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# Risk and risk management of spillover effects: Evidence from the literature

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## Abstract

In this article, we provide a comprehensive review of the existing theoretical and empirical literature regarding spillover effects (effects of a crisis event in an announcing firm on other firms). In particular, we focus on the mechanism behind spillover effects and investigate factors that drive spillover effects. The results of our literature analysis show that spillover effects are most often significantly negative, that is, lead to losses in nonannouncing firms and depend on certain events and firm characteristics. On this basis, we derive implications for the risk management of spillover effects. Taking previous work on certain individual risk-management measures into account, we are the first to provide a holistic spillover risk-management process.

## JEL CLASSIFICATION

G14; G32

## 1 | INTRODUCTION

In this article, we consider spillover effects (typically measured by means of market value losses or gains) to a nonannouncing firm caused by a certain crisis event in an announcing firm. Previous theoretical literature regarding spillover effects examines the mechanism behind spillover effects (see, e.g., Jonsson, Greve, & Fujiwara-Greve, 2009; Yu and Lester, 2008) and argues (see, e.g., Lang and Stulz, 1992) that spillover effects are the sum of two offsetting

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effects: the competitive effect and the contagion effect. The competitive effect means that nonannouncing firms can benefit from the loss event in the announcing firm, whereas the contagion effect implies that the nonannouncing firm also suffers a financial loss. As both effects can appear simultaneously, spillover effects are always the net effect of them and indicate whether the competitive effect dominates the contagion effect or vice versa.

Another strand of the literature empirically investigates whether crisis events (most often operational losses) have the potential to cause spillover effects and which factors influence them (see, e.g., Cummins, Wei, & Xie, 2012; Goins and Gruca, 2008; Szewczyk, 1992). Some articles analyze spillover effects caused by specific events (e.g., Barnett (2007) examines the effects of the Bhopal disaster on other nonannouncing chemical firms), whereas other articles investigate spillover effects caused by certain events types in general (e.g., Cummins et al. (2012) study spillover effects in the financial industry caused by large operational losses).

Finally, there are also a few papers regarding risk management of spillover effects. For instance, Barnett and Hoffman (2008) deal with risk management of spillover effects from a single-firm perspective, whereas Baniak and Grajzl (2013) take an industry perspective.

Hence, there is a lot of previous research on this topic. However, an overview of the literature combining the results of the empirical and the theoretical literature as well as relating them with risk-management strategies of spillover effects is still due. The first contribution of our paper is, therefore, to provide a comprehensive review of the theoretical as well as empirical literature concerning spillover effects. By comparing and analyzing the results of previous studies, we expand existing knowledge in this area. One main finding of our empirical literature review is that spillover effects are most often negative and depend on influencing factors. In particular, characteristics of the announcing and nonannouncing firm (e.g., size), as well as event characteristics (e.g., loss size), affect spillover effects. The second contribution is that we derive based on our literature review implications for the risk management of spillover effects (e.g., identification of factors that drive the occurrence and severity of spillover losses) and provide a comprehensive risk-management process regarding spillover effects, which has not been done before.

The paper is structured as follows: Section 2 gives an overview of the theoretical literature, whereas Section 3 focuses on the empirical literature. Section 4 discusses risk-management strategies with respect to spillover effects, and finally, Section 5 summarizes.

## 2 | THEORETICAL EVIDENCE REGARDING SPILLOVER EFFECTS

Crisis events have the potential to cause severe reputational losses in the announcing firm<sup>1</sup> and spillover effects to other nonannouncing firms.<sup>2</sup> Nonannouncing firms, potentially affected by spillover effects, are competitors and suppliers of the announcing firm. Previous theoretical literature regarding spillover effects argues (see, e.g., Lang and Stulz, 1992) that spillover effects are the sum of two offsetting effects: the competitive effect and the contagion effect.

Assuming that the nonannouncing firm is a *competitor* of the announcing firm, for example, Lang and Stulz (1992) and Eckert, Gatzert, and Pisula (2019) explain that, for instance, customers might buy products of nonannouncing firms instead of products of the announcing firm

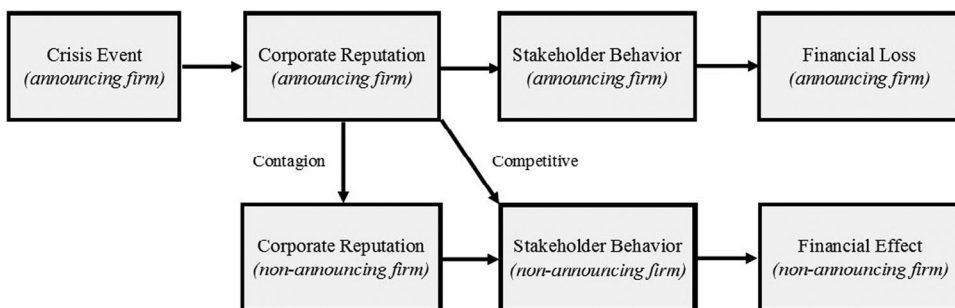
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<sup>1</sup>See, for example, Gatzert (2015) for a review of the empirical evidence of reputation-damaging events on financial performance or Fiordelisi, Soana, and Schwizer (2014) for an empirical investigation.

<sup>2</sup>See, for example, Cummins et al. (2012).

or talented employees might move from the announcing to the nonannouncing firm (“competitive effect”). However, it is also reasonable to assume that the nonannouncing firm might suffer a financial loss (“contagion effect”). Cummins et al. (2012) provide two possible explanations for this result: First, such crisis events may convey new information about the possibility of the occurrence of these events, which also concerns nonannouncing firms in the future, that is, the transparency of this risk is increased. Second, the crisis events could also lead to a loss of reputation for nonannouncing firms, as stakeholders transfer the deteriorated corporate reputation of the announcing firm to the nonannouncing firm, which Jonsson et al. (2009) denote as “generalization” by the stakeholders. Regarding the second explanation, further literature also agrees that firms in the same industry are often “tarred by the same brush” (King, Lenox, & Barnett, 2002, p. 393), that is, stakeholders do not differentiate among firms, and that such an event may deteriorate the reputation of the whole industry (see, e.g., Barnett and Hoffman, 2008; King et al., 2002; Mohammad and Crane, 2015). A deteriorated reputation of the nonannouncing firm can then potentially imply a change in the behavior of the nonannouncing firm’s stakeholders (e.g., customers also avoid buying products of the nonannouncing firm), which can lead to a financial loss in the nonannouncing firm.

Figure 1 illustrates the causal chain of spillover effects regarding a nonannouncing competitor. A crisis event in the announcing firm negatively affects their corporate reputation. This may lead to a change in the behavior of the announcing firm’s stakeholders, finally leading to a financial loss for this firm. Spillover effects occur as the deteriorated corporate reputation of the announcing firm possibly affects nonannouncing firms. On the one hand, stakeholders might transfer the deteriorated corporate reputation of the announcing firm to the nonannouncing firm also deteriorating the nonannouncing firm’s corporate reputation (contagion effect). On the other hand, stakeholders of the nonannouncing firm might change their behavior due to the deteriorated corporate reputation of the announcing firm (competitive effect). Both, competitive and contagion effect, influence the behavior of the nonannouncing firm’s stakeholders, but in opposite directions. The resulting financial effect in the nonannouncing firm depends on whether the competitive effect dominates the contagion effect or vice versa.<sup>3</sup>



**FIGURE 1** Causal chain for announcing firm and nonannouncing competitor caused by a crisis event in an announcing firm

<sup>3</sup>However, note that if the announcing firm and the nonannouncing firm have direct business relations, the crisis event might additionally lead to a direct financial loss in the nonannouncing firm.

According to Hertzel, Li, Officer, & Rodgers (2008), *suppliers* of the announcing firm might also suffer financial losses (contagion effect), as the announcing firms could order fewer products of the supplier in case of a potentially lower customer demand. Competitive effects might occur if a nonannouncing competitor of the announcing firm benefits from the crisis event and a supplier is more closely related to this competitor than to the announcing firm (see Barth, Eckert, Gatzert, & Scholz, 2019).

Theoretical literature (see Aharony and Swary, 1983; Cummins et al., 2012) distinguishes between two different types of contagion. “Pure contagion” means that spillover effects affect all nonannouncing firms in the same way as stakeholders do not differentiate between different competitors or different suppliers. Characteristics of the event and the firms do not influence the spillover effects. In contrast to that, “information-based contagion” implies that the contagion effects (especially, the spillover effects), depend on certain events and firm characteristics. Hence, in case of information-based contagion, some firms might suffer severe losses from spillover effects, whereas in other nonannouncing firms the competitive effect dominates the contagion effect.

Regarding information-based contagion, potential event and firm characteristics affecting spillover effects are discussed in previous literature. With spillover effects spreading through the industry network (see Jonsson et al., 2009; Yu, Sengul, & Lester, 2002), an important factor affecting spillover effects might be the network structure of the industry and the respective positions of the announcing and the nonannouncing firm in the network (see Yu and Lester, 2008). In particular, negative spillover effects might be more likely to occur in firms of the same organizational form (see Jonsson et al., 2009; Yu, Sengul, & Lester, 2008), if the firms are being perceived as similar (see, e.g., Jonsson et al., 2009; Mohammad and Crane, 2015), if the announcing firm is a central organization in the network (Yu and Lester, 2008), or if the announcing firm or the event is typical for the industry (see Jonsson et al., 2009). In addition, it is argued that spillover effects might be positively related to the strength of the cooperative relationship (see Yu et al., 2002), to market commonality (see Yu et al., 2002), structural equivalence (Yu and Lester, 2008), and the proximity to one another (Yu and Lester, 2008). However, as also laid out in Section 3, Goins and Gruca (2008) find lower negative spillover effects for very near rivals due to a higher competitive effect. With the nonannouncing firm having a good reputation (Yu and Lester, 2008) or when a heterogeneous distribution of resources exists (Yu et al., 2008), spillover effects might be less likely to occur. Besides those moderators, Yu et al. (2008) suggest that spillover effects are mediated by the perceptions and reactions of key external institutional intermediaries (e.g., popular press and regulator) of the announcing firm.

### 3 | EMPIRICAL EVIDENCE REGARDING SPILLOVER EFFECTS

Spillover effects have been studied widely in the empirical literature (for an overview see, e.g., de Bandt and Hartmann, 2000; Flannery, 1998) starting with Aharony and Swary (1983), who analyzed the three largest bank failures before 1980 with respect to contagion effects on other banks and the economy as a whole. As both the competitive and the contagion effect appear simultaneously, Lang and Stulz (1992) point out that spillover effects are the sum of these two offsetting effects, implying that empirical studies actually measure the net effect. Table 1

**TABLE 1** Empirical evidence on spillover effects from the academic literature

Article	Data/industry	Spillover effects (competitive vs. contagion)/key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Aharony and Swary (1983)	Effects of the three largest bank failures in the United States of America before 1980 on 73 solvent banks	<ul style="list-style-type: none"> <li>Largest bank failure caused significantly negative abnormal returns/other two bank failures not</li> <li>Failure caused by problems specific to the bank do not lead to contagion effects</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Type of the bank failure (firm specific no contagion effects, otherwise contagion effects)</li> </ul>	Yes
Bowen, Castanias, and Daley (1983)	Effects of the Three Mile Island nuclear accident (1979) on 83 electric utilities	<ul style="list-style-type: none"> <li>Negative spillover effects to nonannouncing electric utilities</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Significantly larger negative effects for utility's with a commitment to nuclear power</li> <li>Significant influence of the amount of nuclear capacity of the nonannouncing firm on spillover effects</li> </ul>	Yes
Hill and Schneeweis (1983)	Effects of the Three Mile Island nuclear accident (1979) on public utility firms	<ul style="list-style-type: none"> <li>Other nuclear utilities experienced significantly negative abnormal returns</li> <li>Nonnuclear utilities did not experience significantly negative abnormal returns</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Type of the firm (nuclear vs. nonnuclear utility firms)</li> </ul>	Yes

(Continues)

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Jarrell and Peltzman (1985)	Effects of 116 <i>auto recalls</i> between 1967 and 1981 resp. 26 <i>drug recalls</i> between 1974 and 1982 on two resp. about 50 rivals	<ul style="list-style-type: none"> <li>Significant stock market losses for nonannouncing firms (contagion effect dominates competitive effect)</li> <li>Drug recalls have more substantial cross-firm effects than auto recalls</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects depend on event type</li> </ul>	Yes
Karafiath and Glascock (1989)	Effects of the <i>closure of the Penn Square Bank</i> in 1982 on 55 nonannouncing banks	<ul style="list-style-type: none"> <li>Negative spillover effects to nonannouncing banks (significant only for certain subsets)</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects depend on the <i>relationship</i> of the announcing and nonannouncing firm</li> </ul>	Yes
Mitchell (1989)	Effects of the <i>Tylenol poisonings</i> (1982–1986) on the <i>drug industry</i> (22 firms)	<ul style="list-style-type: none"> <li>Significantly negative stock price reaction for the entire drug industry</li> </ul>	Competitors/intrasector	-	-
Asness and Smirlock (1991)	Effects of the <i>bankruptcy of Residential Resources</i> (a REIT) in 1989 on 35 REITs (listed on NYSE or AMEX)	<ul style="list-style-type: none"> <li>On average significantly negative spillover effects to nonannouncing REITs</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Significance of spillover effects in subsets of the sample depends on <i>similarity</i> of the firms (higher negative spillover effects in subsets with more similar firms)</li> </ul>	Yes

**TABLE 1** (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Dickinson, Peterson, and Christiansen (1991)	Effects of the <i>failure</i> of the <i>First Republic Bank</i> on 158 banks listed in CRSP	<ul style="list-style-type: none"> <li>Negative spillover effects to other banks</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Results differ for certain subsets (e.g., Texas Banks, Top 25 Banks) indicating spillover effects depend on <i>geographical distance</i> and <i>firm size</i></li> </ul>	Yes
Madura, Whyte, and McDaniel (1991)	Effects of Citicorp's announcement of a \$3 billion <i>increase in loan-loss reserves</i> in 1987 on 13 British banks	<ul style="list-style-type: none"> <li>Significantly negative spillover effects</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects are higher negative for <i>larger firms</i></li> </ul>	Yes
Lang and Stulz (1992)	Effects of 59 <i>bankruptcy announcements</i> between 1970 and 1989 (all bankruptcies in this period of firms with more than \$120 million liabilities and a four-digit SIC code) on the competitors of the bankrupt firm (in each case all firms with the same primary four-digit SIC code)	<ul style="list-style-type: none"> <li>On average significantly negative stock reactions (contagion effect dominates competitive effect on average)</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Significantly positive effects for <i>highly concentrated</i> industries with <i>low leverage</i> and a <i>low degree of competition</i></li> <li>Significantly negative effects for <i>highly leveraged</i> industries with a <i>high degree of competition</i></li> </ul>	Yes

(Continues)



TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Slovin, Sushka, and Polonchek (1992)	Effects of 16 <i>commercial bank common stock issues</i> between 1975 and 1988 on other commercial and investment banks and of 211 <i>industrial common stock issues</i> between 1980 and 1985 on rivals	<ul style="list-style-type: none"> <li>If the announcing firm is a commercial bank, significantly negative spillover effects on commercial and investment banks</li> <li>If the announcing firm is an industrial firm, no significant spillover effects on rivals</li> </ul>	Competitors/intrasector and intersector	<ul style="list-style-type: none"> <li><i>Type of the firm</i> (results differ depending on the type of the announcing and nonannouncing firm)</li> </ul>	Yes
Szewczyk (1992)	Effects of 484 <i>corporate security offerings</i> of firms of various (112 different) industries between 1970 and 1983 on the share price of, in each case, other firms in the same industry	<ul style="list-style-type: none"> <li>Significantly negative abnormal returns for nonannouncing firms</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Abnormal returns in the announcing and nonannouncing firm are positively correlated</li> <li><i>Type of the loss</i> (in particular common stock offerings lead to negative spillover effects)</li> </ul>	Yes
Fenn and Cole (1994)	Effects of two <i>life insurance companies' asset-quality problems</i> (First Executive and Traveler in 1990) on 52 competitors	<ul style="list-style-type: none"> <li>Negative stock market reactions for competitors</li> <li>Significantly negative stock market reactions for competitors with risky assets</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Stock market reactions are significantly larger negative for firms with <i>risky assets</i> (therefore, being in the relevant point <i>more similar</i> to the announcing firm)</li> </ul>	Yes

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Avila and Eastman (1995)	Effects of the <i>failure</i> of four <i>life insurers</i> on the life insurance industry	<ul style="list-style-type: none"> <li>Significantly negative spillover effects to subamples of nonannouncing firms</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Contagion effects depend on <i>firm size</i> of the nonannouncing firm</li> </ul>	Yes
Aharony and Swary (1996)	Effects of five U.S. <i>bank failures</i> between 1983 and 1989 on 33 U.S. bank-holding companies	<ul style="list-style-type: none"> <li>Significant contagion effects</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li><i>Geographical distance</i> and <i>capital</i> are negatively related to contagion effects</li> <li><i>Firm size</i> is positively related to contagion effects</li> </ul>	Yes
Firth (1996)	Effects of 649 <i>dividend changes</i> between 1980 and 1991 from firms listed in NYSE and AMEX, respectively, on firms in the same industry also listed on NYSE and AMEX	<ul style="list-style-type: none"> <li>Dividend change significantly affects the stock price of the nonannouncing firms in the same direction as of the announcing firm (though to a smaller extent)</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Magnitude of stock price reaction in nonannouncing firm significantly related to <i>certain financial characteristics</i> (abnormal returns of the announcing firm, historical stock-return correlations between announcing and nonannouncing firm, immediately prior dividend histories of nonannouncing firm)</li> </ul>	Yes

(Continues)

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Haley and Sigler (1996)	Effects of four <i>life insurer insolvencies</i> in 1991 on the life insurance industry	<ul style="list-style-type: none"> <li>No significant contagion effects</li> </ul>	Competitors/intrasector	–	–
Docking, Hirschey, and Jones (1997)	Effects of 578 <i>bank loan reserve announcements</i> from 1985 to 1990 on other nonannouncing banks (announcing and nonannouncing banks must be listed on either NYSE, AMEX, or NASDAQ)	<ul style="list-style-type: none"> <li>Surprising addition to loan-loss reserve in the announcing bank leads to significantly negative stock price reactions in nonannouncing banks</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Effects of regional bank loan-loss reserve announcements on nonannouncing regional banks are stronger for <i>banks located closer to the announcing bank</i></li> <li>Money-center and large regional banks react differently than other banks</li> </ul>	Yes
Szewczyk, Thomas, and Tsetsekos (1997)	Effects of <i>Mutual Benefits Life's failure</i> on the life insurance industry	<ul style="list-style-type: none"> <li>Significant contagion effects</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Stronger contagion effects for <i>highly rated</i> insurers</li> </ul>	Yes
Bosch, Eckard, and Singal (1998)	Effects of 25 <i>air crashes</i> in 13 different airlines between 1978 and 1996 on on average 10 noncrash airlines	<ul style="list-style-type: none"> <li>Evidence of competitive effects for firms with market overlap</li> <li>Significant negative spillover effects (cumulative abnormal returns) for firms with little market overlap</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Significantly different spillover effects for airlines with high vs. low <i>market overlap</i></li> </ul>	Yes

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Fields, Klein, and Myskowski (1998)	Effects of <i>Lloyd's financial distress</i> in 1993 on 46 property-liability insurance companies	<ul style="list-style-type: none"> <li>Significant contagion effects in the insurance industry</li> <li>Also signs for competitive effect, which is, however, dominated by contagion effect</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Percent of revenue generated from insurance premiums and exposure to reinsurance drive spillover effects</li> </ul>	Yes
Polonchek and Miller (1999)	Effects of 69 equity issuances by insurance companies on other insurers between 1977 and 1993	<ul style="list-style-type: none"> <li>Significantly negative spillover effects to rivals</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Contagion effects depend on the type of the announcing firm and the reputation of the industry</li> </ul>	Yes
Slovin, Sushka, and Polonchek (1999)	Effects of 62 dividend cuts between 1975 and 1992 in U.S. banks on other banks	<ul style="list-style-type: none"> <li>Significant contagion effects following dividend cuts in money-center banks</li> <li>Dividend cuts in regional banks cause competitive effects</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects depend on firm type</li> <li>Stronger competitive effects for firms with a lower geographical distance</li> </ul>	Yes
Bessler and Noheil (2000)	Effects of dividend cuts between 1975 and 1991 in 17 U.S. banks on other banks	<ul style="list-style-type: none"> <li>Significantly negative spillover effects to other banks</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Significantly stronger contagion effects for more similar firms</li> </ul>	Yes

(Continues)

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Jordan, Peek, and Rosengren (2000)	Effects of the disclosure of <i>formal enforcement actions</i> in 35 bank-holding companies on other banks	<ul style="list-style-type: none"> <li>Negative spillover effects (however, most often insignificant)</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects depend on <i>similarity</i> between announcing and nonannouncing firm</li> </ul>	Yes
Akhigbe and Madura (2001)	Effects of 99 U.S. <i>bank failures</i> between 1980 and 1996 on 815 rival banks	<ul style="list-style-type: none"> <li>Significant contagion effects</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects depend on characteristics of the announcing firm (<i>size, type</i>)</li> <li>Characteristics of the nonannouncing firms influence spillover effects (<i>size, capital</i>)</li> </ul>	Yes
Cowan and Power (2001)	Effects of the First Executive <i>failure</i> in 1991 on 76 <i>life insurance</i> companies	<ul style="list-style-type: none"> <li>Significantly negative stock price reactions for other life insurance firms</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Stock price reaction in nonannouncing firms depends on firm characteristics (<i>amount invested in junk bonds, dependence of the firm on life insurance policies and annuities</i>)</li> </ul>	Yes

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Brewer and Jackson (2002)	Effects of three announcements of <i>financial distress</i> by <i>commercial banks</i> between 1989 and 1990 on 134 banking organizations and 61 life insurers	<ul style="list-style-type: none"> <li>Significantly negative spillover effects (measured by cumulative abnormal returns)</li> </ul>	Competitors/intrasector and intersector	<ul style="list-style-type: none"> <li>Spillover effects depend on various factors (<i>geographical distance, firm size, regulatory expectations, asset portfolio composition, and leverage</i>)</li> </ul>	Yes
Kabir and Hassan (2005)	Effects of the <i>long-term capital management crisis</i> (1998) on 869 other <i>financial firms</i> (commercial banks, investment banks, insurance companies, S&L institutions)	<ul style="list-style-type: none"> <li>Significantly negative spillover effects around the event for commercial and investment banks (losses for investment banks much higher)</li> <li>Significantly negative spillover effects for small S&amp;L institutions and big insurance companies</li> </ul>	Competitors/intrasector and intersector	<ul style="list-style-type: none"> <li>Spillover effects depend on <i>firm type</i>, as well as <i>firm size</i> of the announcing firm</li> </ul>	Yes, however, a part of the spillover effect is due to pure contagion on the whole financial sector
Xu, Najand, and Ziegenfuss (2006)	Effects of 561 <i>restatement announcements</i> of public firms caused by accounting irregularities between 1997 and 2002 on in each case five rival firms from the same industry (same GICS code) with similar cash flow characteristics	<ul style="list-style-type: none"> <li>Significant contagion effects but no competitive effect</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Contagion effect is related to the <i>similarity of the cash flows</i> and <i>industry leverage</i></li> </ul>	Yes

(Continues)

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Barnett (2007)	Effects of the <i>Bhopal disaster</i> (1984) on 1,046 <i>chemical firms</i>	<ul style="list-style-type: none"> <li>Volatility of stocks of nonannouncing firms increased significantly after Bhopal disaster</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li><i>Cooperations with rivals</i> helped significantly restabilizing the stock price</li> </ul>	Yes
Gleason, Jenkins, and Johnson (2008)	Effects of 380 <i>accounting restatements</i> between 1990 and 2002 of U.S. firms in all sectors (in particular information technology and consumer discretionary firms) that adversely affect shareholder wealth at the announcing firm on about 59 nonannouncing firms in the same sector per event	<ul style="list-style-type: none"> <li>Accounting restatements adversely affecting shareholder wealth in announcing firm lead to significant market value losses in nonannouncing firms in the same industry</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Nonannouncing firms with <i>high accruals</i> suffer significantly larger market value losses</li> <li>Significantly higher market value losses in nonannouncing firms when the announcing firm is <i>large</i> or other announcing firms <i>have already announced similar restatements</i></li> </ul>	Yes
Goins and Gruca (2008)	Effects of <i>layoff announcements</i> (exceeding 1% of employees) in 57 U.S. firms of the <i>petroleum industry</i> between 1989 and 1996 on the other nonannouncing firms in the sample	<ul style="list-style-type: none"> <li>Market value losses also for nonannouncing firms</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li><i>Close rivals</i> experience a significant <i>dampening</i> of the contagion effect (perhaps due to stronger competitive effects)</li> </ul>	Yes

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Hertzel et al. (2008)	Effects of 250 <i>bankruptcy</i> events of firms of all industries during 1981 and 2004 on the suppliers (on average 2.2) and customers (on average 2.0) of the respective firm	<ul style="list-style-type: none"> <li>On average significantly negative spillover effects to suppliers</li> </ul>	Suppliers/intersector	<ul style="list-style-type: none"> <li>Spillover effects to suppliers especially negative if competitors suffer contagion effects</li> <li>No significantly negative spillover effects to suppliers if competitive effect dominates contagion effect in rival firms</li> </ul>	Yes
Jonsson, Greve, and Fujiwara-Greve (2009)	Effects of 2 <i>discoveries of corporate deviance at Skandia AB</i> on other insurance firms	<ul style="list-style-type: none"> <li>Significantly negative effects on other insurers</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Stronger contagion effects for firms <i>more similar</i> to Skandia AB</li> <li>Significantly higher negative effects for firms owning real estate</li> </ul>	Yes

(Continues)



TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Cheng, Elyasiani, and Lin (2010)	Effects of Spitzer suit event against Marsh in 2004 regarding <i>bid rigging</i> and <i>inappropriate use of contingent commissions</i>	<ul style="list-style-type: none"> <li>Significantly negative spillover effects on other brokers</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects depend on firm characteristics such as <i>firm size</i> and <i>firm type</i></li> </ul>	Yes
Egginton, Hilliard, Liebenberg, and Liebenberg (2010)	Effects of <i>AIG's bail out</i> on the insurance industry	<ul style="list-style-type: none"> <li>Significant competitive and contagion effects</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects depend on <i>market share</i> and <i>leverage</i> of the nonannouncing firm</li> </ul>	Yes
Goldsmith-Pinkham and Yorulmazer (2010)	Effects of the <i>Northern Rock bank run</i> and <i>bail out</i> in 2007 on the U.K. banking system	<ul style="list-style-type: none"> <li>Significantly negative spillover effects to other U.K. banks</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Stronger contagion effects for <i>closer rivals</i></li> </ul>	Yes
Prokopenzuk (2010)	Effects of 6,019 <i>negative earnings surprises</i> in different sectors on competitors	<ul style="list-style-type: none"> <li>Significant contagion effects in the banking sector</li> <li>Significant stronger contagion in the banking sector than in nonbanking sectors</li> <li>No signs of contagion in the insurance sector</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Contagion effects depend on <i>firm size</i> of announcing and nonannouncing firm</li> </ul>	Yes

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
Kolay and Lemmon (2011)	Effects of 215 <i>bankruptcy</i> events of firms with at least \$100 million assets of all industries during 1980 and 2009 on the suppliers (on average 2.55) and customers (on average 2.06) of the respective firm	<ul style="list-style-type: none"> <li>On average significantly negative spillover effects to suppliers.</li> </ul>	Suppliers/intersector	<ul style="list-style-type: none"> <li>Suppliers of <i>economically distressed firms</i> (low operating profit and low leverage) suffer significantly larger negative spillover effects than suppliers of financially distressed firms (high operating profit and high leverage)</li> <li>Supplier with more <i>unsecured trade credits</i> suffer higher negative spillover effects</li> </ul>	Yes

Cummins, Wei, and Xie (2012)	Effects of 573 U.S. <i>operational loss</i> events in the <i>financial sector</i> (in commercial banks, investment banks and insurance companies) on nonannouncing firms (commercial banks, investment banks and insurance companies) traded on the NYSE,	<ul style="list-style-type: none"> <li>Significantly negative intrasector and intersector spillover effects</li> </ul>	Competitors/intrasector and intersector	<ul style="list-style-type: none"> <li>Spillover effects depend on the <i>event type</i> of the underlying operational loss (deceptive sales,<sup>a</sup> internal fraud and external fraud events cause significantly larger negative</li> </ul>	Yes (spillover effects rather information-based than purely contagious)
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(Continues)

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
	AMEX, or NASDAQ between 1978 and 2010			<ul style="list-style-type: none"> <li>spillover effects on nonannouncing firms)               <ul style="list-style-type: none"> <li>Significantly larger negative spillover effects for firms with higher Tobin's Q ratios</li> <li>Spillover effects depend on the <i>type of the involved firms</i></li> </ul> </li> </ul>	
Freedman, Kearney, and Lederman (2012)	Effects of 276 toy recalls in U.S. firms in 2007 on competitors.	<ul style="list-style-type: none"> <li>Toy recalls (except low coverage recalls) in announcing firms cause significant decrease in unit sales of toys in nonannouncing firms</li> <li>Customers bought less but more expensive toys</li> <li>Examining stock market performance provides also evidence of industry-wide spillover effects due to toy recalls</li> </ul>	Competitors/intrasector		–
Adams, Füss, and Gropp (2014)	Spillover effects due to a shock on the VaR of one financial firm among 112 <i>financial institutions</i> (commercial	<ul style="list-style-type: none"> <li>Significantly negative spillover effects</li> </ul>	Competitors/intrasector and intersector	<ul style="list-style-type: none"> <li>Size of spillover effects depends on the <i>state of the financial market</i> (smaller during normal</li> </ul>	Yes

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
	banks, investment banks, insurance companies, hedge funds) between 2003 and 2010			<p>times and higher in volatile markets)</p> <ul style="list-style-type: none"> <li>Spillover effects depending on the <i>firm type</i> (commercial banks and hedge funds play a major role in the transfer of shocks to other financial firms)</li> </ul>	
Adams, Füss, and Schindler (2015)	Spillover effects due to a shock on the VaR of one announcing REIT among 74 U.S. REITs between 2007 and 2011	<ul style="list-style-type: none"> <li>Significantly negative spillover effects</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Size of spillover effects differ significantly for tranquil, normal, and volatile periods of real estate stock prices</li> <li>High leverage, size, and market beta as well as the low geographic distance to the announcing firm increase vulnerability to spillover effects</li> </ul>	Yes
Borah and Tellis (2016)	Spillover effects (measured by online chatter) of 26 automobile recalls from January 1, 2009, to April	<ul style="list-style-type: none"> <li>Significantly negative spillover effects on automobile models of the same brand but other segments</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Size of spillover effect is stronger from dominant brands to less dominant brands than vice versa</li> </ul>	Yes

(Continues)

TABLE 1 (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
	15, 2010, on other automobile models	<ul style="list-style-type: none"> <li>Significantly negative spillover effects on automobile models of a different brand but the same segment</li> </ul>		<ul style="list-style-type: none"> <li>Spillover effects are stronger for brands with a <i>similar market share</i> and which are from the <i>same country</i></li> </ul>	
Fabrizi, Huan, and Parbonetti (2017)	Spillover effects from banks manipulating the LIBOR to nonculpable banks	<ul style="list-style-type: none"> <li>Significantly negative spillover effects on nonculpable banks</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Size of spillover effects higher for <i>large derivative dealers</i></li> </ul>	Yes
Kasperit, Lopatia, Pakhchanyan, and Prokop (2017)	Effects of 62 operational loss events from 2000 to 2013 in <i>European financial institutions</i> on other banks	<ul style="list-style-type: none"> <li>Significantly negative spillover effects on competitors</li> <li>High degree of market efficiency</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Spillover effects depend on the underlying <i>loss size</i> (less pronounced for smaller loss events)</li> </ul>	No
Eckert, Gatzert, and Heidinger (2018)	Spillover effects due to operational losses from 2000 to 2017 in <i>banks and insurance companies</i>	<ul style="list-style-type: none"> <li>On average significantly negative spillover effects</li> <li>Certain events lead to pronounced competitive effects</li> </ul>	Competitors/intrasector and intersector	<ul style="list-style-type: none"> <li><i>External fraud</i> event lead to a significant competitive effect</li> <li><i>Profitable firms</i> cause higher spillover effects</li> <li>Spillover effects to more <i>similar firms</i> are significantly more negative</li> </ul>	Yes
Pino and Sharma (2019)	Spillover effects in the <i>US banking industry</i> from 2001 to 2012	<ul style="list-style-type: none"> <li>No significant spillover effects on banks on average</li> </ul>	Competitors/intrasector	<ul style="list-style-type: none"> <li>Significantly stronger contagion effects for</li> </ul>	Yes

**TABLE 1** (Continued)

Article	Data/industry	Spillover effects (competitive vs. contagion)/ key findings	Competitors or suppliers/intrasector vs. intersector spillover	Influencing factors	Information-based contagion? (vs. pure contagion)
		<ul style="list-style-type: none"> <li>Significantly negative spillover effects on banks with a smaller geographical distance</li> </ul>		banks with a <i>similar location</i> <ul style="list-style-type: none"> <li>Spillover effects are significantly more negative for banks with similar characteristics (size, same regulation)</li> </ul>	
Barth, Eckert, Gatzert, and Scholz (2019)	Spillover effects on competitors and suppliers following the <i>Volkswagen emission scandal</i>	<ul style="list-style-type: none"> <li>Significantly negative spillover effects on competitors and suppliers</li> </ul>	Competitors/intrasector and suppliers/intersector	<ul style="list-style-type: none"> <li>Spillover effects depend on <i>geographical distance</i></li> </ul>	Yes
Eckert, Gatzert, and Pisula (2019)	Effects of three <i>rogue trader scandals</i> in European banks on the European banks and insurance companies	<ul style="list-style-type: none"> <li>Significant spillover effects</li> <li>In two cases dominates the competitive effect, in one case the contagion effect significantly</li> </ul>	Competitors/intrasector and intersector	<ul style="list-style-type: none"> <li>Severity of spillover effects depends on <i>event characteristics</i></li> <li>Firm characteristics (<i>market value, total debt in % of common equity, geographical distance</i>) affect spillover effects</li> </ul>	Yes

<sup>a</sup>Subset of clients, products, and business practices.

provides a more recent comprehensive overview of 51 empirical studies investigating spillover effects in various industries.

In particular, spillover effects are most often measured in terms of market value effects. Some studies investigate spillover effects caused by one specific event, such as, for example, the Three Mile Island nuclear accident (Bowen, Castanias, & Daley, 1983; Hill and Schneeweis, 1983), or a few certain events, such as, for example, five U.S. bank failures (Aharony and Swary, 1996). Other articles focus on spillover effects due to certain types of underlying events in general, implying a larger sample size, such as, for example, accounting restatements (Gleason, Jenkins, & Johnson, 2008), operational losses in general (Cummins et al., 2012), or product recalls in certain industries (Freedman, Kearney, & Lederman, 2012). Most studies focus on spillover effects on competitors in the same industry. Just a few articles additionally take into account spillover effects to firms in other industries (e.g., Adams, Füss, & Gropp, 2014; Kabir and Hassan, 2005), and, to the best of our knowledge, only Hertz et al. (2008), Kolay and Lemmon (2011), and Barth et al. (2019) focus on spillover effects on suppliers.

The results of almost all papers considered in Table 1 show that events that led to losses in the announcing firm on the average, cause (most often significantly) negative spillover effects, indicating that the contagion effect most often outweighs the competitive effect. Exceptions are Aharony and Swary (1983), who do not find contagion effects following two of three considered bank failures in the United States of America before 1980, and Haley and Sigler (1996) investigating spillover effects following life insurer insolvencies in 1991.

Only Kaspereit, Lopatta, Pakhchanyan, and Prokop (2017) investigating operational losses in European financial institutions and partially Kabir and Hassan (2005) analyzing spillover effects after the long-term capital management crisis find signs of pure contagion. The results of the remaining empirical studies investigating influencing factors (see Table 1) show that spillover effects are significantly affected by certain events or firm characteristics indicating information-based contagion, and thus, supporting the hypotheses derived in the theoretical literature (see Section 2).

In order to manage spillover risks, it is important to know the main influencing factors that drive spillover effects. Previous empirical studies analyze various different events and focus on various aspects. Hence, each of these studies only analyzes a few influencing factors, which makes comparability difficult. However, to provide further insight Table 2 presents the most common influencing factors as found in the empirical literature. These include characteristics of the announcing and nonannouncing firm as drivers of spillover effects such as the firm sizes and the similarity or the geographical distance between the firms. For instance, nine out of the total 51 studies investigated the size of the announcing firm as an influencing factor and found that larger announcing firms cause significantly higher negative spillover effects. Moreover, empirical literature often identified event characteristics such as the type of the underlying event or the loss size as influencing factors.<sup>4</sup>

## 4 | SPILLOVER RISK MANAGEMENT

Spillover risk management deals with the risk of spillover losses occurring at nonannouncing firms. Hence, focus in spillover risk management are events occurring at other firms that might affect the considered firm via spillover.

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<sup>4</sup>We do not consider the event type in Table 2, as the influence of the event type is too specific and does not allow generalizing results to obtain implications for risk management.

The literature discusses several recommendations on how to deal with spillover risks that are of relevance for risk management. As described in Figure 1, spillover effects depend on changes of the corporate reputation of the announcing and the nonannouncing firm. Hence, managing spillover risk is closely related to managing reputation risk. The management of reputation (risk) in general is considered to be challenging (see, e.g., Eckert, 2017), and taking into account the corporate reputation of other firms in the industry makes it even more difficult. However, as seen in the previous sections, considering the corporate reputation of other firms and its influencing factors, that is, reputation (risk) management beyond corporate borders, is indispensable when managing spillover risk. Risk events in an announcing firm can spill over to nonannouncing firms and, in addition, most definitions of corporate reputation include that a firm's reputation has to be seen relatively and compared to other firms in the industry (see, e.g., Fombrun, 1996; Walker, 2010).

#### 4.1 | Risk identification

The (spillover) risk identification process consists of two steps. First, the identification of other *firms* that potentially cause spillover effects. Second, the identification of *events* in these other firms that may lead to spillover losses.

Hence, using a network analysis, that is, considering the industry as a network, can be a useful starting point for reputation (risk) management beyond corporate borders and to investigate why, when, and from which firms spillover effects may occur (see Barnett and Hoffman, 2008; Eckert and Gatzert, 2019; Goins and Gruca, 2008; Yu and Lester, 2008; Yu et al., 2008). For this purpose, a firm identifies its relevant firms in the network that might lead to spillover effects. Because different firms might have different tendencies to cause spillover effects, links between firms are weighted according to the relevant influencing factors representing the tendency to cause spillover effects (Table 2 provides the main influencing factors). Therefore, links between firms are stronger if they are more similar or if the other firms are larger, whereas links are weaker if the firms' headquarters are further apart.

**TABLE 2** Empirical evidence regarding main factors influencing spillover risk

Influencing factor	Direction	Number of studies in which the influencing factor was significant
Size of the announcing firm	Larger announcing firms cause higher negative spillover effects	9
Size of the nonannouncing firm	Higher negative spillover effects for larger nonannouncing firms	11
Similarity between announcing and nonannouncing firm	Higher negative spillover effects for more similar firms	11
Geographical distance	Higher negative spillover effects for closer firms	10
Loss size	Higher losses cause higher negative spillover effects	7



On the basis of the pattern of links between firms in the network, Yu and Lester (2008) identify three archetypal network structures: centralized networks, scale-free networks, and distributed networks. As mentioned in Yu and Lester (2008) and Eckert and Gatzert (2019), a centralized network is characterized by one firm that is connected with many other firms, and all other firms are mainly only connected with the central firm. In a scale-free network, a few important firms are connected with many other firms and among each other. Many other firms are only connected with one or a few of the important firms. In contrast to that, a distributed network as illustrated in Figure 2 typically comprises firms that are all only connected with a few other firms.<sup>5</sup> A similar network position with similar network ties (for instance, firm 9 and firm 11 in Figure 2) and frequent communication ties between two firms increase the probability that stakeholders perceive firms as being similar and that the firms are being assigned a similar reputation (see Barnett and Hoffman, 2008; Yu et al., 2008).

Typically, such a network analysis reveals certain competitors and suppliers as the set of firms that potentially cause spillover effects. Afterward, it is crucial to identify events in these firms that may cause spillover effects. Section 3 offers insight regarding the characteristics of such events. Our overview of the empirical literature suggests that especially large operational losses lead to spillover effects.

## 4.2 | Risk assessment

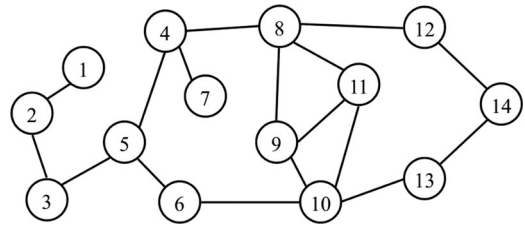
Similar to assessing reputational losses, a main problem regarding the assessment of spillover risks is the difficulty to quantify the severity of a specific spillover loss. There is no explicit claim payment. The spillover loss arises in the future for instance due to less revenue or higher costs to find employees. Due to that, the empirical literature approximates the severity of spillover losses by means of market value losses (see Section 3). Nevertheless, the characteristics of spillover effects lead to a lack of historical data for firms. To get at least a first impression of the importance of spillover risks, qualitative approaches to assess spillover risk like risk workshops (see Gatzert and Schmit, 2016) may be useful.

However, having identified events that may lead to spillover effects in the risk identification process, it may be possible to approximately assess their likelihood. Moreover, using for instance scenario analysis, firms might estimate the severity of spillover losses in these cases. On this basis, it is possible to derive risk maps, where these events get classified regarding their likelihood and loss severity.

A further quantitative approach to assess spillover risks provides Eckert, Gatzert, and Heidinger (2018) and Eckert and Gatzert (2019), which, however, requires a certain amount of historical data. Using data from operational loss data bases and based on a network analysis, they calibrate a stochastic model regarding spillover losses caused by large operational losses in other firms. Hence, having carried out a network analysis and using suitable operational loss data bases, their model can be adapted and used in risk assessment of spillover risks. Besides the expected spillover loss, their model provides also risk measures such as the value at risk.

<sup>5</sup>For simplification, in Figure 2 we have refrained from weighting links based on influencing factors. In a more advanced figure of a network, links between firms depend on influencing factors as mentioned above. More information regarding network analysis can be found, for example, in Chen, Cummins, Sun, and Weiss (2014).

**FIGURE 2** Illustrative network of firms (type: distributed network; see also Eckert and Gatzert, 2019). Nodes (1, 2,..., 14) represent firms and lines between firms indicate close relationships between them



### 4.3 | Risk response

Regarding the risk response with focus on risk mitigation, firms should develop a plan of how to respond to such spillover effects that can be applied immediately when needed. For instance, Yu and Lester (2008, p. 105) suggest that such a plan “should cover various aspects such as marketing and public relations, legal and technical considerations”. In addition, according to traditional economic research, firms should always respond with aggressive competitive strategies (see Yu and Lester, 2008). Taking into account the possibility of spillover effects, however, this only holds true if no contagion effects threaten (see Yu et al., 2002), and firms should be aware of their own reputation, which could also be deteriorated. In such cases, the following strategies are worth considering (see Barnett and Hoffman, 2008).

First, if an event also deteriorates the corporate reputation of other firms in the industry, firms could team up with the competitors to jointly improve the reputation of the industry (see Barnett and Hoffman, 2008),<sup>6</sup> where incentives for the firms include, for example, maintaining stability and preserving access to resources (see Desai, 2011; Jonsson et al., 2009; Yu et al., 2008). Besides strategies to promote changes to stakeholders (see Greenwood and Suddaby, 2006; Greenwood, Suddaby, & Hinings, 2002; Suddaby and Greenwood, 2005), Desai (2011) studies strategies to defend current practices. However, such strategies can be risky for nonannouncing firms (see Barnett and King, 2008; Desai, 2011; Maguire and Hardy, 2009), which is why Desai (2011) also investigates which types of firms are suitable to defend current practices, which in turn may contribute to protecting the reputation of the industry. For instance, firms with lower core similarity<sup>7</sup> to the announcing firm should engage in this regard.

Second, in a “preferential detachment process” (Yu et al., 2008, p. 453) firms could try to become more independent, reducing their relations to other firms in the industry and showing the stakeholders that they are not similar to the potential announcing firm (see Baniak and Grajzl, 2013; Barnett and Hoffman, 2008; Desai, 2011; King et al., 2002; Yu et al., 2008). This way, firms can reduce the likelihood and magnitude of negative spillover effects (see Yu et al., 2008). For instance, firms can implement self-regulatory standards (see Baniak and Grajzl, 2013; Barnett and King, 2008; Barnett, 2007; King et al., 2002) or join certain programs, such as voluntary environmental programs (see, e.g., Barnett and Hoffman, 2008), to signal stakeholders that they are better than other firms (in particular as the announcing firm; see Barnett and Hoffman, 2008). This is, especially, relevant if the reputations of the firms in an industry are tied together and there exists a common reputation (see King et al., 2002).

<sup>6</sup>See Hoffman (2001) for an example in the chemical industry.

<sup>7</sup>Core similarity between two firms mean that their main characteristics are similar (see Desai, 2011).

Communicating with stakeholders in such situations in order to emphasize differences to other firms is crucial (see Baniak and Grajzl, 2013; King et al., 2002).

Also, in terms of prevention and risk mitigation, corporate reputation should be seen relatively and compared with competitors (see, e.g., Fombrun, 1996; Walker, 2010), which is why one important part in reputation management beyond corporate borders is to keep up with the competitors in terms of the level of corporate reputation. Reason for this is that an improvement of a competitor's reputation generally implies a competitive advantage (see Goins and Gruca, 2008), whereby a higher reputation of the competitor also causes increasing expectations of stakeholders in general (see Barnett and Hoffman, 2008; Bertels and Pelozo, 2008). As laid out in Barnett and Hoffman (2008) and Hoffman and Woody (2008), this can sometimes lead to an "arms race," which could be observed, for example, in the banking sector with respect to investing in environmental performance. Goldman Sachs started to release an environmental policy framework in 2005, followed by the Bank of America, the Citigroup, and Morgan Stanley in 2007, who introduced similar programs to keep up with their competitor.

Finally, a further risk response measure in terms of risk transfer is reputation risk insurance that also covers spillover effects. An overview of several existing products can be found in Gatzert, Schmit, and Kolb (2016). Even though most of these relatively new (and few) policies mostly cover crisis-management costs, there are also insurance policies that cover financial losses (e.g., due to lost revenues) as well as losses due to spillover. In general, however, insurance solutions should be used to complement an adequate risk-management plan instead of replacing it.

#### 4.4 | Risk monitoring

As events in *other* firms lead to spillover losses, it is especially important as well as challenging to regularly monitor the identified risks and their assessment. The relevant firms might change as well as their tendency to cause spillover effects. Moreover, there are a lot of different events potentially causing spillover effects (see Sections 2 and 3), which is why the risk landscape may change more often than with most other risk types.

### 5 | SUMMARY

In this article, we first investigate theoretically, the mechanism and drivers of spillover effects. For this purpose, we provide an overview of the existing theoretical literature regarding spillover effects, which argues that spillover effects comprise of two offsetting effects: the competitive effect (nonannouncing firm benefits) and the contagion effect (nonannouncing firm suffers also a financial loss). By connecting previous literature regarding spillover effects with literature regarding the corporate reputation of a firm, we explain the relationship between spillover effects and the corporate reputation. There, again, both the competitive and the contagion effect play an important role.

In addition to our theoretical investigation, we give an overview of the existing empirical literature regarding spillover effects, where our results show that most studies find significantly negative spillover effects. This indicates that the contagion effect usually dominates the competitive effect emphasizing the importance of managing spillover risk. Analyzing previous work, we especially focus on which events can cause spillover effects and which factors

influence them. Most articles agree that spillover effects depend on certain firm and event characteristics indicating rather information-based contagion than pure contagion and supporting the hypotheses of the theoretical literature.

On the basis of our overview of the literature regarding spillover effects, we are the first to discuss risk-management strategies of spillover effects from a single firm, as well as from an industry perspective, by extending corporate reputation (risk) management beyond corporate borders. Taking into account the influencing factors of spillover effects, we combine individual measures discussed in previous studies in a holistic spillover risk-management process, which has not been done so far. Besides risk identification, risk assessment and risk monitoring of spillover effects, in particular, the risk response is a decisive step in the risk-management process that requires thoughtful preparation.

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## REFERENCES

- Adams, Z., Füss, R., & Gropp, R. (2014). Spillover effects among financial institutions: A state-dependent sensitivity value-at-risk approach. *Journal of Financial and Quantitative Analysis*, 49(3), 575–598.
- Adams, Z., Füss, R., & Schindler, F. (2015). The sources of risk spillovers among U.S. REITs: Financial characteristics and regional proximity. *Real Estate Economics*, 43(1), 67–100.
- Aharony, J., & Swary, I. (1983). Contagion effects of bank failures: Evidence from capital markets. *Journal of Business*, 56(3), 305–322.
- Aharony, J., & Swary, I. (1996). Additional evidence on the information-based contagion effects of bank failures. *Journal of Banking & Finance*, 20, 57–69.
- Akhigbe, A., & Madura, J. (2001). Why do contagion effects vary among bank failures? *Journal of Banking & Finance*, 25(4), 657–680.
- Asness, C., & Smirlock, M. (1991). A note on REIT bankruptcy and intraindustry information transfers—An empirical analysis. *Journal of Banking & Finance*, 15, 1171–1782.
- Avila, S., & Eastman, K. (1995). The market effects of life insurer insolvencies and the implications for regulators. *Journal of Insurance Regulation*, 13(3), 302–328.
- de Bandt, O., & Hartmann, P. (2000). *Systemic risk: A survey* (Working Paper). European Central Bank, Frankfurt, Germany.
- Baniak, A., & Grajzl, P. (2013). Equilibrium and welfare in a model of torts with industry reputation effects. *Review of Law & Economics*, 9(2), 265–302.
- Barnett, M. L. (2007). Tarred and untarred by the same brush: Exploring interdependence in the volatility of stock returns. *Corporate Reputation Review*, 10, 3–21.
- Barnett, M. L., & Hoffman, A. J. (2008). Beyond corporate reputation: Managing reputational interdependence. *Corporate Reputation Review*, 11, 1–9.
- Barnett, M. L., & King, A. A. (2008). Good fences make good neighbors: A longitudinal analysis of an industry self-regulatory institution. *Academy of Management Journal*, 51, 1150–1170.
- Barth, F., Eckert, C., Gatzert, N., & Scholz, H. (2019). *Spillover effects from the Volkswagen emissions scandal: An analysis of stock, corporate bond, and credit default swap markets* (Working Paper). Friedrich-Alexander University Erlangen-Nürnberg (FAU), Nürnberg, Germany
- Bertels, S., & Pelozo, J. (2008). Running just to stand still? Managing CSR reputation in an era of ratcheting expectations. *Corporate Reputation Review*, 11(1), 56–72.
- Bessler, W., & Nohel, T. (2000). Asymmetric information, dividend reductions, and contagion effects in bank stock returns. *Journal of Banking & Finance*, 24(11), 1831–1848.
- Borah, A., & Tellis, G. J. (2016). Halo (spillover) effects in social media: Do product recalls of one brand hurt or help rival brands? *Journal of Marketing Research*, 52(2), 143–160.

- Bosch, J. C., Eckard, E. W., & Singal, V. (1998). The competitive impact of air crashes: Stock market evidence. *Journal of Law and Economics*, 41, 503–519.
- Bowen, R. M., Castanias, R. P., & Daley, L. A. (1983). Intra-industry effects of the accident at Three-Mile Island. *Journal of Financial and Quantitative Analysis*, 18(1), 87–111.
- Brewer, E., & Jackson, W. E. (2002). *Inter-industry contagion and the competitive effects of financial distress announcements: evidence from commercial banks and life insurance companies* (Working Paper). Federal Reserve Bank of Chicago, Chicago, IL.
- Chen, H., Cummins, J. D., Sun, T., & Weiss, M. A. (2014). *The Microstructure of the reinsurance network among US property-casualty insurers and its effect on insurers' performance* (Working Paper). Temple University, Philadelphia, PA.
- Cheng, J., Elyasiani, E., & Lin, T.-T. (2010). Market reaction to regulatory action in the insurance industry: The case of contingent commission. *Journal of Risk and Insurance*, 77(2), 347–368.
- Cowan, A. R., & Power, M. L. (2001). Interfirm stock price effects of asset-quality problems at first executive corporation. *Journal of Risk and Insurance*, 68(1), 151–173.
- Cummins, J. D., Wei, R., & Xie, X. (2012). Financial sector integration and information spillovers: Effects of operational risk events on U.S. banks and insurer (Working Paper). Temple University, Philadelphia, PA.
- Desai, V. M. (2011). Mass media and massive failures: Determining organizational efforts to defend field legitimacy following crisis. *Academy of Management Journal*, 54(2), 263–278.
- Dickinson, A., Peterson, D. R., & Christiansen, W. A. (1991). An empirical investigation into the failure of First Republic Bank: Is there a contagion effect? *Financial Review*, 26(3), 303–318.
- Docking, D. S., Hirschey, M., & Jones, E. (1997). Information and contagion effects of bank loan-loss reserve announcements. *Journal of Financial Economics*, 43, 219–239.
- Eckert, C. (2017). Corporate reputation and reputation risk. *Journal of Risk Finance*, 18(2), 145–158.
- Eckert, C., & Gatzert, N. (2019). *The impact of spillover effects from operational risk events: A model from a portfolio perspective* (Working Paper). Friedrich-Alexander University Erlangen-Nürnberg (FAU), Nürnberg, Germany.
- Eckert, C., Gatzert, N., & Heidinger, D. (2018). *Empirically assessing and modeling spillover effects from operational risk events in the insurance industry* (Working Paper). Friedrich-Alexander University Erlangen-Nürnberg (FAU), Nürnberg, Germany.
- Eckert, C., Gatzert, N., & Pisula, A. (2019). *Spillover effects in the European financial services industry from internal fraud events: Comparing three cases of rogue trader scandals* (Working Paper). Friedrich-Alexander University Erlangen-Nürnberg (FAU), Nürnberg, Germany.
- Egginton, J. F., Hilliard, J. I., Liebenberg, A. P., & Liebenberg, I. A. (2010). What effect did AIG's bailout, and the preceding events, have on its competitors? *Risk Management and Insurance Review*, 13(2), 225–249.
- Fabrizi, M., Huan, X., & Parbonetti, A. (2017). When LIBOR becomes LIEBOR: Reputational penalties and bank contagion (Working Paper). University of Padua, Pauda, Italy.
- Fenn, G. W., & Cole, R. A. (1994). Announcements of asset-quality problems and contagion effects in the life insurance industry. *Journal of Financial Economics*, 35, 181–198.
- Fields, J. A., Klein, L. S., & Myskowski, E. G. (1998). Lloyd's financial distress and contagion within the US property and liability insurance industry. *Journal of Risk and Uncertainty*, 16(2), 173–185.
- Fiordelisi, F., Soana, M.-G., & Schwizer, P. (2014). Reputational losses and operational risk in banking. *The European Journal of Finance*, 20(2), 105–124.
- Firth, M. (1996). Dividend changes, abnormal returns, and intra-industry firm valuations. *Journal of Financial and Quantitative Analysis*, 31, 189–212.
- Flannery, M. J. (1998). Using market information in Prudential Bank supervision: A review of the U.S. empirical evidence. *Journal of Money, Credit and Banking*, 30(3), 273–305.
- Fombrun, C. J. (1996). *Reputation: Realizing value from the corporate image* (1st ed.). Boston, MA: Harvard Business School Press.
- Freedman, S., Kearney, M., & Lederman, M. (2012). Product recalls, imperfect information, and spillover effects: Lessons from the consumer response to the 2007 toy recalls. *Review of Economics and Statistics*, 94, 499–516.
- Gatzert, N. (2015). The impact of corporate reputation and reputation damaging events on financial performance: Empirical evidence from the literature. *European Management Journal*, 33(6), 485–499.

- Gatzert, N., & Schmit, J. (2016). Supporting strategic success through enterprise-wide reputation risk management. *Journal of Risk Finance*, 17(1), 26–45.
- Gatzert, N., Schmit, J., & Kolb, A. (2016). Assessing the risks of insuring reputation risk. *Journal of Risk and Insurance*, 83(3), 641–679.
- Gleason, C. A., Jenkins, N. T., & Johnson, W. B. (2008). The contagion effects of accounting restatements. *The Accounting Review*, 83, 83–110.
- Goins, S., & Gruca, T. S. (2008). Understanding competitive and contagion effects of layoff announcements. *Corporate Reputation Review*, 11(1), 12–34.
- Goldsmith-Pinkham, P., & Yorulmazer, T. (2010). Liquidity, bank runs, and bailouts: Spillover effects during the northern rock episode. *Journal of Financial Services Research*, 37(2-3), 83–98.
- Greenwood, R., & Suddaby, R. (2006). Institutional entrepreneurship in mature fields: The big five accounting firms. *Academy of Management Journal*, 49, 27–48.
- Greenwood, R., Suddaby, R., & Hinings, C. R. (2002). Theorizing change: The role of professional associations in the transformation of institutionalized fields. *Academy of Management Journal*, 45, 58–80.
- Haley, J. D., & Sigler, K. J. (1996). Contagion effects in the life insurance industry spring and summer 1991. *Managerial Finance*, 22(3), 11–27.
- Hertzel, M. G., Li, Z., Officer, M. S., & Rodgers, K. J. (2008). Inter-firm linkages and the wealth effects of financial distress along the supply chain. *Journal of Financial Economics*, 87, 374–387.
- Hill, J., & Schneeweis, T. (1983). The effect of Three Mile Island on electric utility stock prices: A note. *The Journal of Finance*, 38(4), 1285–1292.
- Hoffman, A., & Woody, J. (2008). *Memo to the CEO: Climate change, what's your strategy?* (1st ed.). Cambridge, MA: Harvard Business School Press.
- Jarrell, G., & Peltzman, S. (1985). The impact of product recalls on the wealth of sellers. *Journal of Political Economy*, 93(3), 512–536.
- Jonsson, S., Greve, H. R., & Fujiwara-Greve, T. (2009). Undeserved loss: The spread of legitimacy loss to innocent organizations in response to reported corporate deviance. *Administrative Science Quarterly*, 54, 195–228.
- Jordan, J. S., Peek, J., & Rosengren, E. S. (2000). The market reaction to the disclosure of supervisory actions: Implications for bank transparency. *Journal of Financial Intermediation*, 9(3), 298–319.
- Kabir, M. H., & Hassan, M. K. (2005). The near-collapse of LTCM, US financial stock returns, and the fed. *Journal of Banking & Finance*, 29, 441–460.
- Karafiath, I., & Glascock, J. (1989). Intra-industry effects of a regulatory shift: Capital market evidence from Penn Square. *Financial Review*, 24(1), 123–134.
- Kaspereit, T., Lopatta, K., Pakhchanyan, S., & Prokop, J. (2017). Systemic operational risk: Spillover effects of large operational losses in the European banking industry. *The Journal of Risk Finance*, 18(3), 252–267.
- King, A. A., Lenox, M. J., & Barnett, M. L. (2002). Strategic responses to the reputation commons problem. In A. J. Hoffman & M. J. Ventresca (Eds.), *Organizations, policy and the natural environment: Institutional and strategic perspectives* (pp. 393–406). Stanford, CA: Stanford University Press.
- Kolay, M., & Lemmon, M. L. (2011). Spillover effects in the supply chain: Evidence from chapter 11 filings, *Unpublished working paper*. Salt Lake City, UT: University of Utah.
- Lang, L. H. P., & Stulz, R. M. (1992). Contagion and competitive intra-industry effects of bankruptcy announcements. *Journal of Financial Economics*, 32, 45–60.
- Madura, J., Whyte, A. M., & McDaniel, W. R. (1991). Reaction of British bank share prices to Citicorp's announced \$3 billion increase in loan-loss reserves. *Journal of Banking & Finance*, 15, 151–163.
- Maguire, S., & Hardy, C. (2009). Discourse and deinstitutionalization: The decline of DDT. *Academy of Management Journal*, 52, 148–178.
- Mitchell, M. L. (1989). The impact of external parties on brand-name capital: The 1982 tylenol poisonings and subsequent cases. *Economic Inquiry*, 27, 601–618.
- Mohammad, S., & Crane, A. (2015). Theorizing reputational spillovers (Working Paper). Schulich School of Business, York University, Toronto, ON, Canada.
- Pino, G., & Sharma, S. C. (2019). On the Contagion Effect in the US Banking Sector. *Journal of Money, Credit and Banking*, 51, 261–280.
- Polonchek, J., & Miller, R. K. (1999). Contagion effects in the insurance industry. *Journal of Risk and Insurance*, 66(3), 459–475.

- Prokopczuk, M. (2010). Intra-industry contagion effects of earnings surprises in the banking sector. *Applied Financial Economics*, 20(20), 1601–1613.
- Slovin, M. B., Sushka, M. E., & Polonchek, J. A. (1992). Informational externalities of seasoned equity issues. *Journal of Financial Economics*, 32, 87–101.
- Slovin, M. B., Sushka, M. E., & Polonchek, J. A. (1999). An analysis of contagion and competitive effects at commercial banks. *Journal of Financial Economics*, 54(2), 197–225.
- Suddaby, R., & Greenwood, R. (2005). Rhetorical strategies of legitimacy. *Administrative Science Quarterly*, 50, 35–67.
- Szewczyk, S. H. (1992). The intra-industry transfer of information inferred from announcements of corporate security offerings. *Journal of Finance*, 47, 1935–1945.
- Szewczyk, S. H., Thomas, M. R., & Tsetsekos, G. P. (1997). Contagion effects in stock returns and analysts' forecasts: The case of Mutual Benefit Life Insurance Corporation. *Quarterly Journal of Business and Economics*, 36(1), 3–15.
- Walker, K. (2010). A systematic review of the corporate reputation literature: Definition, measurement, and theory. *Corporate Reputation Review*, 12(4), 357–387.
- Xu, T., Najand, M., & Ziegenfuss, D. (2006). Intra-industry effects of earnings restatements due to accounting irregularities. *Journal of Business Finance and Accounting*, 33, 696–714.
- Yu, T., & Lester, R. H. (2008). Moving beyond firm boundaries: A social network perspective on reputation spillover. *Corporate Reputation Review*, 11(1), 94–108.
- Yu, T., Sengul, M., & Lester, R. H. (2008). Misery loves company: The spread of negative impacts resulting from an organizational crisis. *Academy of Management Review*, 33(2), 452–472.
- Yu, T. Y., Sengul, M., & Lester, R. H. (2002). Reputation spillover: How changes in corporate reputation affect competitive action. *Academy of Management Best Paper Proceedings*, Denver, Colorado.

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