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Awareness, Determinants, and Value of Reputation Risk Management: An Empirical Study in the Banking and Insurance Industry

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AWARENESS, DETERMINANTS, AND VALUE OF REPUTATION RISK MANAGEMENT: AN EMPIRICAL STUDY IN THE BANKING AND INSURANCE INDUSTRY

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ABSTRACT

Reputation risk has become increasingly important, especially in the financial services industry where trust plays a crucial role. The aim of this paper is to provide a holistic view on the practice of reputation risk management based on a sample of US and European banks and insurers. This is done by focusing on three central aspects: First, we investigate how the awareness and management of reputation risk as reflected in annual reports has developed over the last ten years by adopting a text mining approach. Second and third, having identified firms with an implemented reputation risk management, we empirically study determinants and firm characteristics as well as its value-relevance, which to the best of our knowledge has not been done so far. Our results show that the awareness of reputation risk has increased and that it also gained in importance relative to other risks. Moreover, we find that less leveraged and more profitable firms are significantly more likely to implement a reputation risk management. This also holds for firms that belong to the banking industry, are situated in Europe, have a higher awareness for their reputation and face fewer risks. Finally, we obtain first indications that reputation risk management can increase firm value.

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-

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[1] In their reconceptualization of reputation risk, Scott and Walsham (2005) 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 (2009) 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

ment of reputation risk even more important, among them especially the social web, where news are circulating farer 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] At the same time, in an experimental setting Li et al. (2014) show that the interaction between companies and stakeholders using Twitter can positively influence reputation, for instance. Overall, the social web thus creates threats as well as opportunities for reputation, thereby increasing the importance of reputation risk management. 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 (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 an empirical study regarding the awareness, determinants and value of reputation risk management based on a sample of European and US banks and insurers, which 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; Walker, 2010) as well as the impact of reputation on financial performance (see Gatzert, 2015, and de la Fuente Sabate and de Quevedo Puente, 2003, for a review). In comparison, the scientific literature on reputation risk is relatively scarce. Empirical studies concerning reputation risk e.g. focus on market reactions following operational loss events and find that they (by far) exceed the original loss in most cases, indicating reputation losses (see Biell and Muller, 2013; Cannas et al., 2009; Cummins et al., 2006; Fiordelisi et al., 2014; Gillet et al., 2010; Perry and de Fontnouvelle, 2005; Sturm, 2010). Fiordelisi et al. (2013) investigate which factors determine reputation risk for banks, which is similarly done by Kamiya et al. (2013) for insurers. 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 Kim, 2012; Rhee and Valdez, 2009; Schultz et al., 2011; Zyglidopoulos and Phillips, 1999), fewer research deals with proactive reputation risk management ap-

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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 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).

proaches (see, e.g., Dowling, 2006; Eccles et al., 2007; Scandizzo, 2011; Scott and Walsham, 2002; Walter, 2007). 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.

Thus, 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. In addition, to the best of our knowledge, research on the determinants and value of reputation risk management has not been conducted yet, whereas this topic has been extensively studied in the context of ERM in general (see, e.g., Baxter et al., 2013; Beasley et al., 2005, 2008; Gordon et al., 2009; Hoyt and Liebenberg, 2011; Liebenberg and Hoyt, 2003; Pagach and Warr, 2011). 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 200 group annual reports. Our paper is thereby the first that allows a comparison between industries and regions concerning the awareness of reputation risk as well as the development over the last ten years, thus extending the work of Mukherjee et al. (2014) who only focus on European banks and use a shorter period. In addition, we use the text mining approach to examine the importance of reputation risk relative to other risks and to calculate frequencies relative to the total number of words of the disclosure. 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 indicate that firms have become more aware of the relevance of reputation and its risks as reflected in their annual reports and that the importance of reputation risk relative to other risks considerably increased. Concerning the determinants of reputation risk, we observe that firms that are less leveraged, have a higher return on assets, 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 face fewer risks 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. 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 by studying the 20 largest publicly listed US and European banking and insurance companies by total assets as of the end of the year 2015. We thereby exclude Berkshire Hathaway Inc. as the holding also includes a large proportion of non-financial services firms from multiple industries. 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 we further exclude the (mainly) investment banks Goldman Sachs Group and Morgan Stanley. Table 1 gives an overview of the ultimately investigated companies.

Table 1: Banks and insurers in the sample

Banks	*Insurers*
European:	*European:*
Barclays PLC	Allianz Group
BNP Paribas Group	Aviva PLC
Deutsche Bank Group	AXA Group
HSBC Holdings PLC	Legal & General Group PLC
Santander Group	Prudential PLC
US:	*US:*
Bank of America Corporation	American International Group Inc.
Citigroup Inc.	Hartford Financial Services Group Inc.
JPMorgan Chase & Co.	Lincoln National Corporation
U.S. Bancorp	MetLife Inc.
Wells Fargo & Company	Prudential Financial Inc.

To be able to investigate the development over time, we examine the companies over a period of ten years (2006-2015), resulting in 200 firm-year observations. 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.

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. To account for plural forms and other word endings, we cut ('stem') the words after 'reputation', 'risk' and 'management', thus obtaining root words.[3] 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 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.

Note that we set up a process in a big data mining tool as a manual word count is impracticable for a large amount of documents and words, which also comes with some limitations.[4] However, the resulting imprecisions are generally minor in comparison to an unstandardized and highly error-prone manual word count.

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 (2016) 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 200 firm-year observations to 128 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.

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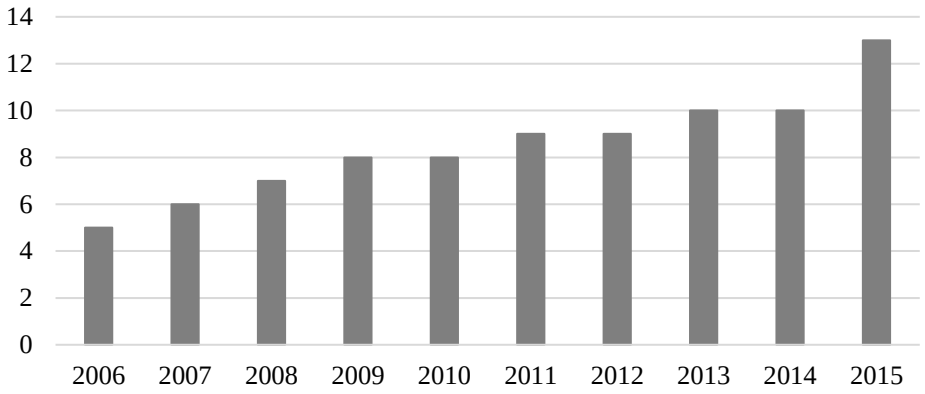
[3] Since the counts for 'reputation' originally also contain the counts for 'reputation(al) risk' as well as 'reputation(al) risk management' and 'reputation(al) risk' the counts for 'reputation(al) risk management', we subtract the respective numbers to avoid double counts.

[4] 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'.

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. 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). In particular, if the text mining analysis resulted in counts for 'reputation(al) risk management' for a specific firm-year, we took it as a first sign that a reputation risk management is in place. In addition, all annual reports were manually reviewed. Apart from having a separate dedicated section for reputation risk management in the annual report, we set the dependent variable RRM to 1 if various indications for an independent reputation risk management are reported, in particular 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). Figure 1 shows the number of firms in the sample with a reputation risk management in the respective year, increasing from 25% of the sample in 2006 to 65% 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). 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. In addition to that, 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, and Golshan and Rasid, 2012, for ERM in general). Consequently, we 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 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 (2010) 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, 2016, 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. 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. Nevertheless, we expect banks to be further advanced concerning reputation risk management, as they are even more confronted with skepticism and scrutiny after various financial crises. Thus, we hypothesize a positive relationship between *Bank* and *RRM* (given the reference group 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 country-specific differences in the implementation of reputation risk management. Since Fiordelisi et al. (2014) find higher reputation losses in Europe than in North America, a reputation risk management in this region seems even more important. Thus, 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.[5] 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

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

In particular, for the Cox proportional hazard model 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 (2016) in the context of the determinants of ERM, taking into account all 200 firm-year observations with the same variables and including year dummies to control for year effects, i.e.,

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

where the expression in brackets represents the odds ratio.

[5] 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.

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,[6] 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; Cannas et al., 2009; Cummins et al., 2006; Fiordelisi et al., 2014; Gillet et al., 2010; Perry and de Fontnouvelle, 2005; Sturm, 2010). 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 regression 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.

Apart from the independent variable *RRM* (as defined in Section 2.2.2) we include six control variables in addition to year dummies: the three most common control variables for firm value (see, e.g., Hoyt and Liebenberg, 2011) *Size*, *Leverage* and *RoA* (all as defined above), *Bank* and *Europe* (both as defined above) since our sample includes firms from two industries and regions, 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:

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[6] 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.

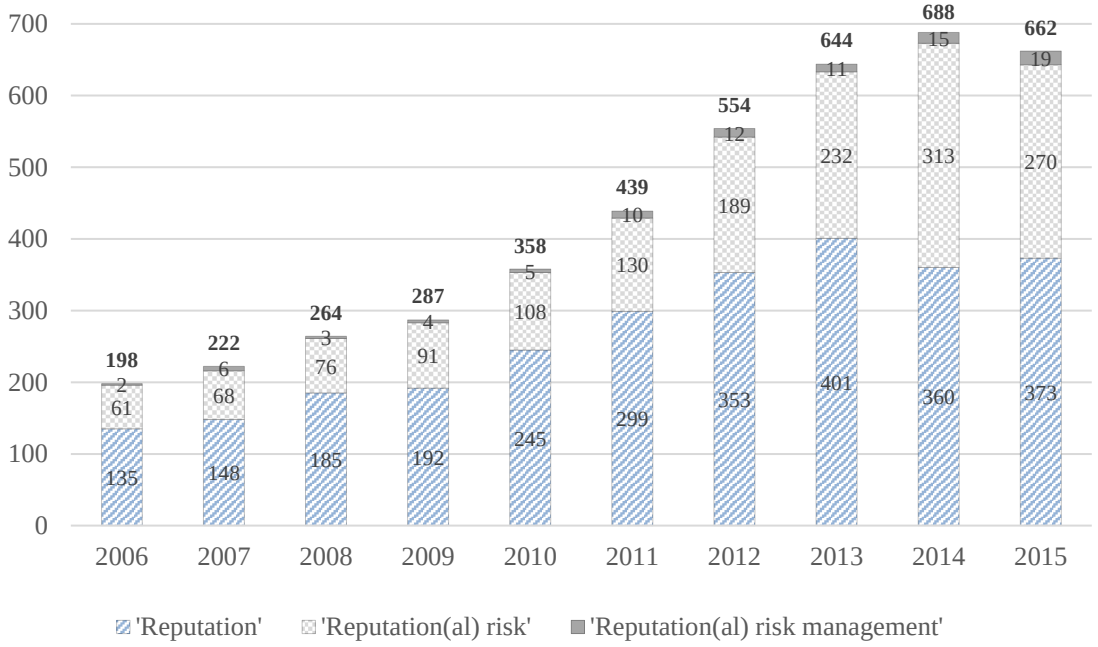
$$Q = \beta_0 + \beta_1 RRM + \beta_2 Size + \beta_3 Leverage + \beta_4 RoA + \beta_5 MB + \beta_6 Bank + \beta_7 Europe + \beta_{8\text{-}16} Year\_Dummies + \varepsilon \quad (4)$$

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), who analyze the disclosures of 20 European banks from 2007-2012, Figure 2 shows that the sum of the three examined terms more than tripled from 198 in 2006 to 662 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 135 (i.e. 6.75 uses per annual report on average) in 2006 to 373 (i.e. 18.65 uses per annual report on average) in 2015. It reaches its maximum in 2013 with 401 counts, followed by a slight decline in 2014. In 2015, we find an increase again, but the number of the term ‘reputation’ is not back to the level of the maximum in 2013. Surveys by Schillings and RSG Consulting

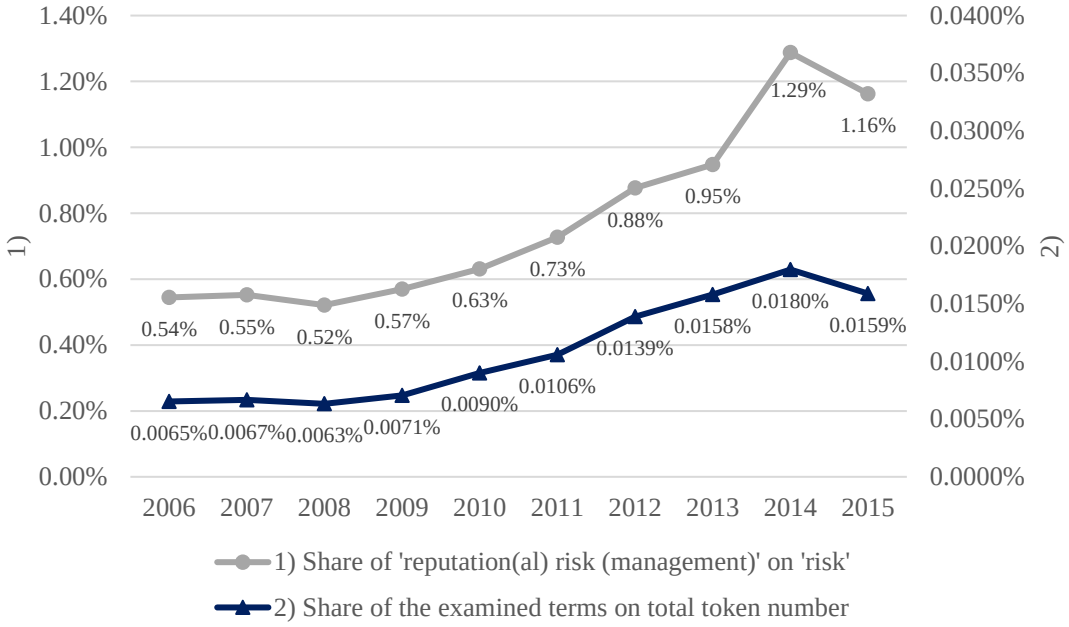
(2013) among British firms as well as by Auge-Dickhut et al. (2013) among Swiss banks also confirm that reputation gained in relevance during the last years.

The number of the term ‘reputation(al) risk’ exhibits an even stronger growth than ‘reputation’, although being less frequently used. It increases from 61 uses (i.e. 3.05 uses per annual report) in 2006 to 270 (i.e. 13.5 uses per annual report) in 2015, which represents almost 4.5 times the number of 2006. The maximum lies in 2014 with 313 counts, followed by a slight decrease in 2015 that is still above the level of 2013. The observed increase of the term ‘reputation(al) risk’ is in line with Aula and Heinonen (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. Furthermore, in a survey of Pohl and Zaby (2008) among German and Swiss banks, 86% agree that the relevance of reputation risks increased in the last ten years.

The least frequently used of the three examined terms, but also the one with the highest growth is ‘reputation(al) risk management’. It increases almost ten times from two counts in 2006 (i.e. 0.1 per annual report) to 19 in 2015 (i.e. 0.95 per annual report) 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. This 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 further calculate two relative frequencies, as shown in Figure 3. We first study the relevance of reputation risks in the context of all risks and find that of all the uses of the term ‘risk’ in the reports, 1.16% were in the context of reputation risk (management) in 2015. This seems like a small number at first glance, but implies an increase of more than twice as compared to 0.54% 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 more than doubled from 0.0065% in 2006 to 0.0159% in 2015 with an interim maximum in 2014 with 0.0180%. 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.

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)

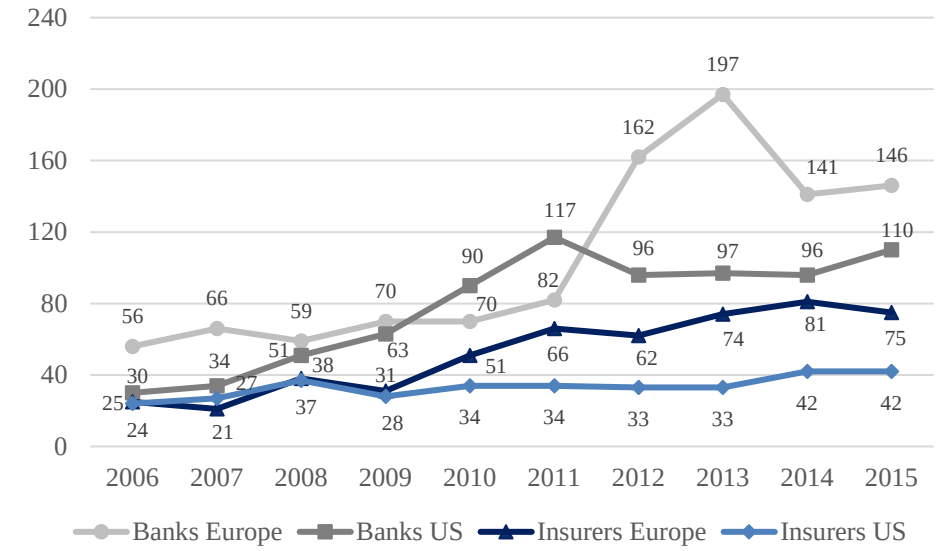


We finally compare the frequencies of the three examined terms for four subsamples (European and US banks, European and US insurers) as depicted in Figure 4 to compare the awareness of reputation (risks) between banking and insurance companies taking into account their regional affiliation. Concerning the term ‘reputation’, European banks are leading in 2006 with 56 counts as well as 2015 with 146 counts. US banks exhibit the second highest frequency with 30 uses in 2006 and 110 in 2015. In 2010 and 2011 their annual reports contain the term ‘reputation’ even more often than those of European banks. European insurers come third (with the exception of 2007 where the US insurers have a higher frequency) with 25 counts in 2006 and 75 in 2015, while US insurers use the term ‘reputation’ the least frequently in their annual reports.

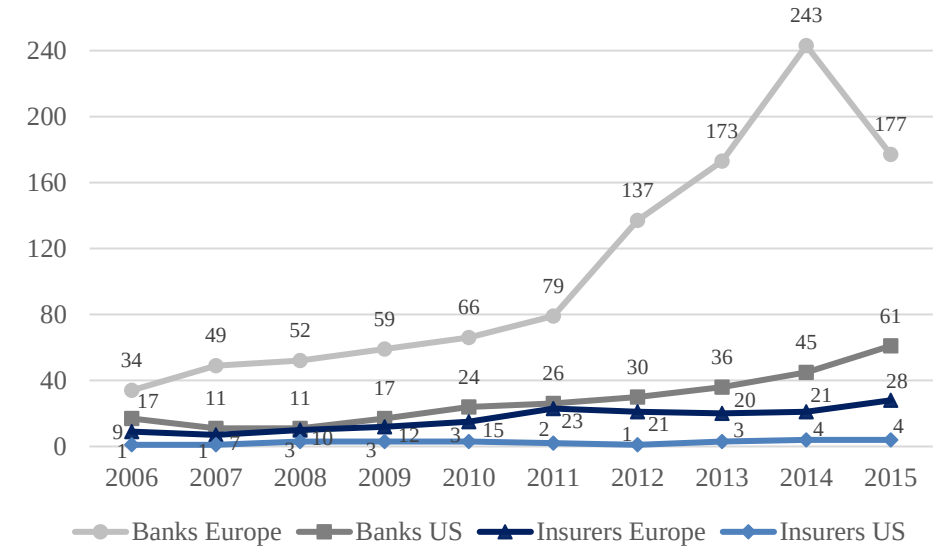
The same order of the subsamples as for ‘reputation’ applies for ‘reputation(al) risk’, i.e. first the European banks (with 34 counts in 2006 and 177 in 2015), followed by US banks (17 in 2006, 61 in 2015), European insurers (nine in 2006, 28 in 2015) and US insurers (one in 2006, four in 2015). In this case, the difference between European banks and the other subsamples is remarkably large. Whereas we observe more counts for ‘reputation’ than for ‘reputation(al) risk’ for the overall sample, the subsample of European banks even exhibits a higher frequency of the term ‘reputation(al) risk’ than for ‘reputation’ in the last two years (243 counts versus 141 and 177 versus 146). European banks are also the only subsample where the maximum of counts does not occur in the last year, but in 2014 with 243 uses, though.

Figure 4: Development of the awareness of reputation risk (management) over time – comparison between subsamples

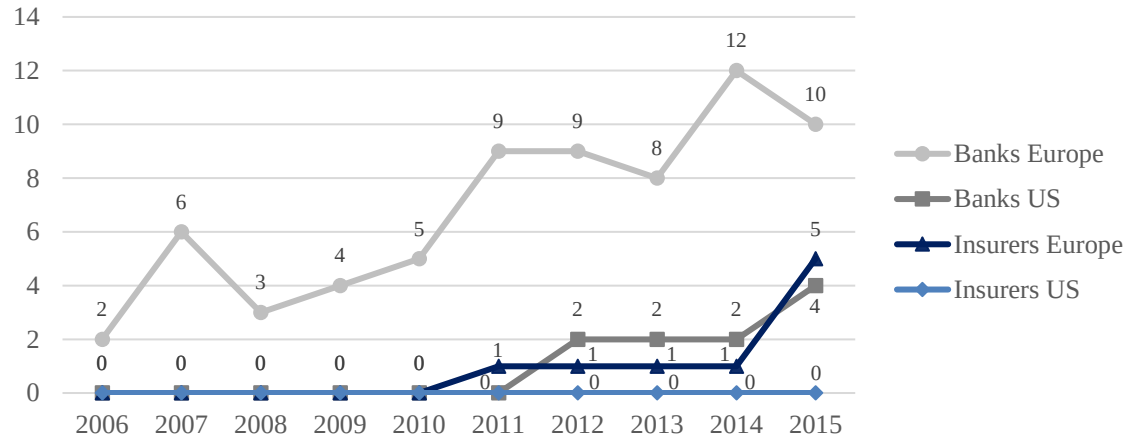
a) Word count for 'reputation' over time



b) Word count for 'reputation(al) risk' over time



c) Word count for 'reputation(al) risk management' over time



Furthermore, European banks are again clearly ahead when it comes to the use of the term ‘reputation(al) risk management’ with two counts in 2006 and ten in 2015. In the annual reports of the other three subsamples we do not obtain any hits for ‘reputation(al) risk management’ in 2006 yet, with the first count occurring in 2011 for the European insurers. The US banks follow in 2012 with two counts. The frequency for US insurers is still zero in 2015, while European insurers come second after the European banks with five counts, and the US banks have four uses of the term ‘reputation(al) risk management’. 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.

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 2 reports Spearman correlation coefficients in addition to Pearson correlation coefficients since not all variables are scaled metrically or normally distributed. The coefficients already suggest significant correlations between six of 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. 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 calculate variance inflation factors for the single regression analyses, which clearly fall below the generally cited critical value of 10 (see, e.g., Marquardt, 1970).

Table 2: Pearson and Spearman rho correlation coefficients (200 firm-year observations)

		RRM	*Q*	*Size*	*Leverage*	*RoA*	*MB*	*Bank*	*Europe*	*Reputation awareness*	*Risk awareness*
RRM	Pearson	1									
	Spearman Rho	1									
Q	Pearson	-0.074	1								
	Spearman Rho	-0.079	1								
Size	Pearson	0.522***	-0.257***	1							
	Spearman Rho	0.527***	-0.241***	1							
Leverage	Pearson	0.151**	0.163**	0.024	1						
	Spearman Rho	0.113	0.189***	0.020	1						
RoA	Pearson	0.023	0.311***	-0.057	-0.303***	1					
	Spearman Rho	-0.015	0.447***	-0.140**	-0.528***	1					
MB	Pearson	-0.211***	0.845***	-0.305***	0.217***	0.277***	1				
	Spearman Rho	-0.138*	0.950***	-0.297***	0.173**	0.447***	1				
Bank	Pearson	0.354***	0.117*	0.697***	-0.156**	0.128*	-0.090	1			
	Spearman Rho	0.354***	0.021	0.698***	-0.228***	0.108	-0.075	1			
Europe	Pearson	0.536***	0.042	0.304***	0.638***	-0.090	0.153**	0.000	1		
	Spearman Rho	0.536***	0.123*	0.314***	0.683***	-0.285***	0.124*	0.000	1		
Reputation awareness	Pearson	0.541***	-0.159**	0.509***	0.073	-0.063	-0.233***	0.446***	0.290***	1	
	Spearman Rho	0.727***	-0.210***	0.704***	0.000	-0.119*	-0.248***	0.577***	0.357***	1	
Risk awareness	Pearson	0.553***	-0.240***	0.593***	0.227***	-0.095	-0.254***	0.404***	0.540***	0.754***	1
	Spearman Rho	0.620***	-0.276***	0.688***	0.266***	-0.295***	-0.278***	0.367***	0.623***	0.760***	1

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

Table 3 compares the examined variables between the groups with and without an implemented reputation risk management (RRM). The first group with RRM consists of 85 firm-year observations versus 115 firm-year observations without reputation risk management. Since not all variables are normally distributed, differences in medians are examined in addition to differences in means, whereby the former are also barely affected by outliers. The analysis shows statistically significant differences between firms with a reputation risk management and firms without one with respect to most 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. Furthermore, firms with an implemented reputation risk management are more leveraged 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. Concerning the value of reputation risk management, the difference in medians yields a significantly higher Tobin's Q among firms without reputation risk management, which is only significant at the 10% level, though, and is confirmed neither by the difference in means nor by the previous correlation analysis. 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.

Table 3: Univariate differences across groups with and without reputation risk management (RRM)

	RRM (85 firm-year observations)		No RRM (115 firm-year observations)		Differences	
	Mean	Median	Mean	Median	Difference in means	Difference in medians
Q	1.000	0.995	1.006	1.003	-0.006	-0.008*
Size	14.238	14.386	13.397	13.241	0.841***	1.145***
Leverage	0.941	0.940	0.931	0.935	0.010**	0.005
RoA	0.498	0.519	0.451	0.536	0.047	-0.017
MB	0.977	0.922	1.243	1.126	-0.266***	-0.204
Bank	0.706	1.000	0.348	0.000	0.358***	1.000***
Europe	0.812	1.000	0.270	0.000	0.542***	1.000***
Reputation awareness	36.176	28.000	10.035	8.000	26.142***	20.000***
Risk awareness	1,355.094	1,103.000	675.617	681.000	679.477***	422.000***

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, 5 and 10% level, respectively.

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. The results are depicted in Table 4. The analysis confirms all 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. Three 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. Firms that face more risks as expressed in their annual reports are 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.

Table 4: Results of the Cox proportional hazard model on the determinants of reputation risk management

	Predicted relation	Parameter estimate	Hazard ratio
Size	+	0.945	2.574
Leverage	+/-	-30.260	0.000
RoA	+	0.717	2.048
Bank	+	2.418*	11.221
Europe	+	6.907***	998.819
Reputation awareness	+	0.050	1.051
Risk awareness	+	-0.004**	0.996

Notes: The dependent variable is *RRM*. ***, ** and * denote statistical significance at the 1, 5 and 10% level, respectively.

To reaffirm the results of the Cox proportional hazard model, 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 5. 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* as well as *Risk awareness* and *RRM*. The significant positive effect of *Bank* on *RRM* is not confirmed, though. Instead, the logistic regression shows three other statistically significant effects: Firms that are less leveraged, that have a higher return on assets and that exhibit a higher awareness for their reputa-

tion as expressed by the respective word count of their annual reports are more likely to have a reputation risk management. These findings support our hypotheses. A statistically significant negative effect of leverage on ERM in general is also observed by Hoyt and Liebenberg (2008, 2011) and Baxter et al. (2013).

Table 5: Results of the logistic regression on the determinants of reputation risk management

	Predicted relation	Parameter estimate	Odds ratio
Size	+	0.766	2.150
Leverage	+/-	-23.984***	0.000
RoA	+	2.674***	14.498
Bank	+	0.919	2.507
Europe	+	8.924***	7,511.292
Reputation awareness	+	0.336***	1.399
Risk awareness	+	-0.004***	0.996

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

Finally, Table 6 depicts the linear regression 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 analysis showed a slightly negative but not significant relation concerning the means and a significant relation concerning the medians between *RRM* and *Q* only at the 10% level, 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. Concerning the model fit, we obtain an R^2 (ratio of explained variance to total variance) of 0.835 and an only slightly lower adjusted R^2 of 0.820. Furthermore, the F-statistic has a p-value <0.000, indicating that the hypothesis that no relationships between the independent and dependent variables exist can be rejected.

Table 6: Results of the linear regression on the value of reputation risk management

	Regression coefficient	Standardized regression coefficient
RRM	0.018***	0.225
Size	-0.016***	-0.331
Leverage	0.152***	0.133
RoA	0.002	0.056
MB	0.046***	0.739
Bank	0.027***	0.348
Europe	-0.013***	-0.171
Intercept	1.027***	

Notes: The dependent variable is *Q*. Year dummies are included but not reported. *** denotes statistical significance at the 1% level.

Since autocorrelation might be a problem according to the Durbin-Watson statistic (=0.751) as longitudinal data are used, we also conducted linear regressions for the ten single years separately with the same model specifications. Table 7 gives an overview about the resulting signs and significance levels of the independent variables. In all cases but one, we find a positive influence of *RRM* on *Q*, which is statistically significant in three cases. The observed single negative influence is not significant. The signs of all variables for 2008-2015 are exactly the same as for all firm-year observations together (thus also showing no specific effects after the financial crisis). Consequently, the years 2006 and 2007 can be seen as 'outliers' with the one (non-significant) negative influence of *RRM* on *Q* occurring in 2007.

Table 7: Summary of linear regressions for the single years on the value of reputation risk management

	2015	2014	2013	2012	2011	2010	2009	2008	2007	2006
RRM	+	+	+*	+*	+**	+	+	+	-	+
Size	-*	-	-	-*	-*	-*	-**	-	-	-*
Leverage	+	+***	+*	+***	+**	+	+	+	-	-
RoA	+	+***	+	+**	+	+	+*	+	+**	+***
MB	+***	+***	+***	+***	+***	+***	+***	+***	+***	+***
Bank	+	+**	+	+**	+**	+**	+*	+*	+	+*
Europe	-	-	-**	-	-*	-	-	-	+	+
Intercept	+***	+***	+*	+***	+***	+***	+***	+***	+***	+***

Notes: The dependent variable is *Q*. ***, ** and * denote statistical significance at the 1, 5, and 10% level, respectively.

As a robustness check, we further conduct a linear regression with less control variables following Hoyt and Liebenberg (2011) and Lechner and Gatzert (2016), 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 0.007), it is no longer significant (p-value 0.227).

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.

4. SUMMARY

This article pursued three research goals concerning reputation risk and its management, using 200 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 implementation 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’) more than tripled from 2006 to 2015. This 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 (18.65 times on average per annual report in 2015), followed by ‘reputation(al) risk’ (13.5 times on average per annual report in 2015) and ‘reputation(al) risk management’ (0.95 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 three significant effects. In line with our hypotheses and the results of the text mining analysis, banks as well as firms from Europe are significantly more likely to implement a reputation risk management. 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* and *Risk awareness*. Furthermore, we find three additional significant effects, which are all in line with our hypotheses. Less leverage (i.e. being less exposed to reputation risks), a higher return on assets (i.e. being more easily able to bear the associated costs of a reputation risk management) as well as more uses of the terms ‘reputation’ and ‘reputation(al) risk’ in the annual report (i.e. being more concerned about reputation) significantly positively influence the implementation of a reputation risk management.

Finally, we find support for the value-relevance of reputation risk management by conducting a linear regression 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 for the whole sample, 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. 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, we find important first insights in understudied topics, which can serve for future research to build upon.

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