

Awareness, Determinants, and Value of Reputation Risk Management: Empirical Evidence from the Banking and Insurance Industry

Dinah Heidinger, Nadine Gatzert

Working Paper

Department of Insurance Economics and Risk Management
Friedrich-Alexander University Erlangen-Nürnberg (FAU)

Version: August 2017

AWARENESS, DETERMINANTS, AND VALUE OF REPUTATION RISK MANAGEMENT: EMPIRICAL EVIDENCE FROM THE BANKING AND INSURANCE INDUSTRY

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This version: August 11, 2017

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 increased during the last ten years and that it gained in importance relative to other risks. Furthermore, we provide the first empirical study of determinants and value of reputation risk management. Our results show that firms that belong to the banking industry, are situated in Europe and have a higher awareness for their reputation are significantly more likely to implement a reputation risk management. Furthermore, the implementation was significantly more likely after the financial crisis and in recent years. Finally, we obtain first indications for the value-relevance of reputation risk management.

Keywords: Reputation risk management; reputation risk; corporate reputation; text mining

JEL Classification: G21; G22; G32

1. INTRODUCTION

The management of reputation risk is challenging, as it is generally considered as 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 developments make the manage-

* Dinah Heidinger and Nadine Gatzert are at the Friedrich-Alexander University Erlangen-Nürnberg (FAU), Department of Insurance Economics and Risk Management, Lange Gasse 20, 90403 Nürnberg, Germany, Tel.: +49 911 5302 884, dinah.heidinger@fau.de, nadine.gatzert@fau.de.

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”, for instance. 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

ment of reputation risk even more important, among them especially the social web, where news are circulating faster and faster and which allows stakeholders to spread information in an unfiltered manner and to dynamically interact among each other (see Aula, 2010), thus giving rise to reputation risks (see Scott and Walsham, 2005).² The necessity of building capabilities for managing reputation risks is especially pronounced in the banking and insurance industry, whose business model is based on trust (see, e.g., Fiordelisi et al., 2014; Csiszar and Heidrich, 2006). This is also reflected in the Allianz Risk Barometer, where the loss of reputation or brand value is among the top ten business risks and in the subsample of financial services firms even among the top five risks (see Allianz Global Corporate & Specialty, 2016). In a study of Deloitte (2014), reputation risks even take the first place among strategic risks. Against this background, the aim of this paper is to conduct the first empirical study regarding the awareness, determinants, and value of reputation risk management based on a sample of European and US banks and insurers, which to the best of our knowledge has not been done so far.

A lot of 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) as well as the impact of reputation on financial performance (see de la Fuente Sabate and de Quevedo Puente, 2003, and Gatzert, 2015, for a review). 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 manage reputation risk. While 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), fewer research deals with proactive reputation risk management approaches (see, e.g., Eccles et al., 2007; Scandizzo, 2011; Scott and Walsham, 2002). Gatzert and Schmit (2016) as well as Regan (2008) treat the subject of embedding reputation risk in a holistic enterprise-wide risk management (ERM), 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 frequencies of related words.

from own actions and external events, reputation risks can also be caused due to 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).

Thus, to the best of our knowledge, empirical research on the determinants and value of reputation risk management has not been conducted yet, while 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). Furthermore, with the exception of Mukherjee et al. (2014), there is no previous work that uses a text mining approach to study the awareness of companies of reputation risks as reflected in their annual reports. Hence, this article aims to fill these gaps, using US and European banking and insurance companies as a sample. Specifically, 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 400 group annual reports (40 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 reputation risk as well as the 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 firm characteristics and determinants that influence the implementation of a reputation risk management and by examining the value-relevance of reputation risk management. This is done based on correlation and regression analyses as well as tests for group differences, using a key word search to identify firms with a reputation risk management.

Our results support the findings by Mukherjee et al. (2014) in that European banks have become more aware of the relevance of reputation and its risks as reflected in their annual reports and we further extend this finding to European insurers and US banks and insurers. Moreover, the results indicate that the importance of reputation risk relative to other risks considerably increased. Concerning the determinants of reputation risk, we observe that firms that rather belong to the banking than to the insurance industry, are rather situated in Europe than in the US, have a higher awareness of their reputation and have a lower word count for the term ‘risk’ in their reports are significantly more likely to implement a reputation risk management. Furthermore, we obtain first indications 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 hypotheses development 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.

2. DATA, METHODOLOGY AND HYPOTHESES DEVELOPMENT

2.1 Data sample

In our empirical analyses, we aim to compare two industry sectors and two regions. Since we study the development over time and employ a text mining approach of annual reports as well as a keyword search for reputation risk management, given that respective ratings are not available yet, we focus on the 40 largest publicly listed US and European banking and insurance companies by total assets as of the end of the year 2015 over a period of ten years (2006-2015), resulting in 400 firm-year observations. While the analysis may thus not be generalizable to small and medium sized firms, a separate reputation risk management system with its considerable costs is typically less relevant than for large firms, who are much more exposed to media and stakeholder attention. In addition, an analysis using only the 20 largest firms (instead of 40) already showed similar results. All firms in the sample had to be in business during the entire period and 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, such that a potential survivor bias should not pose a problem.

We excluded some firms in order to avoid special situations where reputation risk plays a different role and to ensure a better comparability between the insurers and banks in the sample. In particular, we exclude Berkshire Hathaway Inc. as the holding also includes a large proportion of non-financial services firms from multiple industries as well as Munich Re Group with a reinsurer as the parent company. In addition, we do not consider the Crédit Agricole Group that consists of cooperative banks and whose parent company functions as a central bank (and thus has mainly business relationships with other banks) and we further exclude the (mainly) investment banks Goldman Sachs Group, Morgan Stanley, Bank of New York Mellon Corporation and State Street Corporation, since they have a different exposure to reputation risk due to their focus on institutional investors instead of private individuals, which would reduce the comparability in the sample. Table 1 gives an overview of the ultimately investigated companies.³

The respective financial data in million USD are obtained from Thomson Reuters Datastream. The text mining analysis is based on the group annual reports (including amendments if applicable). In case of the European firms, the annual reports are downloaded from the company websites and the standardized 10-K forms from SEC EDGAR are used for US firms.

³ CNP Assurances Group had to be excluded due to missing data and the next largest European insurer was taken instead.

Table 1: Banks and insurers in the sample

<i>Banks</i>	<i>Insurers</i>
<i>European:</i>	<i>European:</i>
Barclays PLC	Aegon Group
BNP Paribas Group	Allianz Group
Deutsche Bank Group	Aviva PLC
HSBC Holdings PLC	AXA Group
Lloyds Banking Group	Generali Group
Royal Bank of Scotland Group	Legal & General Group PLC
Santander Group	Old Mutual PLC
Société Générale Group	Prudential PLC
UBS Group AG	Standard Life PLC
UniCredit Group	Zurich Insurance Group
<i>US:</i>	<i>US:</i>
Bank of America Corporation	Aflac Inc.
BB&T Corporation	Allstate Corporation
Capital One Financial Corporation	American International Group Inc.
Charles Schwab Corporation	Genworth Financial Inc.
Citigroup Inc.	Hartford Financial Services Group Inc.
JPMorgan Chase & Co.	Lincoln National Corporation
PNC Financial Services Group Inc.	MetLife Inc.
SunTrust Banks Inc.	Principal Financial Group Inc.
U.S. Bancorp	Prudential Financial Inc.
Wells Fargo & Company	Travelers Companies Inc.

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.⁴ To account for plural forms and other word endings, we cut ('stem') the words after 'reputation', 'risk' and 'management', thus obtaining root words.⁵ As we are also interested in various relative frequencies besides the absolute frequencies, we further extract the total number of words of 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

⁴ 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 rather neutral than evaluative. As tone analyses generally have a very low R² (see, e.g., Loughran and McDonald, 2011), it is also not useful to include it as a control variable for the value regressions.

⁵ Since the counts for 'reputation' originally also contain the counts for 'reputation(al) risk' as well as 'reputation(al) risk management' and 'reputation(al) risk' the counts for 'reputation(al) risk management', we subtract the respective numbers to avoid double counts.

reasons as laid out in the introduction, we expect to find a generally increasing number of occurrences of the examined terms in the firms' annual reports in the course of 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. Even though this procedure comes with some limitations⁶, manual word counts are unstandardized and highly error-prone. In addition, a manual word count is impracticable for a large amount of documents, particularly in our case, since the total number of words of each document is needed for the calculation of relative frequencies.

2.2.2 Methodology and hypotheses concerning the determinants of reputation risk management

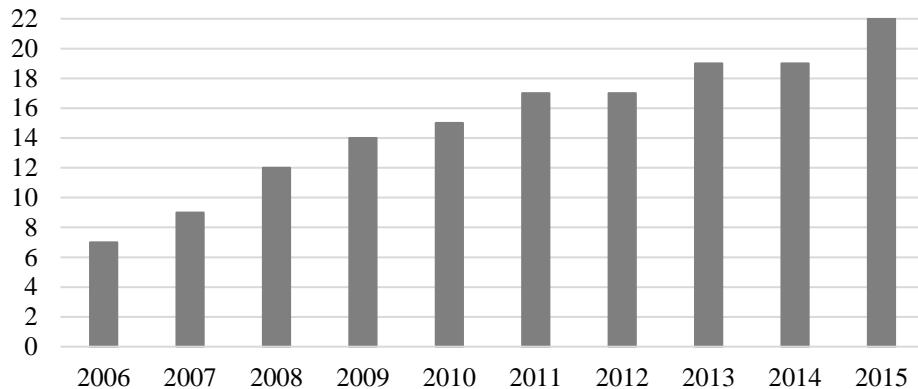
To examine the determinants of the implementation of a reputation risk management, we use a Cox proportional hazard model, following Pagach and Warr (2011) as well as Lechner and Gatzert (2017) in the context of ERM determinants. This model uses time series data, whereby firms exit the data set when a specific event occurs for the first time (depending variable taking the value 1), meaning all further respective firm-year observations are omitted. This reduces our original 400 firm-year observations to 271 when applying this approach. 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 thereby 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 and 0 otherwise. Various arguments exist 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 the frame of these public reports. To determine firms with a reputation risk management, we follow the empirical ERM literature that makes use of key words 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 were thereby only understood as a first in-

⁶ 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 one of the three 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'.

dication whether a reputation risk management is in place. In addition to the automated word count, the content of all annual reports was manually reviewed with respect to qualitative criteria. For this purpose, every finding for ‘reputation’ was analyzed in context and on top, risk management sections were read in full. Apart from having a separate dedicated section for reputation risk management in the annual report, we set the dependent variable RRM to 1 if the following elements of an independent reputation risk management are reported: the existence of a reputation risk framework, a definition of the term reputation risk and/or specialized committees or functions for managing reputation risk (see also, e.g., Regan, 2008; Gatzert and Schmit, 2016). Future plans in this context did not suffice, the features had to be already implemented. Figure 1 shows the number of firms in the sample with a reputation risk management in the respective year, increasing from 17.5% of the sample in 2006 to 55% in 2015.

Figure 1: Number of firms in the sample (see Table 1) with an implemented reputation risk management based on a key word search



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

Size: Larger firms usually face a higher amount of risks that in addition are more complex (see, e.g., Beasley et al., 2005).⁷ As reputation risks are often considered as ‘risks of risks’ (see, e.g., Gatzert and Schmit, 2016), larger firms should have an implemented reputation risk management for proportionality reasons. Moreover, larger firms tend to have a higher number of stakeholders and are more of public interest, thus potentially amplifying reputation risk. Furthermore, empirical studies find that firm size is associated with higher reputation losses when confronted with a reputation damaging event (see, e.g., Fiordelisi et al., 2013). Finally, larger firms also have more resources to implement a reputation risk management (see, e.g., Beasley et al., 2005, for ERM in general). Consequently, we expect *Size* to be positively relat-

⁷ Note that while we consider the largest US and European banks and insurers, their total assets still range from (in million USD) 42,286 to 3,653,526 during the examined period.

ed 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 a more sophisticated risk management including a reputation risk management 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 significant higher reputation losses. This could lead to different reactions: Either more leveraged firms are more eager to implement a reputation risk management or firms being 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 a reputation risk management for these firms. Since profitable firms are also more likely to bear the costs associated with a reputation risk management (see, e.g., Lechner and Gatzert, 2017, for 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) to be able to observe industry differences concerning the implementation of a reputation risk management.⁸ Since trust plays an important role in the financial services industry in general (see, e.g., Fiordelisi et al., 2014), a reputation risk management is highly recommended for banks as well as insurers. Arguments why banks need to focus even more on reputation risk management can be found in the systemic risk and (reputational) spillover effect literature, though. Highly liquid bank liabilities that are callable at will support the emergence of bank runs, while insurance claims depend on the occurrence of a pre-defined event and the generally long term liabilities of insurers are much less liquid with lapse penalties and the tax system discouraging 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 insurers).

⁸ See Table 1 for the classification of the firms to the banking or insurance industry.

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 that more European firms have implemented a reputation risk management. However, since the majority of firms presumably does not know about the size of reputation losses, it might be possible that we do 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 to a limited extent. 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 instance. Moreover, the “Enhancements to the Basel II framework” introduced requirements for the identification and assessment of reputational risks, specifically: “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 vastly not implemented or only to very limited extent, respectively. For instance, a survey by KPMG among German banks finds that the majority does not include reputation risks in stress tests (see Kaiser, 2014). Even if firms met all the requirements, they would not automatically be classified as having a reputation risk management in our analysis since our definition of reputation risk management adoption goes beyond possible regulatory requirements, but only if they have adopted a holistic view on reputation risk management as indicated by the criteria in Section 2.2.2. Therefore, regulatory requirements might support the decision of European firms for a holistic reputation risk management, 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 proxy the firm’s awareness of its reputation (risks) by summing up the frequencies of the terms ‘reputation’ and ‘reputation(al) risk’ as a result of the text mining analysis of the annual reports. Firms reporting more about these two aspects seem to have identified more risks related to their reputation on the one hand and are 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.

Risk awareness: We also include a variable for the occurrences of the term ‘risk’ in general in the annual reports taken from the text mining analysis.⁹ Firms with a higher frequency of 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 can thereby be 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. Overall, we expect a positive relation between *Risk awareness* and *RRM*.

Thus, our model concerning the determinants of reputation risk management in the functional form can be summarized as

$$RRM = f(Size, Leverage, RoA, Bank, Europe, Reputation awareness, Risk awareness).^{10} \quad (1)$$

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:

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

We additionally conduct a binary logistic regression as a robustness check similar to Liebenberg and Hoyt (2003) and Lechner and Gatzert (2017) in the context of the determinants of ERM, taking into account all 400 firm-year observations with the same variables and including year dummies to control for year effects, i.e.,

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

where the expression in brackets represents the odds ratio. As we have multiple observations per firm, we calculate robust standard errors that are clustered at the firm level to avoid distorted significance tests in this respect.

⁹ 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, concerns for multicollinearity should not pose a problem. This is confirmed by the later reported respective bivariate correlation coefficients that do not exhibit a strong relation.

¹⁰ Another factor that might encourage the implementation of a reputation risk management is if the respective firm (nearly) experienced events that lead 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 that are more suitable for providing background information of the firms’ past. Nevertheless, as a starting point, we find indications in our analysis that the financial crisis triggered implementations of reputation risk management (see Section 3.2.2), suggesting that history also matters.

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, various theoretical and empirical evidence shows that (changes of) 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,¹¹ while reputation damaging events can significantly negatively affect companies (see, e.g., Gatzert, 2015, for a review of the respective 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 by far exceed that of the original operational loss. Hence, if reputational consequences of underlying risks are neglected, risk response priorities may also be misjudged and thus, assets inefficiently allocated (see, e.g., Regan, 2008).

Overall, we thus hypothesize that reputation risk management adds value to the firm. To empirically examine the value of reputation risk management, we perform 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:¹² the three most common control variables for firm value (see, e.g., Hoyt and Liebenberg, 2011) *Size*, *Leverage* and *RoA* (all as defined above) as well as 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 establish the following model:

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

¹¹ 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.

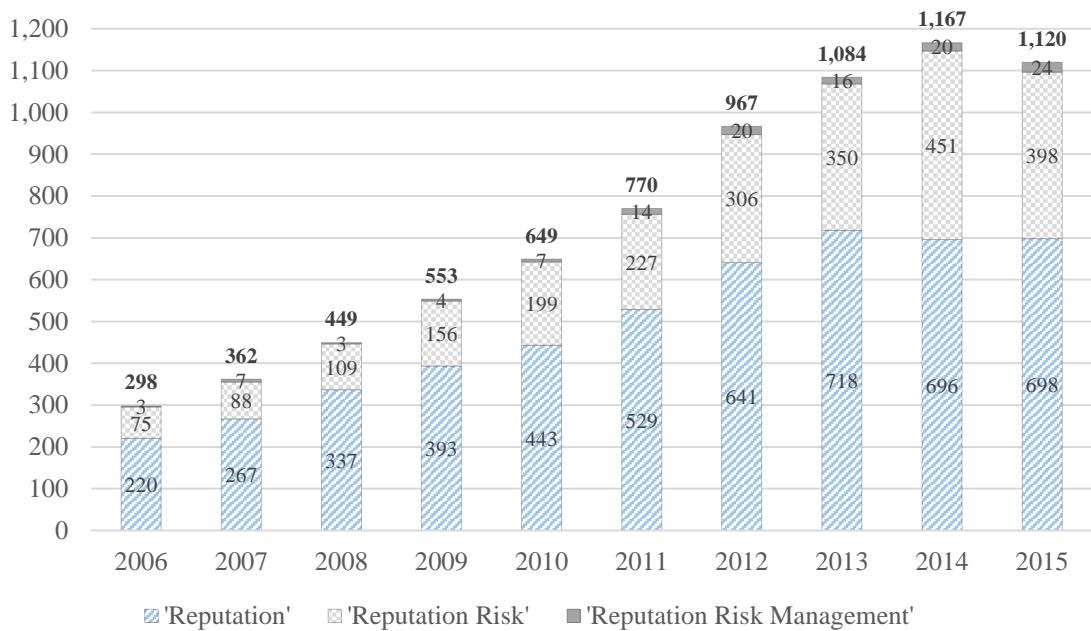
¹² *Bank* and *Europe* are time-invariant and therefore collinear with the firm fixed effect, which thus captures industry and regional effects.

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, Figure 2 shows that the sum of the three examined terms almost quadrupled from 298 in 2006 to 1,120 in 2015. The number is steadily increasing apart from 2015, where we observe a small decline in comparison to 2014.

Figure 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 (see Table 1)



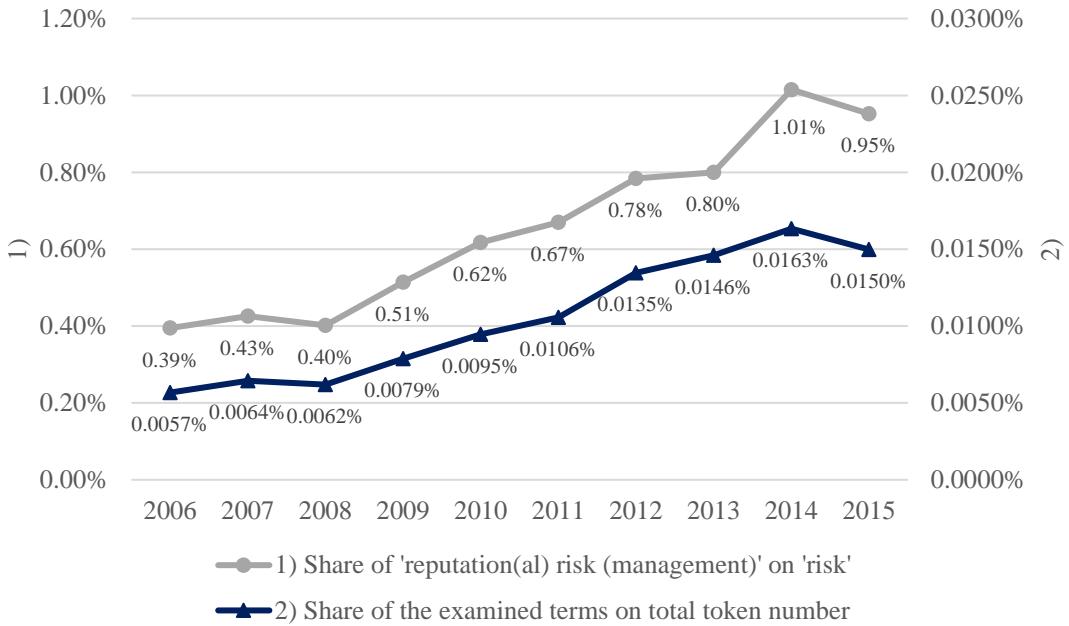
The most frequent of the three investigated terms is ‘reputation’, which increases from 220 (i.e. 5.5 uses per annual report on average) in 2006 to 698 (i.e. 17.45 uses per annual report on average) in 2015. The number of the term ‘reputation(al) risk’ exhibits an even stronger growth than ‘reputation’, although being less frequently used. It increases by a factor of five from 75 uses (i.e. 1.88 uses per annual report) in 2006 to 398 (i.e. 9.95 uses per annual report) in 2015. The observed increase of the term ‘reputation(al) risk’ is in line with Aula and Heinenen (2016) stating 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 eight times from three counts in 2006 to 23 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 be expected. It is also consistent with various industry surveys, which find that companies are working to improve their reputation risk management (see, e.g., Deloitte, 2014; IBM Global Technology Services, 2012).

To investigate the relative importance of the examined terms, we first study the relevance of reputation risks in the context of all risks in Figure 3 and find that of all the uses of the term ‘risk’ in the reports, 0.95% were in the context of reputation risk (management) in 2015. This seems like a small number at first glance, but implies an increase by almost 2.5 times as compared to 0.39% in 2006. Thus, despite the small percentages, the importance of reputation risks as reflected in the annual reports appears to have increased relative to other risks over the considered period of ten years. Second, 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 2.5 times from 0.0057% in 2006 to 0.0150% in 2015 with an interim maximum in 2014 with 0.0163%. This finding shows that the growth concerning the absolute frequencies of the three examined terms is not only due to a generally higher number of words in the annual reports, but that the firms’ awareness of the relevance of reputation and its risk as reflected in the annual reports really rose.

We finally compare the frequencies of the three examined terms for four subsamples as depicted in Figure A.1 in the Appendix to compare the awareness of reputation (risks) between banking and insurance companies taking into account their regional affiliation. Concerning the term ‘reputation’, European banks are leading in 2006 with 80 counts as well as 2015 with 288 counts. US banks exhibit the second highest frequency with 63 uses in 2006 and 192 in 2015. European insurers come third (with the exception of 2006-2008), while US insurers use the term ‘reputation’ the least frequently in their annual reports. The same order of the subsamples as for ‘reputation’ applies for ‘reputation(al) risk’. In this case, the difference between European banks (39 counts in 2006 and 291 in 2015) and the other subsamples (e.g. US insurers one in 2006, four in 2015) is remarkably large. Furthermore, European banks are again clearly ahead when it comes to the use of the term ‘reputation(al) risk management’, followed by US banks. In the annual reports of the other two subsamples we obtain the first hit for ‘reputation(al) risk management’ in 2011 for the European insurers and the frequency for US insurers is still zero in 2015. The result that European firms are generally ahead concerning reputation risk management is also supported by a survey of Deloitte (2014) that finds that European firms are more focused on reputation risk management than US firms.

Figure 3: Development of 1) the share of the term ‘reputation(al) risk (management)’ on ‘risk’ 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 (see Table 1)



Overall, our findings for the different subsamples suggest that banks as well as firms from Europe exhibit a higher awareness for reputation and its risks since these firms use the three examined terms considerably more frequently, whereby the difference between the two industries is more pronounced than between the two regions.

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 in the sample and first focus on identifying respective determinants and firm characteristics. Starting with a univariate analysis, Table A.1 in the Appendix reports Pearson and Spearman correlation coefficients. The coefficients already suggest significant correlations between the examined determinants and the implementation of a reputation risk management: For *Size*, *Leverage* (only according to Pearson correlation), *Bank*, *Europe*, *Reputation awareness* and *Risk awareness* we observe a weak to moderate positive relation, providing first support of the respective hypothesized effects. For *RoA* we find a significantly negative correlation, which is weak in size and only significant at the 5%-level according to the Pearson and 10%-level according to the Spearman correlation, though. 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 2 compares the examined variables between the groups with and without an implemented reputation risk management (RRM). The first group with RRM consists of 151 firm-year observations versus 249 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 with a reputation risk management and firms without one with respect to all of the examined determinants: Firms with a reputation risk management tend to be larger, rather belong to the banking industry than the insurance industry, are rather situated in Europe than in the US and tend to be more aware of their reputation and risk situations as expressed by the word count of their annual reports. For instance, the term ‘risk’ (‘reputation’ and variations thereof, see Section 2) was used in RRM firms on average 1,244 (33) times as compared to 654 (9) times in non-RRM firms, which suggests a substantially higher consideration of reputation as well as respective risks and potentially risk awareness in general.

Table 2: Univariate differences across groups with and without reputation risk management (RRM)

	RRM (151 firm-year observations)		No RRM (249 firm-year observations)		Differences	
	Mean	Median	Mean	Median	Difference in means	Difference in medians
<i>Q</i>	0.996	0.993	1.021	1.009	-0.025***	-0.016***
<i>Size</i>	13.766	14.033	12.887	12.836	0.879***	1.197***
<i>Leverage</i>	0.930	0.9370	0.921	0.934	0.009**	0.003
<i>RoA</i>	0.483	0.482	0.706	0.554	-0.223**	-0.072
<i>MB</i>	0.924	0.894	1.361	1.166	-0.437***	-0.272***
<i>Bank</i>	0.742	1.000	0.353	0.000	0.389***	1.000***
<i>Europe</i>	0.722	1.000	0.366	0.000	0.356***	1.000***
<i>Reputation awareness</i>	33.086	26.000	9.257	7.000	23.829***	19.000***
<i>Risk awareness</i>	1,244.543	1,010.000	645.036	568.000	599.507***	442.000***

Notes: Differences in means are based on a t-test. Differences in medians are based on a non-parametric medians-test. *** and ** denote statistical significance at the 1 and 5% level, respectively.

Furthermore, firms with an implemented reputation risk management are more leveraged and have a lower return on assets on average, which is only statistically significant when it comes to the difference in means, though. Thus, the analysis of group differences leads to the same

results as the examination of the correlation coefficients in regard of the determinants. For the value of reputation risk management, the differences in means and medians yield a significantly higher Tobin's Q among firms without reputation risk management. This – our hypothesis contradicting – finding might be explained by the fact that a univariate analysis does not take into account control variables. 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 in a multivariate setting, we first use a Cox proportional hazard model as described in Section 2.2.2. The results are depicted in Table 3. The analysis leads to the hypothesized signs of the relationship between the determinants and *RRM* except for *Risk awareness*, which exhibits a slightly negative influence in contrast to our expectations and in contrast to the univariate results. Four effects are statistically significant using the Wald-test: Firms belonging to the banking industry as well as firms situated in Europe *ceteris paribus* are more likely to implement a reputation risk management, which is in line with our hypotheses. In addition, this finding is consistent with the result of the text mining analysis where European banks exhibit the highest frequency concerning the term ‘reputation(al) risk management’. In the context of ERM in general, Beasley et al. (2005) also find that non-US firms are significantly more likely to have a mature risk management.

Table 3: 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>	+	0.600	2.242	1.822
<i>Leverage</i>	+/-	-11.240	-2.092	0.000
<i>RoA</i>	+	0.612	2.653	1.844
<i>Bank</i>	+	2.124**	3.783	8.364
<i>Europe</i>	+	3.872***	6.896	48.058
<i>Reputation awareness</i>	+	0.054**	1.743	1.055
<i>Risk awareness</i>	+	-0.003***	-4.283	0.997

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

Also supporting our hypothesis, the regression shows that firms with a higher awareness for reputation as reflected in their annual report are significantly more likely to implement a reputation risk management. 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, 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, 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), *Bank* and *Reputation awareness* (both positive).

We further perform a logistic regression for all firm-year observations using the same variables and also including dummy variables to control for year effects as shown in Table 4. The logistic regression leads to the same signs for the relation of the determinants as the Cox proportional hazard model. Furthermore, it confirms the significant results concerning *Europe*, *Reputation awareness* and *Risk awareness*. The significant positive effect of *Bank* on *RRM* is not confirmed, though. Among the significant variables, *Reputation awareness* exhibits the strongest influence on *RRM*, followed by *Europe* (both positive) and *Risk awareness* (negative), as indicated by the standardized parameter estimates. The logistic regression also allows examining whether specific years exhibit an effect on the implementation of reputation risk management. In this context, we find significantly positive year dummies for 2008 and 2009, implying that the proceeding financial crisis induced firms to invest in their reputation risk management, as well as for 2013 and 2015, indicating that this is also a topical issue in recent years.

Table 4: Results of the logistic regression on the determinants of reputation risk management

	Predicted relation	Parameter estimate	Standardized parameter estimate	Odds ratio
<i>Size</i>	+	0.214	0.469	1.238
<i>Leverage</i>	+/-	-8.306	-0.788	0.000
<i>RoA</i>	+	0.302	0.640	1.353
<i>Bank</i>	+	1.040	1.074	2.829
<i>Europe</i>	+	3.071***	3.172	21.560
<i>Reputation awareness</i>	+	0.159***	6.910	1.173
<i>Risk awareness</i>	+	-0.002***	-2.524	0.998

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.

Finally, Table 5 depicts the linear fixed effects model results concerning the value of reputation risk management proxied by Tobin's Q. In addition to the regression coefficients, standardized regression coefficients are reported such 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 effect between the two variables after controlling for other variables. Supporting our theory about

the value contribution of reputation risk management, we find a significantly positive effect of *RRM* on *Q* using a t-test.

Table 5: Results of the linear fixed effects model on the value of reputation risk management

	Regression coefficient	Standardized regression coefficient
<i>RRM</i>	0.015***	0.115
<i>Size</i>	-0.019*	-0.321
<i>Leverage</i>	0.216	0.158
<i>RoA</i>	0.005	0.082
<i>MB</i>	0.061***	0.769
Intercept	0.985***	

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 and 10% level, respectively.

As a robustness check, we conduct the regression with less control variables following Hoyt and Liebenberg (2011) and Lechner and Gatzert (2017), for example. We thereby only use the three most common control variables of firm value (apart from *RRM* and year dummies), *Size*, *Leverage*, and *RoA* (see, e.g., Hoyt and Liebenberg, 2011). While the results show a positive influence of *RRM* on *Q* (regression coefficient 0.005), it is no longer significant (p-value 0.364).

Overall, even though we thus do not find entirely clear and unambiguous evidence for the value of reputation risk management, we observe at least a first indication for its value-relevance, where further studies can build upon. It is possible that firms do not implement a reputation risk management even though it adds value due to cost-benefit considerations as the value-relevance might not be general knowledge. This could especially be the case because reputation risk is one of the hardest risks to manage and still few best practices exist in this regard.

4. SUMMARY

This article pursued three research goals concerning reputation risk and its management, using 400 firm-year observations of US and European banking and insurance companies. We first investigated the development of the awareness of reputation risks by 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’ therein. 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. Second and third, to the best of our knowledge this is the first paper to empirically identify firm characteristics and determinants for the implemen-

tation of a reputation risk management as well as to investigate the value-relevance of reputation risk management using regression analyses.

The results in 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', 'reputation(al) risk management') almost quadrupled from 2006 to 2015. This finding implies that various developments that make reputation more volatile, such as higher stakeholder expectations and engagement as well as the impact of social media, are reflected in firms' perceptions. The increasing trend does not only hold 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. The term 'reputation' is most frequently used (17.45 times on average per annual report in 2015), followed by 'reputation(al) risk' (9.95 times on average per annual report in 2015) and 'reputation(al) risk management' (0.58 times on average per annual report in 2015), whereby the latter is also the one with the strongest growth. We also observe that the share of 'reputation(al) risk (management)' on the term 'risk' 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 awareness for reputation risks as reflected in the annual reports is more pronounced among banks and European firms.

Concerning the determinants of reputation risk management, the univariate analyses already show significant differences between the groups with and without a reputation risk management. The multivariate Cox proportional hazard model further reveals four significant effects. In line with our hypotheses and the results of the text mining analysis, firms from Europe as well as banks are significantly more likely to implement a reputation risk management. As European firms have proven empirically to be more sensitive in terms of reputation losses, this finding shows that firms also behave rationally in practice in this respect. Besides, regulatory requirements in Europe might also induce part of the regional differences. Since banks have suffered more during the financial crisis, firms' histories seem to play a role for adopting reputation risk management as well. 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, supporting our hypothesis as well. 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. A possible explanation could be that these firms see reputation risk only as a secondary risk and thus, do not manage it separately but within other risk categories. The results of the logistic regression confirm the significant effects concerning *Europe*, *Reputation awareness* and *Risk awareness*. In addition, this re-

gression shows that the implementation of reputation risk management was significantly more likely in the aftermath of the financial crisis and in recent years.

Finally, we find support for the value-relevance of reputation risk management by conducting a linear fixed effects model to test for the influence of reputation risk management on Tobin's Q, while including other control variables that typically influence Tobin's Q. We observe a significantly positive impact of reputation risk management on Tobin's Q, which should encourage further firms to implement a reputation risk management in the future since the respective benefits generally outweigh the costs, which is not robust, though, as the effect, while still being positive, is no longer significant with fewer control variables.

Overall, our results strongly emphasize the increasing relevance of reputation risk and its management. Since the management of this type of risk is challenging and still mostly in a developing state, especially concerning quantitative measures of reputation risk, future research on this topic is necessary and qualitative work as well as empirical studies are needed. For instance, further empirical studies on the determinants of reputation risk management could investigate if governance factors, such as the structure of the board of directors or management compensation, also play a role, which is similarly done in the context of ERM by Beasley et al. (2005). As we examine the development over time and conduct a text mining analysis of the annual reports, we use a relatively small sample as well as key words to identify firms with a reputation risk management, given that ratings or similar information is not available (yet). 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 annual reports and imply that it is suitable to use these public disclosures for the identification of reputation risk management. As our sample is composed of the respectively largest firms by book value of total assets, the results might not be generalizable to small and medium sized companies. An independent, holistic reputation risk management is less relevant for these firms, though, as the costs presumably outweigh the benefits in their case and managing reputation risks alongside other risk categories is thus more pragmatic. The higher amount of stakeholders and media attention emphasizes the importance of reputation risk management for large firms as well, also in respect to reputation spillover effects. Thus, we find important first insights in understudied topics, which can serve for future research to build upon.

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APPENDIX

Figure A.1: Development of the awareness of reputation risk (management) over time – comparison between subsamples

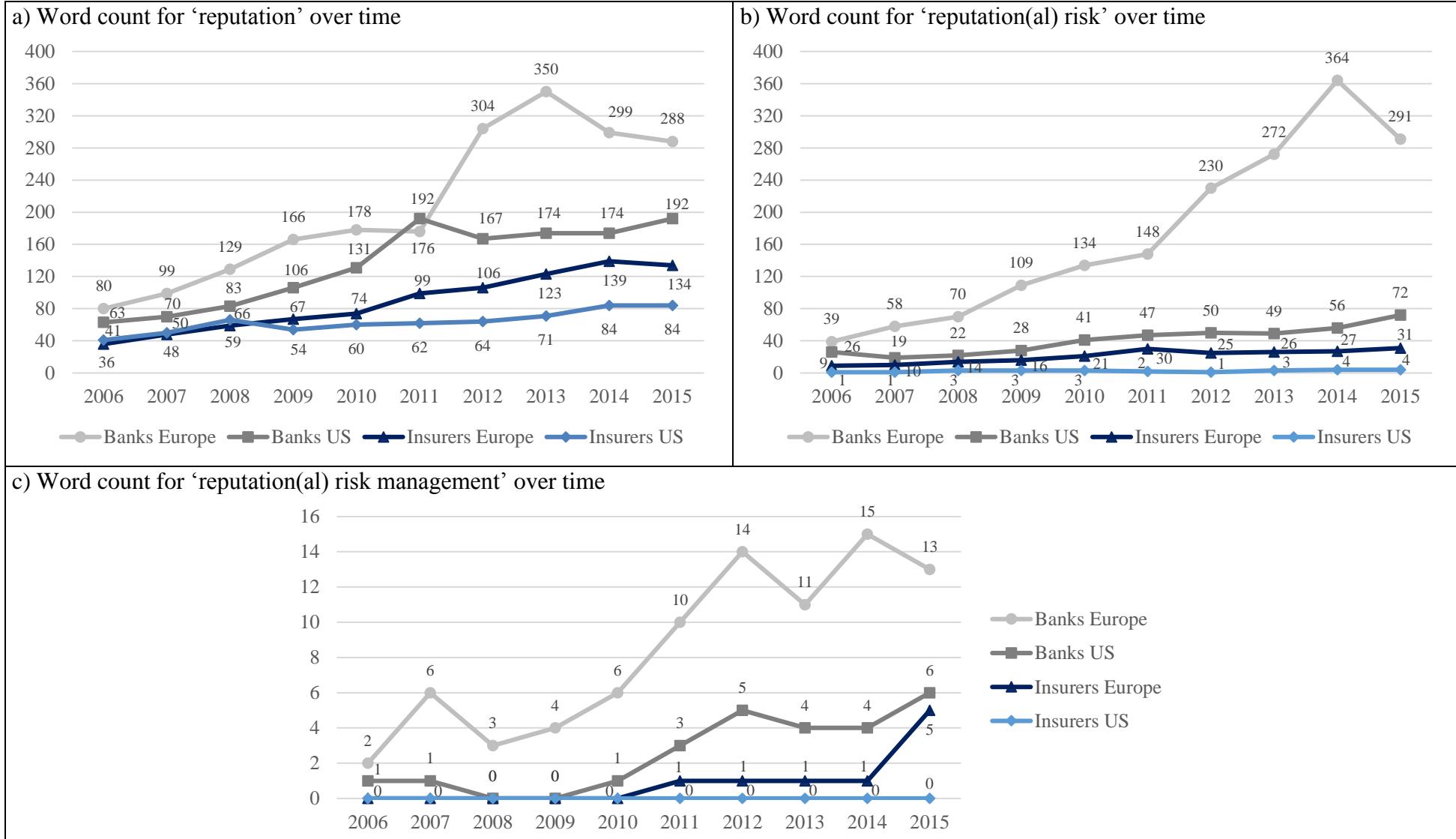


Table A.1: Pearson and Spearman rho correlation coefficients (400 firm-year observations)

		<i>RRM</i>	<i>Q</i>	<i>Size</i>	<i>Leverage</i>	<i>RoA</i>	<i>MB</i>	<i>Bank</i>	<i>Europe</i>	<i>Reputation awareness</i>	<i>Risk awareness</i>
<i>RRM</i>	Pearson	1									
	Spearman Rho		1								
<i>Q</i>	Pearson	-0.194***		1							
	Spearman Rho	-0.209***		1							
<i>Size</i>	Pearson	0.402***	-0.344***		1						
	Spearman Rho	0.403***	-0.252***		1						
<i>Leverage</i>	Pearson	0.094*	-0.033	0.471***		1					
	Spearman Rho	0.040	0.086*	0.438***		1					
<i>RoA</i>	Pearson	-0.105**	0.485***	-0.363***	-0.526***		1				
	Spearman Rho	-0.089*	0.495***	-0.387***	-0.602***		1				
<i>MB</i>	Pearson	-0.267***	0.899***	-0.317***	0.094*	0.388***		1			
	Spearman Rho	-0.250***	0.954***	-0.261***	0.125**	0.464***		1			
<i>Bank</i>	Pearson	0.376***	0.037	0.468***	0.026	-0.032	-0.024		1		
	Spearman Rho	0.376***	-0.064	0.475***	-0.060	-0.020	-0.100**		1		
<i>Europe</i>	Pearson	0.346***	-0.136***	0.496***	0.652***	-0.293***	-0.049	0.000		1	
	Spearman Rho	0.346***	-0.028	0.492***	0.727***	-0.444***	-0.150	0.000		1	
<i>Reputation awareness</i>	Pearson	0.549***	-0.190***	0.495***	0.137***	-0.187***	-0.249***	0.450***	0.292***		1
	Spearman Rho	0.664***	-0.320***	0.567***	0.048	-0.213***	-0.350***	0.522***	0.289***		1
<i>Risk awareness</i>	Pearson	0.475***	-0.297***	0.649***	0.350***	-0.292***	-0.327***	0.378***	0.577***	0.754***	
	Spearman Rho	0.467***	-0.386***	0.722***	0.426***	-0.483***	-0.385***	0.299***	0.652***	0.690***	1

Notes: ***, ** and * denote statistical significance at the 1, 5, and 10% level, respectively.