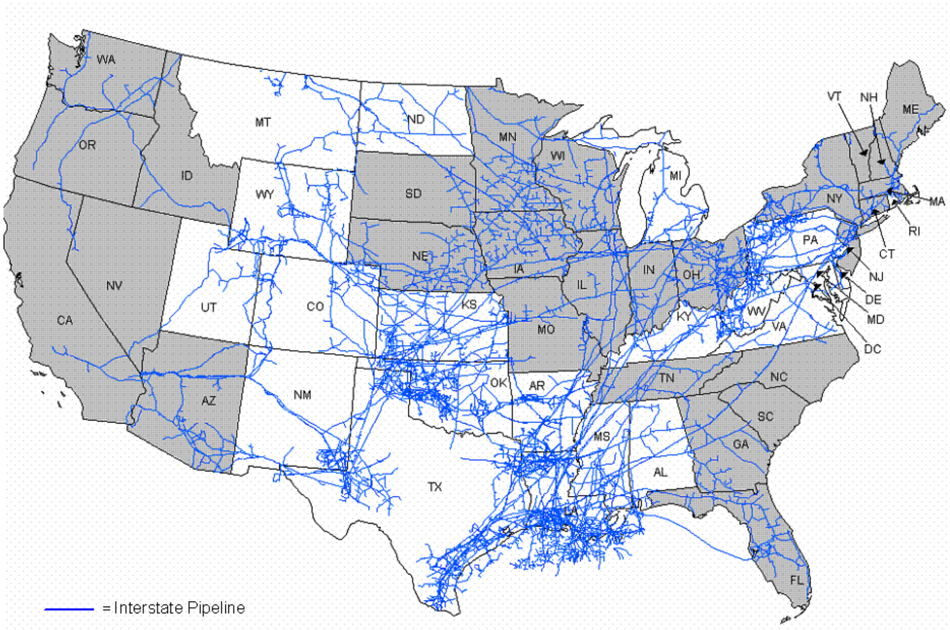
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
	Ct shipper ties formed at t+1				*Ct. shipper ties dissolved at t+1*			
Ct. shipper ties formed at *t* (ln)	-0.08	-0.07	-0.07	-0.07				
	(0.06)	(0.06)	(0.06)	(0.06)				
Ct. shipper ties dissolved at *t* (ln)					-0.30***	-0.31***	-0.30***	-0.30***
					(0.07)	(0.07)	(0.07)	(0.07)
Operating revenue (ln)	-0.28	-0.26	-0.31	-0.29	-0.30	-0.35	-0.29	-0.34
	(0.26)	(0.25)	(0.25)	(0.25)	(0.37)	(0.38)	(0.37)	(0.38)
Slack resources	-0.01	-0.01	-0.01	-0.01	0.02	0.02	0.02	0.02
	(0.01)	(0.01)	(0.01)	(0.01)	(0.02)	(0.02)	(0.02)	(0.02)
Operator's share of available pipeline	0.06	0.05	0.03	0.02	0.48	0.39	0.48	0.39
	(0.60)	(0.59)	(0.61)	(0.60)	(0.68)	(0.70)	(0.68)	(0.69)
Pipeline lengths (miles, ln)	-0.03	-0.01	0.10	0.10	0.12	0.22	0.11	0.21
	(0.41)	(0.43)	(0.41)	(0.43)	(0.83)	(0.80)	(0.83)	(0.79)
Change in pipeline lengths	0.34*	0.37**	0.35*	0.37*	-0.30	-0.33	-0.30	-0.33
(percentage)	(0.14)	(0.14)	(0.15)	(0.15)	(0.21)	(0.21)	(0.21)	(0.21)
Average relationship duration	0.03	0.01	0.02	0.01	-0.10	-0.08	-0.10	-0.08
	(0.12)	(0.12)	(0.12)	(0.12)	(0.09)	(0.09)	(0.09)	(0.09)
General reputation	-0.11	-0.11	-0.11	-0.11	0.01	0.01	0.01	0.01
	(0.09)	(0.09)	(0.09)	(0.09)	(0.10)	(0.09)	(0.10)	(0.09)
Media attention (ln)	-0.00	-0.01	0.01	0.00	-0.01	0.03	-0.01	0.04
	(0.16)	(0.16)	(0.16)	(0.16)	(0.13)	(0.13)	(0.13)	(0.13)
Time under repair	-0.19*	-0.19*	-0.19*	-0.19*	0.06	0.07	0.05	0.06
	(0.08)	(0.08)	(0.08)	(0.08)	(0.11)	(0.10)	(0.11)	(0.10)
Ct. of severe controllable	-0.19	-0.20	-2.81	-2.38	0.09	0.08	1.21	1.08
accidents (ln)	(0.16)	(0.16)	(1.73)	(1.82)	(0.18)	(0.18)	(1.60)	(1.30)
Ct. of severe uncontrollable	-0.03	-5.44+	-0.03	-4.71	-0.27	5.13**	-0.27	5.09**
accidents (ln)	(0.25)	(2.82)	(0.25)	(3.18)	(0.23)	(1.78)	(0.23)	(1.82)
Ct. of non-severe controllable	-0.03	-0.03	-0.02	-0.03	0.02	0.03	0.01	0.02
accidents (ln)	(0.06)	(0.06)	(0.07)	(0.06)	(0.10)	(0.10)	(0.10)	(0.10)
Ct. of non-severe uncontrollable	-0.06	-0.08	-0.06	-0.07	-0.10	-0.12	-0.10	-0.12
accidents (ln)	(0.10)	(0.10)	(0.10)	(0.10)	(0.12)	(0.12)	(0.12)	(0.12)
Capability reputation	0.17*	0.15+	0.16*	0.14+	0.14	0.15	0.14	0.15
	(0.08)	(0.08)	(0.08)	(0.08)	(0.11)	(0.11)	(0.11)	(0.11)
Character reputation	0.07	0.05	0.05	0.04	-0.05	-0.02	-0.04	-0.01
	(0.11)	(0.11)	(0.11)	(0.11)	(0.10)	(0.10)	(0.10)	(0.10)
Ct. of severe/uncontrollable		0.69+		0.60				
accidents x Capability reputation		(0.36)		(0.41)				
Ct. of severe/controllable			0.34	0.28				
accidents x Capability reputation			(0.22)	(0.24)				
Ct. of severe/uncontrollable						-0.68**		-0.68**
accidents x Character reputation						(0.23)		(0.23)
Ct. of severe/controllable							-0.14	-0.12
accidents x Character reputation							(0.19)	(0.16)
Constant	3.66	3.70		3.41	4.23	3.66	4.08	3.51
	(3.97)	(4.08)		(4.18)	(6.18)	(6.06)	(6.26)	(6.14)
Observations	423	423	423	423	423	423	423	423
Number of pipeline operators	57	57	57	57	57	57	57	57
df	16	17	17	18	16	17	17	18
Log pseudo-likelihood	-837.68	-836.31	-836.49	-835.48	-932.56	-929.80	-932.36	-929.64
-2(*LL*1-*LL*2)		2.74	2.38	4.39		5.52+	0.39	5.83+

* Coefficients are reported with robust standard errors clustered by each firm in parentheses. All models include firm and year fixed effects. All variables are lagged one year. Log-pseudo likelihood comparisons based on Model 1 for Models 2, 3 and 4; and Model 5 for Models 6, 7 and 8. $+p < 0.1$, $*p < 0.05$, $**p < 0.01$, $***p < 0.001$

FIGURE 1. Uncertainty and the Type of Reputation used in Sensemaking of Adverse Events by Exchange Partners

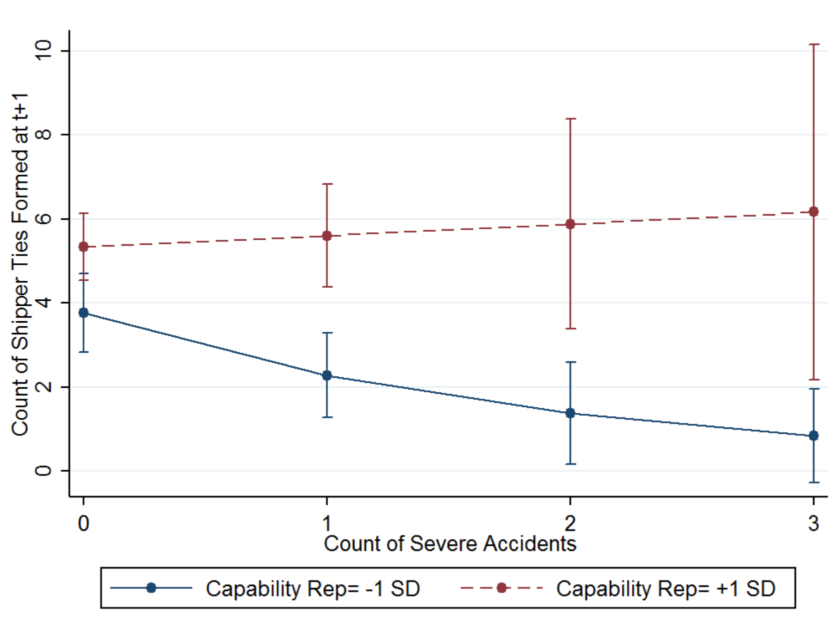
<table>
<tr><td></td><td colspan="2">Type of uncertainty</td></tr>
<tr><td>Exchange relationship outcome</td><td>Lemons problem</td><td>Moral hazard</td></tr>
<tr><td rowspan="2">Relationship formation by potential partners</td><td>• Uncertainty about quality (ex ante) is high
• Capability reputation more relevant cue</td><td>• Risk of blame shifting or stigma anxiety is low
• Character reputation less relevant cue</td></tr>
<tr><td colspan="2">H1: Capability reputation will have a greater buffering effect on relationship formation than character reputation following adverse events.</td></tr>
<tr><td rowspan="2">Relationship dissolution by current partners</td><td>• Uncertainty about quality is low
• Capability reputation less relevant cue</td><td>• Risk of blame shifting and stigma anxiety is high
• Character reputation more relevant cue</td></tr>
<tr><td colspan="2">H2: Character reputation will have a greater buffering effect on relationship dissolution than capability reputation following adverse events.</td></tr>
</table>

FIGURE 2. Map of Interstate Natural Gas Pipelines



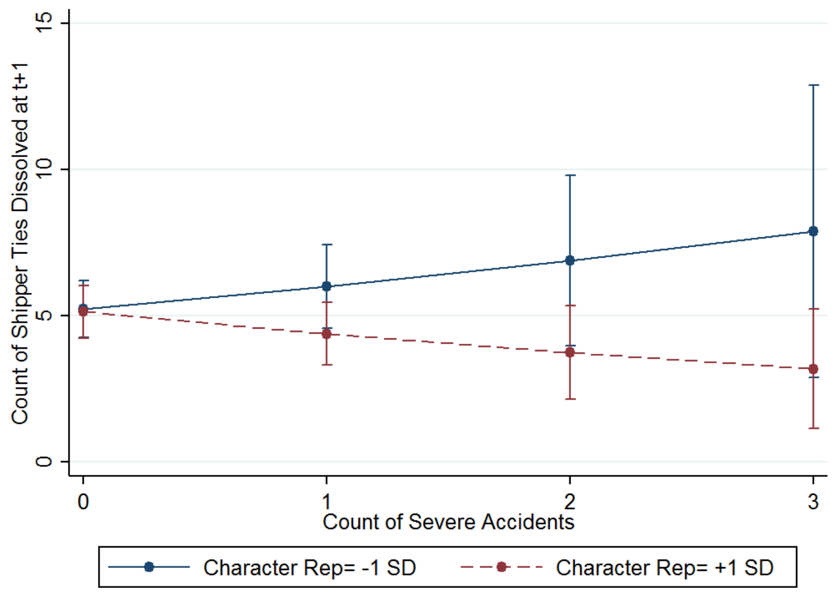
Source: U.S. Energy Information Administration, 2007

FIGURE 3. Marginal Effect of Severe Accidents and Capability Reputation on the Count of Shipper Ties Formed at *t+1*



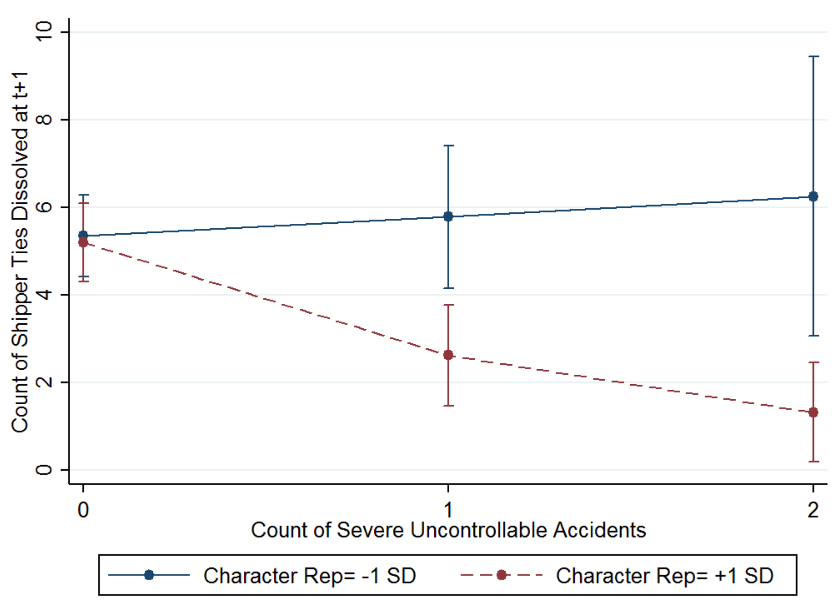
Marginal effects are based on estimates from Model 2 in Table 2, using the non-logged count of severe accidents.

FIGURE 4. Marginal Effect of Severe Accidents and Character Reputation on the Count of Shipper Ties Dissolved at *t+1*



Marginal effects are based on estimates from Model 7 in Table 2, using the non-logged count of severe accidents.

FIGURE 5. Marginal Effect of Severe and Uncontrollable Accidents and Character Reputation on the Count of Shipper Ties Dissolved at t+1



Marginal effects are based on estimates from Model 6 in Table 3, using the non-logged count of severe uncontrollable accidents.

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