



Awareness, determinants and value of reputation risk management: Empirical evidence from the banking and insurance industry[☆]

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ABSTRACT

The aim of this paper is to empirically study reputation risk management in the US and European banking and insurance industry, which has become increasingly important in recent years. We first use a text mining approach and find that the awareness of reputation risk (management) as reflected in annual reports has increased during the last ten years and that it has gained in importance relative to other risks. Furthermore, we provide the first empirical study of the determinants and value of reputation risk management. Our results show that larger firms, as well as firms that are located in Europe and have a higher awareness of their reputation, are significantly more likely to implement a reputation risk management program. Finally, we obtain initial indications of the value-relevance of reputation risk management.

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1. Introduction

The management of reputation risk is challenging, as it is generally considered to be a risk of risks (see, e.g., [Scott and Walsham, 2005](#); [Regan, 2008](#); [Gatzert and Schmit, 2016](#)), thus having various sources.¹ At the same time, several drivers and develop-

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¹ In their reconceptualization of reputation risk, [Scott and Walsham \(2005, p. 311\)](#) define reputation risk as “the potential that actions or events negatively associate an organization with consequences that affect aspects of what humans value.” The definition by the Basel Committee of Banking Supervision ([BCBS, 2009, p. 19](#)) states that “[r]eputational risk can be defined as the risk arising from negative perception on the part of customers, counterparties, shareholders, investors, debt-holders, market analysts, other relevant parties or regulators that can adversely affect a bank’s ability to maintain existing, or establish new, business relationships and continued access to sources of funding (e.g. through the interbank or securitisation markets).” Overall, reputation risks thus occur because of an event or circumstances that change the perceptions of stakeholders, leading to altered behavior and ultimately resulting in financial consequences. Apart from an organization’s own ac-

tions and external events, reputation risks can also be caused by associations with other parties (see, e.g., [Csiszar and Heidrich, 2006](#)).

² The number of social media users is predicted to further increase, having doubled from more than one billion to over two billion in the period from 2010 to 2015 alone (see [Statista, 2016](#)).

³ <http://www.agcs.allianz.com/assets/PDFs/Reports/AllianzRiskBarometer2016.pdf>, accessed: 01/25/2017.

insurers, which to the best of our knowledge has not previously been done.

Much research exists on corporate reputation, especially concerning its definition and measurement (for a review, see, e.g., Barnett et al., 2006; Clardy, 2012; Lange et al., 2011; Walker, 2010) as well as the impact of reputation on financial performance (see de la Fuente Sabate and de Quevedo Puente, 2003; Gatzert, 2015, for reviews). In comparison, the scientific literature on reputation risk is relatively scarce. Empirical studies concerning reputation risk mostly focus on market reactions following operational loss events and find that they (by far) exceed the original loss in most cases, thus indicating severe financial reputational losses (see, e.g., Biell and Muller, 2013; Cummins et al., 2006; Fiordelisi et al., 2014; Gillet et al., 2010; Sturm, 2013). Fiordelisi et al. (2013) further investigate which factors determine reputation risk for banks. Another strand of the literature deals with approaches to managing reputation risk. Several papers focus on reputation repair after a crisis event, including communication strategies (see, e.g., Chakravarthy et al., 2014; Coombs, 2007; Hosseinali-Mirza et al., 2015; Rhee and Valdez, 2009), but there is less research dealing with proactive reputation risk management approaches (see, e.g., Eccles et al., 2007; Scandizzo, 2011; Scott and Walsham, 2002). Gatzert and Schmit (2016) and Regan (2008) address the topic of embedding reputation risk in a holistic enterprise risk management (ERM) framework, while Gatzert et al. (2016) investigate stand-alone insurance solutions for reputation risk as one risk management measure. In addition, Mukherjee et al. (2014) analyze disclosures of 20 European banks on reputation risk and calculate the frequencies of related words.

Overall, the results of previous empirical research emphasize that it is vital to closely monitor the level of corporate reputation and to manage potential reputation risks, since reputation and reputation-damaging events can substantially (negatively) impact stakeholder behavior and (thus) financial performance (see, e.g., Gatzert, 2015, for a review of empirical evidence). Therefore, reputation risk management should create value for firms.⁴ However, despite its great relevance, to the best of our knowledge, empirical research on the determinants and value of reputation risk management has not yet been conducted, although this topic has been extensively studied in the context of ERM in general (see, e.g., Gatzert and Martin, 2015, for a review, and Beasley et al., 2005; 2008; Gordon et al., 2009; Hoyt and Liebenberg, 2011; Liebenberg and Hoyt, 2003; Pagach and Warr, 2011).⁵ In particular, since a truly holistic ERM should capture all risk categories, including reputation risk (see Regan, 2008), reputation risk management as an extension and improvement of ERM should be a positive signal for shareholders and should therefore be valued.

This article aims to investigate these research questions based on a sample of US and European banking and insurance companies. We first investigate the awareness of reputation risk (management) over time by conducting a text mining analysis, whereby we approximate ‘awareness’ based on the frequency of the terms ‘reputation’, ‘reputation(al) risk’ and ‘reputation(al) risk management’ in 820 group annual reports (82 firms over a ten year period). Our paper is the first that allows a comparison between industries and regions concerning the reporting and thus the awareness of repu-

tation risk as well as its development over the last ten years, extending the work of Mukherjee et al. (2014) who only focus on European banks and use a shorter period. We further contribute to the literature by providing the first study on the firm characteristics and determinants that influence the implementation of a reputation risk management program, and by examining the value-relevance of reputation risk management also in relation to the effect of general ERM. This is done based on correlation and regression analyses as well as tests for group differences, using a keyword search and further objective criteria to identify firms that manage reputation risk, which can also be applied in future studies.

Our results support the findings by Mukherjee et al. (2014) that European banks have become more aware of the relevance of reputation and its risks, as reflected in their annual reports. We further extend this finding to European insurers and to US banks and insurers. Moreover, the results indicate that the importance of reputation risk relative to other risks has considerably increased. Concerning the influencing factors of reputation risk management implementation, we observe that larger firms, European firms and firms with a higher awareness of their reputation and a lower word count for the term ‘risk’ in their reports are significantly more likely to manage reputation risk. Furthermore, we find that reputation risk management adds value to the firm.

The paper is structured as follows. Section 2 provides information on the sample selection and the data sources as well as the methodology and development of hypotheses based on a literature review. Section 3 presents the empirical results regarding the awareness, determinants and value of reputation risk management, and Section 4 concludes the paper.

2. Data, methodology and hypotheses development

2.1. Data sample

In our empirical analyses, we aim to compare two industry sectors and two regions. For this reason, we start with all US and European banks and insurers with available market capitalization for 2015 in Datastream, and then apply several screening criteria (see Table 1).

We focus on large cap firms for a period of ten years (2006–2015), since a holistic reputation risk management system with its considerable costs is typically more relevant for large firms, which are much more exposed to media and stakeholder attention. All firms in the sample had to be in business during the entire period. We are not aware of any large financial services firm that went bankrupt due to a pure reputation risk event during the considered ten years, and therefore potential survivor bias does not pose a problem. After the exclusion of specific industry subsectors due to their special status, such as stock exchanges, and also excluding firms with incomplete data for the sample period, our sample covers 820 firm-year observations. The firms in the sample are composed of 24 US banks, 28 European banks, 15 US insurers and 15 European insurers and represent more than 69% of the total industry market capitalization.

The related financial data in millions of USD were obtained from Thomson Reuters Datastream and the text mining analysis was based on the group annual reports (including amendments if applicable). In the case of the European firms, the annual reports were downloaded from the company websites and the standardized 10-K forms from SEC’s EDGAR database were used for US firms. The text mining analysis for the identification of reputation risk management was conducted using a criterion catalogue including keywords as laid out in detail in Section 2.2.2.

⁴ Tischer and Hildebrandt (2014) argue that the reason for the value-relevance of reputation is that favorable stakeholder behavior leads to higher cash flows, which are also less discounted due to the perceived lower risk, thus increasing shareholder value.

⁵ ERM is said to increase value in cases of market imperfections such as taxes, bankruptcy costs, external capital costs and agency costs, by reducing lower-tail events and their associated costs (see, e.g., Nocco and Stulz, 2006). See also, e.g., Beasley et al. (2008) and Pagach and Warr (2011) for more detailed discussions including related references in the context of ERM studies, and Gatzert and Martin (2015) for a review of empirical evidence regarding the value of ERM for firms.

Table 1
Sampling procedure.

Screening criteria	(Proportion of) market capitalization	Number of firms
Total US and European banks and insurers with available market capitalization in Datastream	5,587,823 million USD	1,376
After exclusion of non-large cap firms (< one billion USD market capitalization)	76.78% (4,290,590 million USD)	100
After exclusion of specific TRBC subsectors (financial and commodity market operators, financial technology and infrastructure, insurance brokers)	74.35% (4,154,426 million USD)	94
After exclusion of firms without complete data for the sample period	69.48% (3,882,437 million USD)	82

2.2. Methodology and hypotheses development

2.2.1. Methodology concerning the awareness of reputation risk (management)

We first adopt a text mining approach to gain insight into the awareness and management of reputation risk as reflected in the firms' annual reports. Specifically, we examine the development of the frequency of the terms 'reputation', 'reputation(al) risk' and 'reputation(al) risk management' over time.⁶ To account for plural forms and other word endings, we cut ('stem') the words after 'reputation', 'risk' and 'management', thus obtaining root words.⁷ As we are also interested in various relative frequencies as well as absolute frequencies, we extract the total number of words in the document as well as the number of uses of the general term 'risk'. Since reputation (risk) and its management have become more relevant, for several reasons laid out in the introduction, we expect to find a generally increasing number of occurrences of the examined terms in the firms' annual reports over time.

As text mining tools are commonly used in the textual analysis literature, we set up a process in the big data mining tool RapidMiner for this purpose. Although this procedure has some limitations,⁸ manual word counts are unstandardized and highly error-prone. In addition, a manual word count is impracticable for a large number of documents, particularly in our case, since the total number of words in each document is needed for the calculation of relative frequencies.

2.2.2. Methodology and hypotheses concerning the determinants of reputation risk management

To examine the determinants of the implementation of a reputation risk management program, we use a Cox proportional hazard model, following Pagach and Warr (2011) and Lechner and Gatzert (2018) in the context of ERM determinants. This model uses time series data, and firms exit the data set when a specific event occurs for the first time (dependent variable takes the value 1), so that all subsequent firm-year observations are omitted. Applying this approach reduces our original 820 firm-year observa-

tions to 597. Apart from parameter estimates, hazard ratios are reported, *ceteris paribus*, indicating the influence of the independent variables on the likelihood of a change in the dependent variable. Hazard ratios greater (less) than 1 therefore imply a positive (negative) influence.

In our case, the dependent variable is *RRM*, which is a dummy variable that takes the value 1 if a firm has an implemented reputation risk management program and 0 otherwise. Various arguments exist concerning why it is suitable to use group annual reports and 10-K files for the identification of reputation risk management. Firms are subjected to extensive reporting requirements for their annual reports, especially concerning risk management. Specifically, the generally high absolute frequencies of the examined words in the text mining analysis (see Section 3.1) show that reputation risk and its management are topics that are generally addressed in these public reports.⁹ To identify firms with a reputation risk management program, we follow the empirical ERM literature that makes use of keywords for identifying whether an ERM system is in place (see, e.g., Hoyt and Liebenberg, 2011; Beasley et al., 2008; Liebenberg and Hoyt, 2003; Pagach and Warr, 2011; Gordon et al., 2009).

The text mining results for 'reputation(al) risk management' for a specific firm-year therefore served as an initial indication of whether a reputation risk management was in place. In addition, the content of all annual reports was manually reviewed with respect to qualitative criteria. For this purpose, every instance of 'reputation' was analyzed in context and the entire risk management section was also screened. We set the dependent variable *RRM* to 1 if there was a separate dedicated section for reputation risk in the risk management section of the annual report or if the existence of a reputation risk (management) framework and/or specialized committees or functions for managing reputation risk was reported, which are important elements of an independent reputation risk management program (see, e.g., Regan, 2008; Gatzert and Schmit, 2016). Future plans in this context did not suffice, the features had to be already implemented. Table 2 summarizes the applied identification criteria and respective keywords.¹⁰ To illustrate the identification procedure, Table A.1 in the

⁶ In general, text mining analyses usually also take into account the tone of the examined document, but it is doubtful that this would be of use for the subsequent analyses in our case. There is no reason to suspect that the tone determines the implementation of reputation risk management, especially since relevant descriptions of risk management are neutral rather than evaluative. As tone analyses generally have a very low R^2 (see, e.g., Loughran and McDonald, 2011), it is also not useful to include it as a control variable for the value regressions.

⁷ Since the counts for 'reputation' originally also contain the counts for 'reputation(al) risk' as well as 'reputation(al) risk management', and similarly 'reputation(al) risk' contains the counts for 'reputation(al) risk management', we subtract the respective numbers to avoid double counts.

⁸ For instance, if the examined terms are separated by a hyphen at the end of the line, they are not recognized. Furthermore, it is possible that terms are not assigned to the proper category of the three possible categories if other words are in between, e.g., the expression 'reputation and operational risk' would be attributed to 'reputation' instead of 'reputation(al) risk', as the term 'reputation' is not directly followed by 'risk'.

⁹ European banks also report information about risk management in their Internal Capital Adequacy Assessment Process (ICAAP) report addressed to the regulator, and in their public Pillar III risk reports in the context of Basel. However, when comparing the relevant word frequencies of all available Basel disclosures with those of the annual reports, we find that annual reports contain more information about reputation risk in 84% of the cases, with a respective word count that is on average about 16 words higher, since annual reports often contain additional information about the Basel disclosures. For all instances where the Basel disclosure had a higher word count of 'reputation(al) (risk)', we used the Basel disclosure in addition to the annual reports to identify reputation risk management. We found only one case for which the Basel disclosure suggests the existence of a reputation risk management program while the annual report does not. However, this does not affect the main results.

¹⁰ Because of the manual verification, varying word order in the keywords could also be considered. For instance, the phrase "policy for reputation risk" also counted for the keyword "reputation risk policy".

Table 2
Qualitative reputation risk management identification criteria and keywords.

Set <i>RRM</i> = 1 (reputation risk management implemented) if at least one of the following three criteria is satisfied:	
1. <i>Own risk category</i> in risk management section or subsumed with other risk types under one heading but with separate definition (reputation risk subsumed, e.g., in sections on: brand and reputation(al) risk, strategic, reputation(al), contagion and emerging risk, (non-)compliance and reputation(al) risk, compliance, conduct and reputation(al) risk)	
2. <i>Framework</i> :	
Reputation(al) risk framework	
Reputation(al) risk management framework	
Reputation(al) risk control framework	
Reputation key risk framework	
Reputation(al) risk principal and key risk framework	
Framework to protect its reputation	
Reputation(al) risk policy	
Reputation(al) risk management policy	
Reputation(al) risk governance policy	
Policy for reputation(al) risk control	
Reputation(al) risk governance guidelines	
Guideline on the management of reputation(al) risk	
Reputation(al) risk management program	
Directive on controlling reputation(al) risk	
3. <i>Committee/function</i> :	
Reputation(al) risk committee	
Reputation(al) risk management committee	
Reputation(al) risk review committee	
Reputation(al) risk policy committee	
Reputation committee	
Reputation(al) risk governance function	
Reputation(al) risk council	
Reputation council	
Reputation(al) risk forum	
Reputation(al) risk department	
Reputation(al) risk management department	
Reputation(al) risk management office	
Reputation(al) risk management team	
Reputation(al) risk measurement and control unit	
Reputation(al) risk (sub-)function	
Corporate office of reputation(al) risk	
Corporate office of reputation(al) risk management	
Reputation(al) risk steward	
Head of reputation(al) risk	

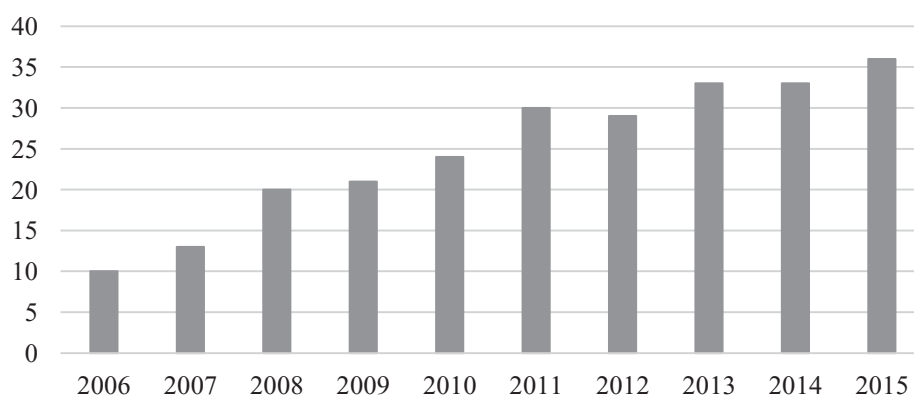


Fig. 1. Number of firms in the sample with an implemented reputation risk management program based on the criteria in Table 2.

Appendix provides excerpts from annual reports and 10-K files for 2015, with relevant keywords and passages highlighted.

Following this approach, the automated text mining procedure resulted in hits for 101 reports, of which eleven were eliminated after manual verification. After scanning the remaining reports using the qualitative search (i.e., at least one of the three criteria in Table 2 is satisfied), a total of 249 firm-years with an implemented reputation risk management program could be identified. Fig. 1 shows the number of firms in the sample with a reputation risk management program in the respective years, increasing from 12.2% in 2006 to 43.9% in 2015.

We then examine the influence of the following determinants (independent variables) on *RRM*.

Size: Larger firms usually face a higher number of risks that are also more complex (see, e.g., Beasley et al., 2005).¹¹ As reputation risks are often considered to be ‘risks of risks’ (see, e.g., Gatzert and Schmit, 2016), larger firms should have an implemented reputation risk management program for proportionality reasons. Moreover, larger firms tend to have a higher number of stakeholders and are of greater public interest, thus potentially amplifying reputation risk. Empirical studies find that firm size is associated with higher reputation losses in a reputation-damaging

event (see, e.g., Fiordelisi et al., 2013). Finally, larger firms also have more resources to implement a reputation risk management program (see, e.g., Beasley et al., 2005, for ERM in general). We thus expect *Size* to be positively related to *RRM*. Following related studies concerning the determinants of ERM, we define *size* as the natural logarithm of the book value of total assets.

Leverage: The direction of the relation between leverage and reputation risk management is partly ambiguous. On the one hand, firms with more sophisticated risk management including a reputation risk management program are expected to have access to lower-cost capital and are thus more leveraged. On the other hand, Sturm (2013) finds that more leveraged firms experience statistically significantly higher reputation losses. This could lead to different reactions: either more leveraged firms are more eager to implement a reputation risk management program or firms concerned with reputation could reduce their leverage to be less exposed to reputation risks. Empirical studies concerning the determinants of ERM also frequently state that the relation between leverage and risk management is unclear (see, e.g., Pagach and Warr, 2010). In accordance with other studies in the context of the determinants of ERM, we define leverage as the ratio of the book value of total liabilities to the book value of total assets.

RoA: Fiordelisi et al. (2013) empirically show that more profitable firms are more likely to suffer reputational losses, which emphasizes the relevance of reputation risk management for these firms. Since profitable firms are also more likely to bear the costs

¹¹ Note that while we consider only large cap US and European banks and insurers, their total assets still range from (in millions of USD) 2,721 to 3,777,312 during the examined period.

associated with a reputation risk management program (see, e.g., Lechner and Gatzert, 2018, regarding ERM in general), we assume a positive relation between RoA and RRM. We use the return on assets, calculated as the net income divided by the book value of total assets, as an indication of profitability.

Bank: We include a dummy variable that takes the value 1 for banks and 0 otherwise (i.e., for insurers) as indicated by the Datastream industry sector, in order to be able to observe industry differences concerning the implementation of a reputation risk management program. Since trust plays an important role in the financial services industry in general (see, e.g., Fiordelisi et al., 2014), a reputation risk management program is highly recommended for banks as well as insurers. Arguments concerning why banks need to focus even more on reputation risk management can also be found in the systemic risk and (reputational) spillover effect literature. Highly liquid bank liabilities that are callable at will support the emergence of bank runs, while insurance claims depend on the occurrence of a predefined event, and the generally long-term liabilities of insurers are much less liquid, having lapse penalties and a tax system that discourages early surrender (see, e.g., Kessler, 2013). In their literature review about systemic risk of insurers, Eling and Pankoke (2016) also conclude that insurers are less vulnerable to impairments of the financial system than banks. Consequently, banks should have an even higher interest in reputation risk management, to reduce negative spillover effects from other financial services firms. Thus, we hypothesize a positive relationship between *Bank* and *RRM* (given the reference group of insurers).

Europe: We include another dummy variable that takes the value 1 for European firms and 0 otherwise (i.e., for US firms) to investigate regional differences in the implementation of reputation risk management. As Fiordelisi et al. (2014) find higher reputation losses in Europe than in North America, it would be rational for more European firms to have implemented a reputation risk management program. However, since most firms presumably do not know about the size of reputation losses, it is possible that we might not find this empirical result reflected in practice. Furthermore, some regulatory requirements in Europe, which were in force during the sample period, might play a role. In the insurance context, the Minimum Requirements for Risk Management in Insurance Companies (MaRisk VA) in Germany listed reputation risk among the material risks, for example. Moreover, the “Enhancements to the Basel II framework” introduced requirements for the identification and assessment of reputational risks: “A bank should identify potential sources of reputational risk to which it is exposed. [...] The risks that arise should be incorporated into the bank’s risk management processes and appropriately addressed in its ICAAP and liquidity contingency plans. [...] Bank management should have appropriate policies in place to identify sources of reputational risk when entering new markets, products or lines of activities. [...] [I]n order to avoid reputational damages and to maintain market confidence, a bank should develop methodologies to measure as precisely as possible the effect of reputational risk in terms of other risk types (eg credit, liquidity, market or operational risk) to which it may be exposed. This could be accomplished by including reputational risk scenarios in regular stress tests.” (BCBS, 2009, p. 19 f.). Nevertheless, also among European banks, methods for measuring reputation risk are in most cases not implemented or only implemented to very limited extent. For instance, a survey by KPMG among German banks found that the majority of banks do not include reputation risks in stress tests (see Kaiser, 2014). Firms that are subject to this regulation are thus not automatically classified as having a reputation risk management program in our analysis, since our definition of reputation risk management adoption goes beyond possible regulatory requirements and is only assumed if the criteria in Section 2.2.2 are

satisfied.¹² Therefore, regulatory requirements might support the decision of European firms in favor of a holistic reputation risk management program, but cannot fully explain potential regional differences in the implementation. Overall, we assume a positive relation between *Europe* and *RRM*, as we consider US firms as our reference group.

Reputation awareness: We sum up the frequencies of the terms ‘reputation’ and ‘reputation(al) risk’ in the text mining analysis of the annual reports as a proxy for the firm’s awareness of its reputation (risks). Firms reporting more about these two aspects seem to have identified more risks related to their reputation on the one hand and to be more concerned about their reputation on the other hand. Therefore, we expect a positive relation between this variable and the implementation of a reputation risk management program.

Risk awareness: We also include a variable for the occurrences of the term ‘risk’ in the annual reports resulting from the text mining analysis.¹³ Firms with a higher frequency for this term seem to have identified a higher number of risks and, being aware of these risks, may also be able to manage them adequately. Being exposed to more risks is thereby considered to be linked to being exposed to more reputation risks as secondary risks. Furthermore, a higher awareness for risks in general should foster the implementation of a reputation risk management program. Overall, we expect a positive relation between *Risk awareness* and *RRM*.

Thus, our model concerning the determinants of reputation risk management is given by¹⁴

$$RRM = f(\text{Size, Leverage, RoA, Bank, Europe, Reputation awareness, Risk awareness}). \quad (1)$$

In particular, for the Cox proportional hazard model (which also takes time effects into account) we estimate the following equation, where $h_0(t)$ represents the baseline hazard:

$$h(t, X) = h_0(t) \exp(\beta_1 \text{Size} + \beta_2 \text{Leverage} + \beta_3 \text{RoA} + \beta_4 \text{Bank} + \beta_5 \text{Europe} + \beta_6 \text{Reputation awareness} + \beta_7 \text{Risk awareness}). \quad (2)$$

We additionally conduct a binary logistic regression as a robustness check, similar to Liebenberg and Hoyt (2003) and Lechner and Gatzert (2018) in the context of the determinants of ERM, taking into account all 820 firm-year observations with the same variables and including year dummies to control for year effects, as follows:

$$\ln\left(\frac{p(RRM = 1)}{1 - p(RRM = 1)}\right) = \beta_1 \text{Size} + \beta_2 \text{Leverage} + \beta_3 \text{RoA} + \beta_4 \text{Bank} + \beta_5 \text{Europe} + \beta_6 \text{Reputation awareness} + \beta_7 \text{Risk awareness} + \beta_{8-16} \text{Year_Dummies} + \varepsilon, \quad (3)$$

where the expression in brackets represents the odds ratio. As we have multiple observations per firm, we calculate robust standard

¹² For instance, out of the 28 European banks in the sample, only 13 were identified as $RRM = 1$ firms for the year 2009 after the introduction of the new Basel regulation regarding reputation risk, whereby the number increased over time to 18 firms in 2015.

¹³ Since the term ‘reputation(al) risk’ represents only a small fraction of the general term ‘risk’, as shown by the results of the word count analysis, multicollinearity should not pose a problem. This is confirmed by the later reported bivariate correlation coefficients that do not exhibit a strong relation.

¹⁴ Another factor that might encourage the implementation of a reputation risk management program is if the firm (nearly) experienced events leading to severe reputation losses in the past. For an empirical study, it is difficult to clearly identify which events would count. However, this question could be examined in case studies, as these are more suitable for providing background information on the firm’s past.

errors that are clustered at the firm level to avoid distorted significance tests.

2.2.3. Methodology and hypothesis concerning the value of reputation risk management

We also aim to empirically investigate the value of reputation risk management, as the objective of reputation risk management is to protect and enhance reputation as a valuable asset. In this regard, theoretical and empirical evidence shows that (change in) reputation influences stakeholder behavior (see, e.g., Lange et al., 2011; Gatzert, 2015), thus also affecting a firm's financial performance. In particular, most empirical studies find a (significant) positive relation between reputation and financial performance, while reputation-damaging events can significantly negatively affect companies (see, e.g., Gatzert, 2015, for a review of the related empirical literature). With respect to the latter, event studies concerning operational losses in the financial services industry, for instance, almost always find significant financial reputation losses measured by cumulative abnormal market returns (see Biell and Muller, 2013; Cummins et al., 2006; Fiordelisi et al., 2014; Gillet et al., 2010; Sturm, 2013). The magnitude of these financial reputation losses may even far exceed the original operational loss. Hence, if reputational consequences of underlying risks are neglected, risk response priorities may also be misjudged and thus, assets may be inefficiently allocated (see, e.g., Regan, 2008).

Overall, we hypothesize that reputation risk management adds value to the firm. To empirically examine the value of reputation risk management, we use a linear fixed effects model with Tobin's Q (Q) as the dependent variable, which is also used by the majority of the studies concerning the value of ERM in general (see Gatzert and Martin, 2015). We calculate Q in accordance with, e.g., Hoyt and Liebenberg (2011) as the sum of the market value of equity (approximated by market capitalization) and the book value of total liabilities divided by the book value of total assets. Standard errors are again clustered at the firm level.

Apart from the independent variable RRM , as defined in Section 2.2.2, we include four control variables in addition to year dummies:¹⁵ the three most common control variables for firm value (see, e.g., Hoyt and Liebenberg, 2011) *Size*, *Leverage* and *RoA* (all as defined above) and the market-to-book ratio MB . MB is calculated as the ratio of the market value of equity to the book value of equity and is generally used to account for growth options (see, e.g., Beasley et al., 2008; Pagach and Warr, 2010). Thus, we have the following model:

$$Q_{it} = \alpha_i + \beta_1 RRM_{it} + \beta_2 Size_{it} + \beta_3 Leverage_{it} + \beta_4 RoA_{it} + \beta_5 MB_{it} + \beta_{6-14} Year_Dummies_t + u_{it} \quad (4)$$

3. Empirical results: awareness, determinants and value of reputation risk management

3.1. The awareness of reputation risk (management)

We first study the development of the awareness of reputation risk and reputation risk management for the considered banks and insurance companies over the last ten years using the text mining analysis of their annual reports. Consistent with our expectations and with observations in Mukherjee et al. (2014) for the disclosures of 20 European banks from 2007–2012, Fig. 2 shows that the sum of the three examined terms is steadily increasing and that it more than tripled from 569 to 1,957 between 2006 and 2015.

The most frequent of the three investigated terms is 'reputation', which increases from 428 (i.e., 5.22 uses per annual report

on average) in 2006 to 1,294 (i.e., 15.78 uses per annual report on average) in 2015. The number of occurrences of the term 'reputation(al) risk' exhibits an even stronger growth than 'reputation', although it is less frequently used. It increases by a factor of more than 4.5 from 138 uses (i.e., 1.68 uses per annual report) in 2006 to 629 (i.e., 7.67 uses per annual report) in 2015. The observed increase of the term 'reputation(al) risk' is in line with the observations of Aula and Heinonen (2016), who state that only 40 of the S&P Global 500 reported about reputation risks in 2009, whereas the figure rose to more than 350 in 2012. The least frequently used of the three examined terms, but also the one with the highest growth is 'reputation(al) risk management'. It increases by a factor of eleven, from three counts in 2006 to 34 in 2015, with the highest count in the last year of the considered period (2015). This indicates that more and more firms are taking a proactive position concerning reputation risks, and future increases can therefore be expected. It is also consistent with various industry surveys, which have found that companies are working to improve their reputation risk management (see, e.g., Deloitte, 2014; IBM Global Technology Services, 2012).¹⁶

To investigate the relative importance of the examined terms, we first study the relevance of reputation risks in the context of all risks (Fig. A.1 in the Appendix) and find that of all the uses of the term 'risk (management)' in the reports, 0.82% were in the context of reputation risk (management) in 2015. This seems like a small number at first glance, but implies an increase by more than two times, compared to 0.39% in 2006. Secondly, we divide the sum of the three examined terms ('reputation', 'reputation(al) risk' and 'reputation(al) risk management') for each year by the total number of words of the annual reports and find a similar development. The respective percentage increased by more than two times from 0.0064% in 2006 to 0.0151% in 2015. This finding shows that the growth of the absolute frequencies of the three examined terms is not only due to a generally higher number of words in the annual reports, but also to a real increase in the firms' awareness of the relevance of reputation and its risk, as reflected in the annual reports.

Finally, we compare the average frequencies per firm of the three examined terms for our four subsamples, as shown in Fig. A.2 in the Appendix, to compare the awareness of reputation (risks) between banking and insurance companies, taking into account their regional affiliation. In general, we observe an increasing trend for all subsamples and terms. Concerning the term 'reputation', US banks show the highest word frequencies, followed by European banks, European insurers and US insurers. For the terms 'reputation(al) risk' and 'reputation(al) risk management' European banks show the highest frequency, followed by US banks, European insurers and US insurers, with few exceptions.

3.2. Determinants and value of reputation risk management

3.2.1. Univariate results

We next distinguish between firms with and without an implemented reputation risk management program in the sample, and first focus on identifying respective determinants and firm characteristics. Starting with a univariate analysis, Table A.2 in the Appendix reports Pearson and Spearman correlation coefficients. The coefficients already suggest significant correlations between all examined determinants and the implementation of a reputation risk management program. For *Size*, *Leverage*, *Bank*, *Europe*, *Reputation*

¹⁵ *Bank* and *Europe* are time-invariant and therefore collinear with the firm fixed effect, which thus captures industry and regional effects.

¹⁶ To ensure that the regulatory environment in the European banking industry did not affect the results, we also examined the word frequencies for the sample excluding European banks and found that this led to the same results. In particular, the sum of the three terms in the annual reports steadily increased from 338 counts in 2006 to 975 counts in 2015.

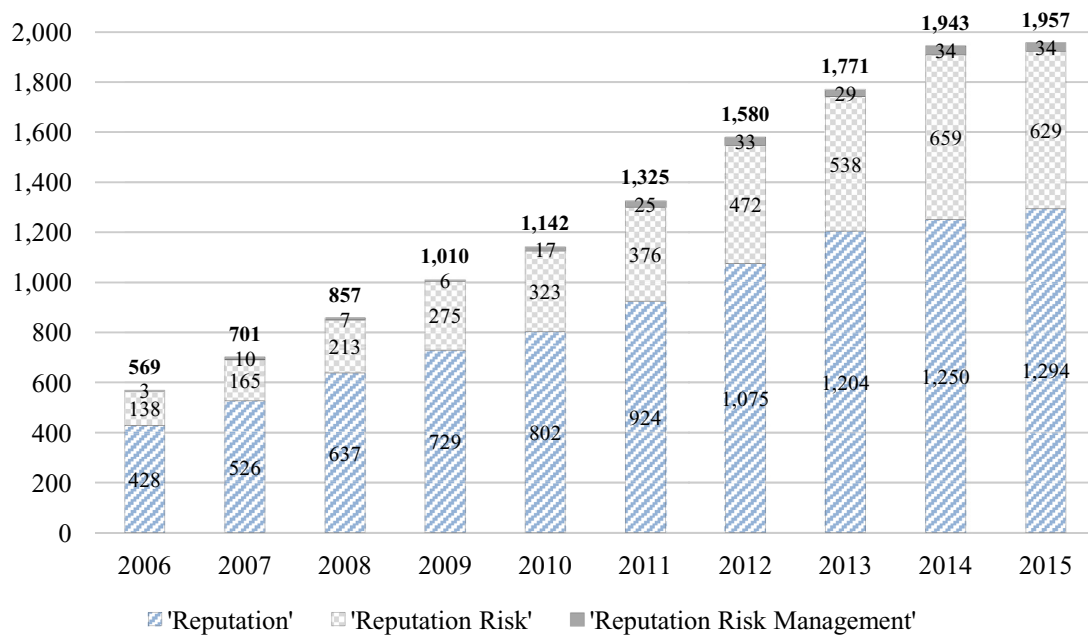


Fig. 2. Development of the awareness of reputation risk (management) over time based on the total number of examined terms in the annual reports of European and US banks and insurers.

Table 3

Univariate differences across groups with and without a reputation risk management (RRM) program.

	RRM (249 firm-year observations)		No RRM (571 firm-year observations)		Differences	
	Mean	Median	Mean	Median	Difference in means	Difference in medians
Q	1.022	0.996	1.141	1.019	−0.119***	−0.023***
Size	13.255	13.594	12.256	12.426	0.999***	1.168***
Leverage	0.919	0.936	0.859	0.921	0.060***	0.015***
RoA	0.740	0.544	1.676	0.755	−0.936***	−0.211***
MB	1.141	1.020	1.586	1.340	−0.445***	−0.320***
Bank	0.727	1.000	0.594	1.000	0.133***	0.000***
Europe	0.811	1.000	0.399	0.000	0.412***	1.000***
Reputation awareness	28.426	22.000	9.771	7.000	18.655***	15.000***
Risk awareness	1,171.353	962.000	586.837	489.000	584.516***	473.000***

Notes: Differences in means are based on a t-test. Differences in medians are based on a non-parametric Wilcoxon rank-sum test. *** denotes statistical significance at the 1% level.

awareness and Risk awareness we observe a weak to moderate positive relation, providing initial support for the hypothesized effects. For RoA we find a significantly negative correlation, though it is small. Concerning the value of reputation risk management, the correlation coefficients show a significantly negative but weak relation between RRM and Q without controlling for further value-relevant variables. The lack of high correlation coefficients between the independent variables of the regression analyses indicates that multicollinearity should not pose a problem. To further investigate multicollinearity, we calculated variance inflation factors, which clearly fall below the generally cited critical value of 10 (see, e.g., Marquardt, 1970).

Table 3 compares the examined variables between the groups with and without an implemented reputation risk management program (RRM). The first group with RRM consists of 249 firm-year observations versus 571 firm-year observations without reputation risk management. In addition to differences in means, differences in medians are examined, as the latter are barely affected by outliers. The analysis shows statistically significant differences between firms that manage reputation risk and firms that do not, with respect to all the examined determinants. RRM firms tend to be larger, have more leverage and a lower return on assets, to belong to the banking industry rather than the insurance industry, to be situated in Europe rather than in the US and to be more aware of their reputation and risk situation, as expressed by the word

count of their annual reports. For instance, the term 'risk' ('reputation(al) (risk)') was used in RRM firms on average 1,171 (28) times, compared to 587 (10) times in non-RRM firms, which suggests a substantially higher consideration of reputation as well as related risks and potentially higher risk awareness in general. Thus, with regard to the determinants, the analysis of group differences leads to the same results as the examination of the correlation coefficients.

With regard to the value of reputation risk management, the differences in means and medians yield a significantly higher Tobin's Q among firms without a reputation risk management program. This finding – contradicting our hypothesis – might be explained by the fact that a univariate analysis does not take control variables into account. Therefore, we further investigate the influence of reputation risk management on Tobin's Q in a multivariate setting, while controlling for other value-relevant variables.

3.2.2. Multivariate results

To examine the determinants of the implementation of a reputation risk management program in a multivariate setting, we first use a Cox proportional hazard model as described in Section 2.2.2. Table 4 shows that the analysis leads to the hypothesized signs of the relationships between the determinants and RRM, except in the case of Risk awareness, which exhibits a slightly negative influence, in contrast to our expectations and in contrast to the univariate

Table 4

Results of the Cox proportional hazard model on the determinants of reputation risk management.

	Predicted relation	Parameter estimate	Standardized parameter estimate	Hazard ratio
<i>Size</i>	+	0.499**	2.926	1.647
<i>Leverage</i>	+/-	-0.031	-0.021	0.970
<i>RoA</i>	+	0.061	0.835	1.063
<i>Bank</i>	+	0.161	0.315	1.174
<i>Europe</i>	+	2.263***	4.463	9.616
<i>Reputation awareness</i>	+	0.061***	2.360	1.063
<i>Risk awareness</i>	+	-0.002***	-3.428	0.998

Notes: The dependent variable is *RRM*. *** and ** denote statistical significance at the 1% and 5% level, respectively.**Table 5**

Results of the logistic regression on the determinants of reputation risk management.

	Predicted relation	Parameter estimate	Standardized parameter estimate	Odds ratio
<i>Size</i>	+	-0.212	-0.673	0.809
<i>Leverage</i>	+/-	-1.756	-0.565	0.173
<i>RoA</i>	+	-0.119	-0.776	0.888
<i>Bank</i>	+	-0.382	-0.400	0.682
<i>Europe</i>	+	2.502***	2.720	12.201
<i>Reputation awareness</i>	+	0.132***	4.977	1.141
<i>Risk awareness</i>	+	0.000	0.000	1.000

Notes: The dependent variable is *RRM*. Year dummies are included but not reported. Standard errors were clustered at the firm level. *** denotes statistical significance at the 1% level.

results. Four effects are statistically significant using the Wald test. Larger firms and firms situated in Europe, ceteris paribus, are more likely to implement a reputation risk management program, which is in line with our hypotheses. In the context of ERM in general, Beasley et al. (2005) also find that larger firms (see also Hoyt and Liebenberg, 2011; Pagach and Warr, 2011) and non-US firms are significantly more likely to have a mature risk management program.

Also supporting our hypotheses, the regression shows that firms with a higher awareness of reputation as reflected in their annual report are significantly more likely to implement a reputation risk management program. However, firms with a higher word count for the term 'risk' in their annual reports (*Risk awareness*) are significantly less likely to implement a reputation risk management program, which is contrary to our expectations. A possible explanation could be that these firms only manage reputation risk as a secondary risk, and thus have no independent reputation risk management program but assess it within the other risk categories. Among the four statistically significant variables, a comparison of the standardized parameter estimates shows that *Europe* has the strongest effect (positive), followed by *Risk awareness* (negative), *Size* (positive) and *Reputation awareness* (positive).

Using the Cox proportional hazard model without including European banks subject to the Basel regulation concerning reputation risk (see Section 2.2.2), as a robustness check, confirms the significantly positive influences of *Europe* and *Reputation awareness*, while *Size* and *Risk awareness* are no longer significant, i.e., the single finding that contradicted our hypothesis is not observed in this case.

We also perform a logistic regression for all firm-year observations using the same variables and including dummy variables to control for year effects as shown in Table 5. The logistic regression confirms the significant results regarding *Europe* and *Reputation awareness*, while the significant effects of *Size* and *Risk awareness* on *RRM* are not confirmed. Among the significant variables, *Reputation awareness* exhibits the strongest influence on *RRM*, followed by *Europe* (both positive), as indicated by the standardized parameter estimates.

The results concerning the value of reputation risk management with Tobin's *Q* as a proxy using the linear fixed effects model are displayed in Table 6. In addition to the regression coefficients, stan-

Table 6

Results of the linear fixed effects model on the value of reputation risk management.

	Regression coefficient	Standardized regression coefficient
<i>RRM</i>	0.023*	0.026
<i>Size</i>	-0.037**	-0.131
<i>Leverage</i>	-0.160	-0.057
<i>RoA</i>	0.002	0.015
<i>MB</i>	0.114***	0.262
Intercept	1.507***	

Notes: The dependent variable is *Q*. Year dummies are included but not reported. Standard errors were clustered at the firm level. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

dardized regression coefficients are reported so that the magnitude of the effects of the independent variables on *Q* can be compared. Whereas the univariate analyses showed a slightly negative significant relation between *RRM* and *Q*, the multivariate analysis shows the relation between the two variables after controlling for other variables. We find a significantly positive effect of *RRM* on *Q* using a *t*-test, supporting our theory about the value contribution of reputation risk management.

As a robustness check, we conduct the regression with fewer control variables, following Hoyt and Liebenberg (2011) and Lechner and Gatzert (2018), for example, using only the three most common control variables of firm value (apart from *RRM* and year dummies), i.e., *Size*, *Leverage* and *RoA*. While the results show a positive influence of *RRM* on *Q* (regression coefficient = 0.015), it is no longer significant (*p*-value = 0.284). When including only the significant control variables *Size* and *MB*, the results are robust (regression coefficient for *RRM* = 0.022 at the 10% significance level including year dummies; excluding year dummies, the coefficient is 0.033 at the 1% significance level).¹⁷

We next investigate the question of reverse causality, i.e., whether reputation risk management increases firm value or whether more valuable firms are more likely to engage in reputation risk management. To this end, in addition to including Tobin's

¹⁷ We also conducted the regression analyses including the robustness checks without European banks to address potential regulatory issues and found that this led to similar results.

Table 7

Results of the linear fixed effects model on the value of (reputation) risk management.

	Regression coefficient	Standardized regression coefficient
<i>RRM</i>	0.022*	0.025
<i>ERM</i>	0.019	0.016
<i>Size</i>	−0.038**	−0.134
<i>Leverage</i>	−0.169	−0.061
<i>RoA</i>	0.002	0.015
<i>MB</i>	0.113***	0.259
Intercept	1.513***	

Notes: The dependent variable is *Q*. Year dummies are included but not reported. Standard errors were clustered at the firm level. ***, ** and * denote statistical significance at the 1%, 5% and 10% level, respectively.

Q as an independent variable in the regression analyses concerning the determinants of reputation risk management, which does not result in a significant effect, we conduct a panel Granger Causality test. The results imply that reputation risk management indeed increases value rather than vice versa.

Furthermore, using the return on assets as the dependent variable as an alternative performance measure to Tobin's *Q*, we do not find a significant effect of *RRM*.¹⁸ A possible explanation is that reputation risk management rather influences market value-based figures, since the concept of reputation is closely connected to the perceptions of stakeholders (see, e.g., Walker, 2010).

As an additional analysis, we extend regression (4) by including a dummy variable that captures the firm's *ERM* status (*ERM*), with results as shown in Table 7.¹⁹ For the identification of *ERM*, we used the extended keyword list in Lechner and Gatzert (2018), resulting in 710 firm-years with *ERM* (about 86% of the sample). All firms with an *RRM* also have an *ERM* but not vice versa.²⁰ As *RRM* still has a significantly positive influence on *Q*, reputation risk management seems to provide additional value.²¹

Overall, we observe a strong initial indication for the value-relevance of reputation risk management, which further studies can build upon. Future analyses could, for instance, study whether firms with a reputation risk management program can better moderate the effects of crisis events, compared to firms without one. While a comprehensive event study of this issue is beyond the scope of this paper, to provide an initial insight we use the reports of the five highest banking operational loss events per month in 2015 involving sample firms available on Risk.net, based on SAS OpRisk Global Data. If a sample firm appears in the reports with several losses, we selected the highest loss. Following this procedure, we obtained operational loss events for 15 firms in the sample, of which twelve had a reputation risk management program in 2015 and three did not. Of the twelve firms that manage reputation risk, eight had no reputation risk management implemented at the

beginning of the sample period (2006). For these firms (apart from BNP Paribas where we could not find any considerable press coverage about operational losses from 2006 until the implementation of a reputation risk management program in 2007) we also studied another operational loss event, occurring at a time when no reputation risk management existed, to allow a pre- and post-implementation comparison. This resulted in 22 operational loss events in total, twelve for firms with a reputation risk management program and ten for firms without.

To investigate the reputational effects of these operational loss events, we followed Gillet et al. (2010) and Fiordelisi et al. (2013, 2014), for instance, and isolated the reputational loss by subtracting the (negative) operational loss (divided by the market capitalization) from the abnormal return at day zero, before calculating the cumulative abnormal returns (CARs) for five different event windows after the operational loss announcement (day zero) from day −5 to day +5. Thus, the reputational loss is approximated by the market reaction measured by the CARs that exceeds the original operational loss.

We find that the resulting mean and median CAR of the group of firms that engages in reputation risk management is positive for all event windows, apart from the event window (0;5) for the median, which shows a slightly negative CAR, i.e., no reputation losses occur, while for the group of firms that does not manage reputation risk, the event windows (−1;5) and (0;5) show reputation losses in terms of negative mean and median CARs. For the event windows (−1;1), (−1;5) and (0;1) we find a significant difference in the means of the CARs for firms with a reputation risk management program in comparison to firms without, with mean CARs of 2.92 percentage points (*p*-value = 0.088), 3.10 percentage points (*p*-value = 0.088) and 2.90 percentage points (*p*-value = 0.072) lower for firms that do not manage reputation risk, using a *t*-test. Besides influencing the severity of reputation losses, reputation risk management also seems to affect the frequency of reputation losses, as the percentage of firms that experiences no reputation losses is higher for the group of firms with a reputation risk management program for all event windows, apart from the event window (−5;5). A possible explanation for why we do not see the expected effect for this widest event window is that in the case of little information leakage before the public announcement, the returns of the trading days before the announcement are not related to the operational loss event.

For the seven firms for which we studied operational loss events before and after the implementation of a reputation risk management program, we find that the number of firms with negative CARs (reputation losses) is higher when not managing reputation risk for three of the five event windows ((−1;1), (−1;5) and (0;1)) and the same for the event window (0;5), though it is lower for the event window (−5;5). However, the latter might be a less relevant event window as explained before. Furthermore, the mean and median CAR after reputation risk management implementation is higher for all event windows apart from event window (−5;5). For the event window (0;1), the difference in medians is significant using a paired Wilcoxon test, with firms experiencing higher CARs by 1.34 percentage points (*p*-value = 0.063) after reputation risk management implementation. While this analysis is not comprehensive, it offers additional insight into the value of reputation risk management to complement the previous empirical analyses and indicates directions for future research.

4. Summary

This article pursued three research goals concerning reputation risk and its management, using 820 firm-year observations of US and European banking and insurance companies. We first investigated the development of the awareness of reputation risks by

¹⁸ This finding may also serve as a first indication of a causality check in regard to the relation between *RRM* and *RoA*. Furthermore, excluding European banks from the sample does not change the results. We additionally verified this finding by conducting a Granger Causality test for the panel, which did not suggest an effect of *RRM* on *RoA* either.

¹⁹ The Pearson and Spearman correlation coefficients for *ERM* and the other considered variables do not suggest multicollinearity problems, as they all fall below 0.5. In particular, the correlation coefficient between *ERM* and *RRM* is 0.260.

²⁰ Even though reputation risk should be managed as part of a truly holistic *ERM* (see, e.g., Regan, 2008; Gatzert and Schmit, 2016), many firms do not consider reputation risk for corporate risk management systematically (710 firm-years with *ERM* versus 249 firm-years with *RRM*).

²¹ Note that while having a positive effect, *ERM* is not significant, which also holds when excluding *RRM* from this regression (regression coefficient = 0.021, *p*-value = 0.298 in this case). A possible explanation is that *ERM* is not a particularly important differentiation criterion since *ERM* is quite common for financial services firms, especially in recent years, and therefore a majority of sample firms (86%) engage in *ERM*.

conducting a text mining analysis of annual reports from 2006 to 2015 and by examining the frequencies of the terms ‘reputation’, ‘reputation(al) risk’ and ‘reputation(al) risk management’. We also compared the differences between industries and regions and examined the relevance of reputation risk as compared to other risks in the annual reports by calculating relative frequencies concerning the term ‘risk’ in general. To the best of our knowledge, this is the first paper to empirically identify firm characteristics and determinants for the implementation of a reputation risk management program and to investigate the value-relevance of reputation risk management using regression analyses.

The results with regard to the awareness of reputation risk (management) based on the text mining analysis show that the sum of the three examined terms (‘reputation’, ‘reputation(al) risk’ and ‘reputation(al) risk management’) more than tripled between 2006 and 2015. This finding implies that various developments, such as higher stakeholder expectation and engagement and the impact of social media, which make reputation more volatile, are reflected in the perceptions of firms. The increasing trend not only holds for the absolute number of uses, but also for the frequency relative to the total number of words of the disclosure, indicating that the growth is not only due to generally longer annual reports, but that the awareness and relevance of reputation and its risks did indeed increase. We further observe that the share of ‘reputation(al) risk (management)’ in the term ‘risk (management)’ in general increased, indicating that reputation risk also gained in relevance relative to other risk categories. Finally, the results split by subsamples imply that the differences concerning the awareness of reputation risks as reflected in the annual reports are more pronounced between industries than between regions.

Concerning the determinants of reputation risk management, the univariate analyses already show significant differences between the groups with and without a reputation risk management program. The multivariate Cox proportional hazard model further reveals four significant effects. In line with our hypotheses, larger firms, which have a higher exposure to reputation risk, as well as firms from Europe, are significantly more likely to implement a reputation risk management program. Moreover, firms with more uses of the terms ‘reputation’ and ‘reputation(al) risk’ in the annual report, which are thus more concerned about reputation, are significantly more likely to implement a reputation risk management program, also supporting our hypotheses. However, in contrast to

our expectations, firms with a higher word count of the term ‘risk’ in their annual report (used as a proxy for *Risk awareness*) are significantly less likely to implement a reputation risk management program. A possible explanation for this could be that these firms see reputation risk only as a secondary risk and thus do not manage it separately but only within other risk categories. The results of the logistic regression confirm the significant effects of *Europe* and *Reputation awareness*, but not of *Size* or *Risk awareness*.

Finally, we observe a significantly positive impact of reputation risk management on Tobin's *Q* using a linear fixed effects model, which suggests that the benefits generally outweigh the costs. We further show that this positive effect is in addition to the effect of general ERM. In addition, we provide an initial insight, with limited statistical significance, that financial reputational losses in terms of CARs following operational loss events are smaller and occur less frequently for firms that engage in reputation risk management.

Given that ratings or similar information about reputation risk management are not available (yet), we use qualitative criteria including keywords to identify firms with a reputation risk management program. Nevertheless, extensive reporting requirements as well as the high word frequencies of the text mining analysis indicate that reputation risk management is generally addressed in public annual reports, making them suitable for the identification of reputation risk management.

In summary, our results strongly emphasize the increasing relevance of reputation risk and its management, which is a challenging area and still mostly in a developing state. Therefore, future research is necessary, especially with respect to quantitative measures of reputation risk, qualitative work and empirical studies. For instance, a more extensive investigation is needed into how reputation risk management may influence market reactions following severe operational loss events or how it moderates the effects of crisis events more broadly. Further investigation is also necessary from the perspective of other stakeholder groups, such as customers. Overall, we have identified some important initial insights into insufficiently studied topics, which could serve for future research to build upon.

Appendix

Table A.1

Excerpts from 2015 reports dealing with reputation risk management.

Deutsche Bank (2016, p. 122) – example for identification with text mining and manual verification (all three criteria)

“Reputational risk management

Within our risk management process, we define reputational risk as the risk of possible damage to DB's brand and reputation, and the associated risk to earnings, capital or liquidity, arising from any association, action or inaction which could be perceived by stakeholders to be inappropriate, unethical or inconsistent with DB's values and beliefs. Our reputational risk is governed by the *Reputational Risk Framework* (the Framework). The Framework was established to provide consistent standards for the identification, assessment and management of reputational risk issues. While every employee has a responsibility to protect DB's reputation, the primary responsibility for the identification, assessment, management, monitoring and, if necessary, referring or reporting, of reputational risk matters lies with DB's Business Divisions. Each employee is under an obligation, within the scope of his/her activities, to be alert to any potential causes of reputational risk and to address them according to the Framework. If a potential reputational risk is identified, it is required to be referred for further consideration within the Business Division through their Unit Reputational Risk Assessment Process. In the event that a matter is deemed to carry a material reputational risk and/or meets one of the mandatory referral criteria, it must be referred through to one of the four *Regional Reputational Risk Committees* (RRRCs) for further review as the 2nd line of defence. The RRRCs are subcommittees of the *Group Reputational Risk Committee* (GRRC) and are responsible for the oversight, governance and coordination of the management of reputational risk in their respective regions of Deutsche Bank on behalf of the Management Board. In exceptional circumstances, matters can also be referred by the RRRCs to the GRRC. The modelling and quantitative measurement of reputational risk internal capital is implicitly covered in our economic capital framework primarily within operational and strategic risk.”

(continued on next page)

Table A.1 (continued)

JPMorgan Chase & Co. (2016, p. 148) – example for identification with text mining and manual verification (all three criteria)

“Reputation risk management

Reputation risk is the risk that an action, transaction, investment or event will reduce trust in the Firm's integrity or competence by our various constituents, including clients, counterparties, investors, regulators, employees and the broader public. Maintaining the Firm's reputation is the responsibility of each individual employee of the Firm. The Firm's Reputation Risk Governance policy explicitly vests each employee with the responsibility to consider the reputation of the Firm when engaging in any activity. Since the types of events that could harm the Firm's reputation are so varied across the Firm's lines of business, each line of business has a separate reputation risk governance infrastructure in place, which consists of three key elements: clear, documented escalation criteria appropriate to the business; a designated primary discussion forum – in most cases, one or more dedicated reputation risk committees; and a list of designated contacts, to whom questions relating to reputation risk should be referred. Line of business reputation risk governance is overseen by a Firmwide Reputation Risk Governance function, which provides oversight of the governance infrastructure and process to support the consistent identification, escalation, management and reporting of reputation risk issues firmwide.”

Munich Re (2016, p. 121) – example for manual identification without text mining (own risk category (with definition) and specialized committees)

“Reputational risk

Reputational risk is the risk of a loss resulting from damage to the Group's public image (for example with clients, shareholders or other parties).

The action we take to monitor and limit reputational risk ranges from the general identification and recording of reputational risks arising out of operational risks for the purposes of the ICS to establishment of whistleblower procedures.

Actual reputational issues arising out of specific incidents are evaluated in the fields of business by *Reputational Risk Committees*. A legal entity's Compliance Officer can always be consulted on any matter relating to the assessment of reputational risks.

There is also a Group Compliance Committee, which deals with compliance and reputational issues and risks at Group level, with a view to standardising the way they are handled throughout the Group. The Committee mainly considers reputational risks that have been notified by the business units. We have also set up the Group Corporate Responsibility Committee, which concerns itself with identifying and undertaking a general analysis of sensitive issues and defining our position on them. The assessments it makes are used as a basis for strategic decisions taken by units in the Group.”

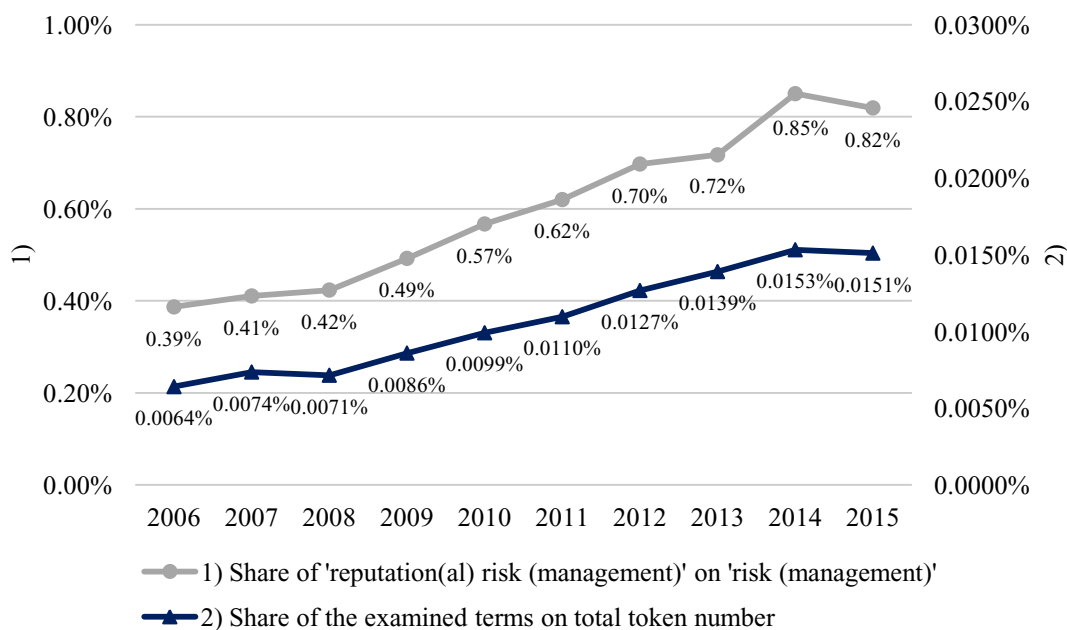


Fig. A.1. Development of (1) the share of the term 'reputation(al) risk (management)' on 'risk (management)' over time (left y-axis) and (2) share of the three examined terms ('reputation', 'reputation(al) risk', 'reputation(al) risk management') on total number of words in the report (right y-axis) for European and US banks and insurers.

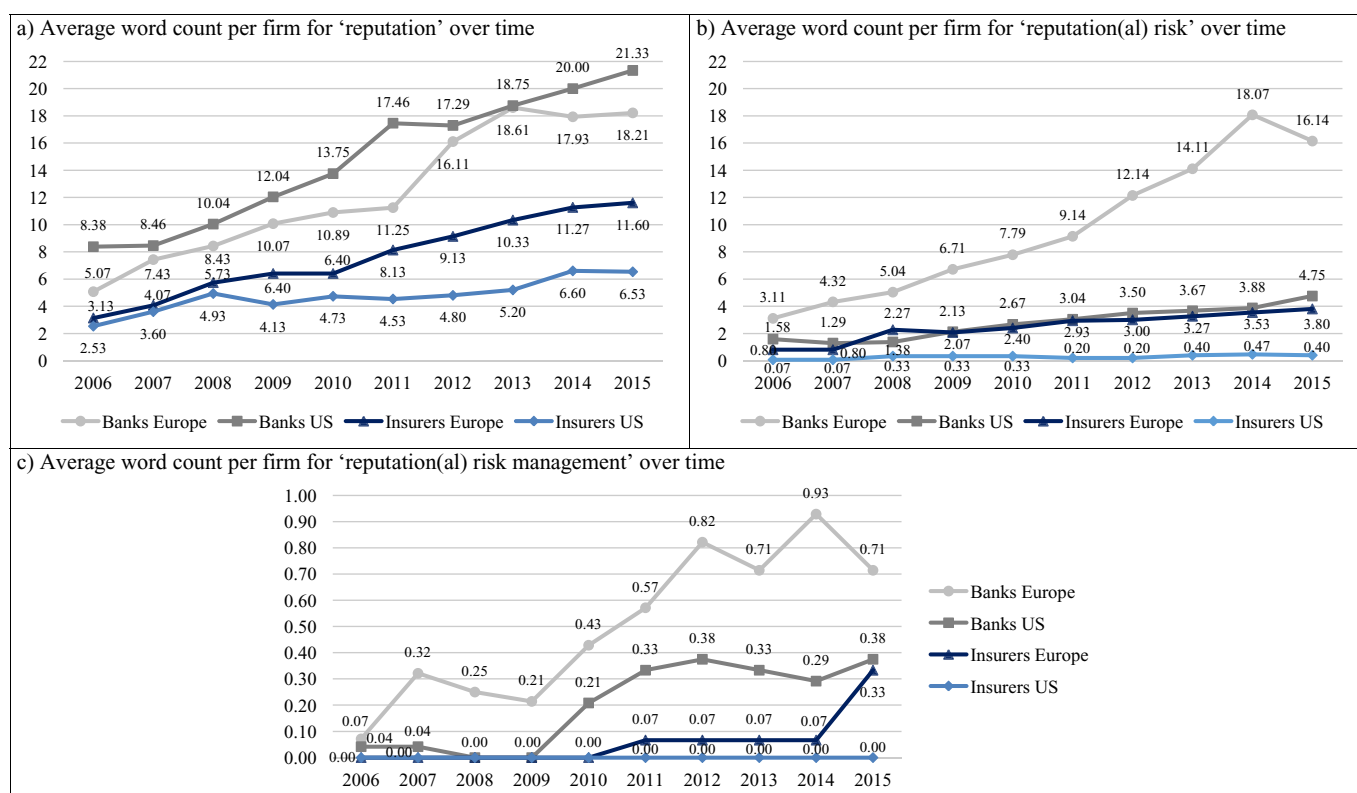


Fig. A.2. Development of the awareness of reputation risk (management) over time – comparison between subsamples.

Table A.2

Pearson and Spearman Rho correlation coefficients (820 firm-year observations).

		RRM	Q	Size	Leverage	RoA	MB	Bank	Europe	Reputation awareness	Risk awareness
RRM	Pearson	1									
	Spearman Rho	1									
Q	Pearson	−0.133***	1								
	Spearman Rho	−0.233***	1								
Size	Pearson	0.315***	−0.545***	1							
	Spearman Rho	0.333***	−0.494***	1							
Leverage	Pearson	0.185***	−0.795***	0.688***	1						
	Spearman Rho	0.134***	−0.311***	0.663***	1						
RoA	Pearson	−0.144***	0.875***	−0.606***	−0.861***	1					
	Spearman Rho	−0.161***	0.669***	−0.600***	−0.698***	1					
MB	Pearson	−0.216***	0.610***	−0.504***	−0.393***	0.541***	1				
	Spearman Rho	−0.258***	0.913***	−0.439***	−0.226***	0.594***	1				
Bank	Pearson	0.127***	0.053	0.240***	0.124***	−0.046	−0.001	1			
	Spearman Rho	0.127***	−0.111***	0.258***	−0.161***	−0.176***	−0.097***	1			
Europe	Pearson	0.379***	−0.228***	0.425***	0.396***	−0.280***	−0.237***	0.037	1		
	Spearman Rho	0.379***	−0.223***	0.440***	0.613***	−0.431***	−0.202***	0.037	1		
Reputation awareness	Pearson	0.495***	−0.060	0.395***	0.138***	−0.107***	−0.171***	0.345***	0.149***	1	
	Spearman Rho	0.525***	−0.242***	0.427***	0.115***	−0.206***	−0.228***	0.410***	0.098***	1	
Risk awareness	Pearson	0.465***	−0.277***	0.648***	0.413***	−0.348***	−0.411***	0.263***	0.582***	0.617***	1
	Spearman Rho	0.468***	−0.522***	0.729***	0.587***	−0.606***	−0.497***	0.212***	0.670***	0.512***	1

Notes: *** denotes statistical significance at the 1% level.

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