LUND UNIVERSITY
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The Impact of Risk Disclosure on the Volatility of Stock Returns

A Content Analysis of Corporate Risk Disclosure in Annual Reports of Automotive Manufacturers

Master Thesis – Corporate & Financial Management

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Abstract

This master thesis investigates risk disclosure in annual reports of automotive manufacturers in order to provide deeper insight into the level of disclosed information and the significance for investors. By the use of a content analysis, we analyze six industry-specific risk dimensions of 21 automotive manufacturers worldwide. Subsequently, two hypotheses are empirically tested regarding the effect of risk disclosure on stock return volatility. The results indicate that risk disclosure and stock return volatility have a positive association. This evidence is contrary to a few theories and to prior studies about the effect of other kinds of disclosure. In addition, our outcomes support that reputation intensifies the negative effect of risk disclosure significantly. However, we find no significant association when reputation is substituted with a premium image in this context. Concluding, we recommend companies to be aware of the effect of risk disclosure on investors' sentiments. Especially companies with a good reputation should disclose with caution in order not to jeopardize their standing.

Keywords: Risk Disclosure, Risk Identification, Risk Management, Risk Disclosure Index, Automotive Manufacturer, Stock Return Volatility, Content Analysis, Reputation, Premium Image.

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Table of Contents

List of Tables

List of Figures

1. Introduction

This chapter begins with background information underlining the importance of our research topic. It is followed by a presentation of the purpose of this thesis, a discussion of the identified gaps in the literature and a statement of our resulting research questions.

1.1 Research Background

The demand for risk disclosure has been increasing over the past years. Not only the financial crisis but also momentous events like the Enron scandal evoked intense stock price volatility and a higher need for corporate transparency (Ozenbas & San Vicente Portes, 2013). Precisely in the automotive industry, recent events like the Volkswagen diesel scandal and other major product recalls at companies such as Mercedes, Toyota, and Nissan, have shown the magnitude of risks and how fast investor's confidence can be destroyed.

Disclosure has an impact on the transparency of the company. Companies use disclosure strategies in order to alter the assessment and the expectation of stakeholders concerning the firm (Archel, Husillos, Larrinaga & Spence, 2009). Not all forms of disclosure have the same impact, but to be effective, disclosure needs to be clear, simple, useful and in the appropriate context (Jankensgard, Alviniussen & Oxelheim, 2016).

Since risks are a complex topic and therefore difficult to assess, it is significant for investors to be acquainted with comprehensive and transparent risk reporting, which assists in evaluating the risk and return of their claims and resultantly make appropriate portfolio investment decisions (Jankensgård, Hoffmann & Rahmat, 2014). However, there is still an ongoing debate about how investors actually interpret the information that has been released (Beyer, Cohen & Beverly, 2010).

According to Ganguin (2005), the automotive manufacturing industry is one of the highest-risk industries, and thus of particular interest in the context of risk

disclosure. It is characterized by a very competitive environment involving a constant price war and thus proprietary information costs associated with specific disclosure can be substantial. Furthermore, original equipment manufacturers (OEMs) do not only have to be aware of their reputation but also about safety issues, since the consequence of quality problems can range from ruining a consumer's day to ending their life.

The anticipated impact of information asymmetries on stock prices and the general growth of stock volatility in the automotive industry over the past years questions the argument whether risk disclosure diminishes stock return volatility. Thus, we aim to answer this question in the following.

1.2 Research Purpose

This master thesis seeks to extend prior research in the field of risk disclosure and its effect on stock return volatility. The intention is to give a deeper insight into the type and level of risk disclosure in annual reports of automotive manufacturers. On the basis of the results, practical suggestions for managers about how they can improve the communication of risk and the corresponding disclosure strategies shall be given. Concluding, valuable insights regarding the effect of the company's reputation and premium image are presented.

1.3 Problem Discussion & Research Questions

With an increasing demand for risk disclosure over the last years, it has become an interesting field of research to investigate and measure the quantity, quality, and effect of it. Several studies conducted a content analysis to evaluate the level of risk disclosure in annual reports (for example Johansson & Thörnberg, 2011; Lajili & Zéghal, 2005; Linsley & Shrives, 2006). They rather focused on specific countries than on specific industries. Since they discovered partly insignificant results, they recommended future research to concentrate on individual industries.

As a consequence, and to focus our research, we chose one of the highest-risk industries. The results shall not only extend prior research but also give investors an overview of different levels of risk disclosure in the automotive manufacturing industry.

From a company's perspective, it is of particular interest to investigate the impact of risk disclosure. Main recipients of corporate disclosure are investors, who use this information to evaluate the company. Their assessment is in turn reflected in the stock return volatility. Hence, companies are especially interested in the effect of risk disclosure on stock return volatility. The literature in this area only seems to be scratching the surface. Prior research explored the impact of risk disclosure on firm value or cost of capital (Hail, 2002; Jorgensen & Kirschenheiter, 2003; Jankensgård, Hoffmann, & Rahmat, 2014). However, throughout our extensive review, we were unable to find an existing study, which explored the effect of the level of risk disclosure on stock return volatility. We intend to fill this research gap and to give managers practical implications regarding the importance of specific disclosure strategies.

One important aspect, which might have an influence on the effect of risk disclosure on stock return volatility, is the reputation of a company. In a recent study Bravo (2016) observed a significant relationship between reputation and the effect of forward-looking information on stock return volatility. Therefore, it is of particular interest to explore if this assumption also holds for the impact of risk disclosure. So far, there is no existing study, at least to the best of our knowledge, which examines the effect of risk disclosure in the context of reputation. Thus, we address this research gap. With the intention to incorporate the specifics of the automotive industry, we also translate the feature reputation to the classification of being a "premium manufacturer".

Summarized, the focus of this study lies on the following research questions:

- *Does the level of risk disclosure affect stock return volatility?*
- *Does being an automotive manufacturer with a better reputation influence the effect of risk disclosure on the stock return volatility?*
- *Does being a premium or non-premium auto manufacturer influence the effect of risk disclosure on the stock return volatility?*

1.4 Outline

The thesis is constructed as follows: Section 2 contains the relevant existing literature and the hypotheses development. Section 3 describes the data and methodology used in the study. The empirical analysis and results are discussed in Section 4. And finally, summary, conclusions and suggestions for future research are provided in Section 5.

2. Theoretical Framework & Hypotheses Development

This chapter begins promptly with a discussion regarding the definition of risk disclosure before thoroughly reviewing the theoretical arguments and empirical evidence concerning the impact of voluntary risk disclosure on the volatility of stock returns.

2.1 Definition of Risk Disclosure

2.1.1 Definition of Risk

A study of "risk disclosure" first requires a definition of "risk" itself. In general, the term risk can be used to describe something "good" or "bad". Lupton (2013) argues that nowadays the overarching idea of risk tends to only relate to undesirable or negative results while any beneficial or positive outcomes are ignored. At the same time, risk and uncertainty tend to be used interchangeably. Nevertheless, he also discusses that in the context of investments, risk, in fact, does get a positive meaning, due to the trade-off of high risk being rewarded with high potential.

The focus of this thesis is on downside risk disclosure, which informs the reader about any hazard, danger, harm, threat or exposure. Furthermore, the definition of risk disclosure incorporates both information about risks and the management of these risks.

2.1.2 Mandatory & Voluntary Risk Disclosure

Depending on the country where a company is listed and has its place of business, mandatory risk disclosure requirements differ. Most common are the International Financial Reporting Standards (IFRS) and the Generally Accepted Accounting Principles in the United States (U.S. GAAP). While these two standards have a lot of similarities and similar principles, they also differ in terms of IFRS being more restrictive and flexible compared to U.S. GAAP (PWC, 2015).

For example, U.S. GAAP is characterized by specific, detailed and more complex requirements on risk disclosure. The Financial Accounting Standards Board (FASB) requires companies to disclose information about risk categories and strategies as well as financial and market risk (e.g. interest rate, currency and credit risk), while other additional information is only encouraged or voluntary. In general, mandatory risk disclosure is mostly limited to disclosure about financial risks and its management, risks from pension plans or risks from joint ventures.

Since it is expected that transparency is determined by the level of what a company actually decides to disclose and not by how much a firm is required to disclose, we do not separate between voluntary and mandatory disclosure in our succeeding measure of risk disclosure.

2.1.3 Costs & Benefits of Voluntary Disclosure

The question of how much a company should publish is a balancing act:

On the one hand, companies want to satisfy the demand of investors for more transparency. According to stakeholder theory, disclosure strategies are used to influence the perception and expectation about a company (Archel, Husillos, Larrinaga & Spence, 2009; Michelon, 2013). Under the agency perspective, voluntarily disclosure can be used to reduce conflicts of interest between managers and investors (Jensen & Meckling, 1976). Especially risk disclosure is crucial in order to evaluate a company (ERAG, 2012). Jorgensen and Kirschenheiter (2003) investigated the effect of discretionary risk disclosure on firm's beta and risk premium, with findings supporting the modern portfolio theory that a higher level of risk disclosure enables investors to cope with risk diversification more effectively. The CFA Institute published a report in 2011 showing that actually 90% of analysts include risk disclosure in their company evaluations. Since investors have to base their investment decision on the information they have access to, disclosure may be as important as risk management itself for a stable stock return.

On the other hand, most managers would prefer to disclose the least possible to save their private control, so capital markets cannot effectively monitor and discipline them (Shleifer & Vishny, 1989). Furthermore, a higher level of disclosure can jeopardize the firm's competitive advantage by providing useful information to competitors. The risk of disclosing inaccurate information can even cause potential litigation and reputational costs (Celik, Ecer, & Karabacak, 2006). In addition to that, a high level of disclosure also affects the psychology of the investors and thus has a negative impact (Jankensgård, Hoffmann & Rahmat, 2014). More disclosure may harm the company by making it appear riskier or by making it more difficult to evaluate the underlying performance (Jankensgard, Alviniussen & Oxelheim, 2016). This information overload effect also develops to be an additional encumbrance for investors in the process of filtering the relevant information they need in order to assess the company's progress (CFA Institute, 2011; ERAG, 2012; Oxelheim, 1999; Jankensgård, Hoffmann & Rahmat, 2014).

2.2 Hypotheses Development

In the following, we assess the relevant theoretical literature and offer two hypotheses to be empirically tested. The first hypothesis deals with the relationship between risk disclosure and the volatility of stock returns. The second hypothesis extends the first one by adding the impact of reputation and accordingly premium image.

2.2.1 Risk Disclosure & Stock Return Volatility

"Investors should be aware of the relevant risks."

(Great Wall Motor Co Ltd, Annual Report, 2014)

Amplified disclosure is generally viewed as a vehicle for reducing information asymmetries in capital markets (Botosan, 1997; 2006). Since risk information is excepted to be credible and value-relevant for investors (Jorgensen & Kirschenheiter, 2003), its disclosure can affect the following settings:

First, a higher level of risk disclosure reduces the information asymmetry between the company and its investors. Investors rely to a large extent on information provided by the firm itself when they value the company's shares. A higher disclosure level should lower the estimation risk since investors can be more confident in their forecast.

Second, disclosure by firms decreases the information asymmetry between well- and less-informed investors. Well-informed investors might require a smaller premium for their risks while less informed investors demand a higher stock return, which increases the bid-ask spread and lowers the liquidity of stocks. A higher disclosure level can diminish this problem by lowering the informational advantage of informed traders. (Diamond & Verrecchia, 1991; Easley & O'Hara, 2004)

Third, from an agency perspective, the disclosure of value-relevant information reduces the uncertainty about a company and periodic surprises and thus mitigates information asymmetries. In accordance with Leuz and Wysocki (2008), disclosure can improve investment efficiency by monitoring managerial decision-making and thus reducing management's possibilities for pursuing too risky projects and consuming perks, which would destroy the value of shares. Emm, Gay and Lin (2007) analyzed firms' choice of market risk disclosure type and related this choice to various firm characteristics. They discover that a more transparent type of risk disclosure is associated with a higher reliance on external funding.

Previous studies have considered stock return volatility as a proxy for information asymmetry, with a low level of volatility indicating fewer information asymmetries (Cormier et al., 2010; Lang & Lundholm, 1996; Leuz & Verrecchia, 2000). Investors immediately react to certain information by trading the shares, given that this information is of importance for them (Nagar, Nanda & Wysocki, 2003). Easley and O'Hara (2004) detect that financial reporting quality influences the information environment of a company and hence its stock volatility. Bushee and Noe (2000) state that a decrease in information asymmetries would imply a reduction in periodic surprises about a firm and thus reduce its stock price volatility. Bravo

(2016) investigates financial forward-looking disclosure in particular and observes that it can indeed help to reduce stock volatility.

Nevertheless, disclosure might not only have positive effects. As a matter of fact, disclosure activities also involve direct and indirect costs (Jankensgård, 2014). While disclosure activities add additional costs to the company's balance sheet, they can also concern investors through an overwhelming amount or intensity. Both factors are able to affect the volatility of stock returns.

Humans have a tendency to be risk averse. In financial theory, investors attempt to avoid unnecessary risk, while unnecessary is subjective and perceived differently by individuals. Kahneman and Tversky (1979) demonstrate that losses are more powerful than gains. Risk Disclosure may magnify this tendency through the salience effect[1] (Jankensgård, Hoffmann & Rahmat, 2014). Since the focus of this thesis lies on downside risk disclosure, where negative circumstances are described, the concept of loss aversion may possibly be an influencing factor as well. For example, this phenomenon can induce companies to delay hazardous disclosure, e.g. the announcement of a profit collapse or imminent risk or affect investors' sentiments towards risk disclosure even stronger.

Current literature lacks evidence concerning the relationship between risk disclosure and stock return volatility. Since risk disclosure can influence information asymmetries and in turn information asymmetries can affect stock return volatility, there should also be a relationship between stock return volatility and risk disclosure. However, as previously described, risk disclosure can affect stock return volatility in two directions. Thus, we test the following hypotheses:

Hypothesis 1a: A higher level of risk disclosure leads to a reduction of stock return volatility.

Hypothesis 1b: A higher level of risk disclosure leads to an increase in stock return volatility.

[1] According to Taylor and Thompson (1982): ''salience refers to the phenomenon that when one's attention is differentially directed to one portion of the environment rather than to others, the information contained in that portion will receive disproportionate weighting in subsequent judgments.''

2.2.2 Risk Disclosure, Stock Return Volatility & the Effect of Reputation

"It takes many good deeds to build a good reputation,
and only one bad one to lose it."

Benjamin Franklin

In the following, we extend the first hypothesis by incorporating the effect of reputation. There are some arguments that explain why reputation has an effect on the impact of risk disclosure. Therefore, we expect that reputation might influence our first hypothesis.

Reputation can alter the credibility of disclosure. This can be explained by the effect of reputation on the emotional predisposition of individual investors and thus the way investors interpret disclosure (Helm, 2007).

Since corporate reputation embodies the perception of the firm's management quality, it can be expected to increase investors' confidence in a firm (Bravo, 2016; Hammond & Slocum, 1996). Also, the company's image may be considered as an intangible factor that determines investors' loyalty and trust (Helm, 2007). Resultantly, disclosure by a firm with a higher reputation might be perceived as more solid with a higher reliability (Schwarzkopf, 2007; Bravo, 2016).

However, in the special case of risk disclosure, a higher credibility through a better reputation might also cause the opposite effect. A good reputation does not act as a shield or buffer against any possible risks. Notwithstanding the focus of previous research on the beneficial aspects of a good reputation, some scholars claim that it might also be an encumbrance for the firm. Rhee and Haunschild (2006) specifically focus on the particular circumstance of severe automobile recalls. They state that a negative event in a firm with a high reputation is more noticeable and therefore also causes greater stakeholder attention. Relating this finding to risk disclosure, one would expect that even a release about risk information would have the same effect. Other previous scholars affirm that a high-reputation

organization can raise the expectations of stakeholders about the future behavior of the firm (Mishina, Dykes, Block & Pollock, 2010; Petkova, Wadhwa, Yao & Jain, 2014). Hence, a greater violation of expectations will take place, whenever a wrongdoing or a negative effect gets published by a company with a high reputation. Combining these findings, risk disclosure of a reputable firm might even create more adverse stakeholder reactions compared to other organizations without this intangible asset (Rhee & Haunschild, 2006; Schnietz & Epstein, 2005; Wade et al., 2006, Zavyalova et al., 2016). Certainly, this can be diluted by the fact, that reputable firms usually enjoy greater financial benefits and thus have a reserve in times of crisis (Black, Carnes & Richardson, 2000). Consequently, in this case, investors might be less concerned whenever they are informed about possible risks.

The above-mentioned arguments prove, that there should be a relationship between reputation and risk disclosure. Therefore, on condition that risk disclosure has an effect on stock return volatility individually, the inclusion of reputation should influence this upshot. Since we expect that the information published by reputable companies is more credible, this effect should be more intensive.

We were unable to find an existing study, which explores the influence of reputation on the impact of risk disclosure. However, a recent study by Bravo (2016) investigates the effect of reputation on the impact of forward-looking disclosure on stock return volatility. His results indicate that reputation in this context increases the effect. Since this finding vindicates the above-mentioned arguments, we expect that risk disclosure is affected by reputation in the same manner.

Related to the focal industry of this thesis, reputation is symbolized by the premium image (Hirsh, Hedlund, Schweizer, 2003). Consequently, the above-mentioned arguments relating to the credibility of the firm and the sentiments of investors should be applicable to premium manufacturers as well. However, given that the premium image does not only rest upon reputation but also extends the brand image by heritage and quality, investors might be more resistant against disclosure (de Mooji, 2004; JD Power, 2013). The investment decision for a stock

of a premium automotive manufacturer is probably rather based on enthusiasm for the brand instead of the performance or disclosure activities of the company. For this reason, the volatility of stock returns is expected to be less influenced by risk disclosure of companies with a premium image.

Since the role of corporate reputation and premium image on stock return volatility still remains an open research question, the following hypotheses are formulated:

Hypothesis 2a: The effect of risk disclosure on stock return volatility increases with firms who have a better reputation.

Hypothesis 2b: The effect of risk disclosure on stock return volatility decreases with firms who have a premium image.

3. Research Design

Before outlining our methodological approach, we introduce the time frame, sample, and utilized variables. The research is conducted using two different methods, a novel measure of text-based searches of annual reports as well as a manual investigation to validate the first method. This qualitative research is designed to further explore the relationship between stock return volatility and the level of risk disclosure.

3.1 Research Approach

We choose a quantitative approach since the aim of this study is to obtain a preferably objective view about the level of risk disclosure and its influence on stock return volatility. Surveys or interviews with investors, companies or analysts are more subjective, may contain self-selection bias and thus lead to less significant results.

3.2 Time Frame

During recent years, a lot of scandals have shaped the automotive industry and increased the request for transparency. Therefore, it is of particular interest to compare how the level of risk disclosure has changed within the last years. The oldest annual report, which was publicly accessible to the time of the study, was from 2010; the newest widely published annual report was from 2014. While organization's disclosure policies are usually constant over time (Abraham & Cox, 2007; Botosan, 1997; Hail, 2002), we expect that a change in the level of risk disclosure within 2010 and 2014 should be reflected in 2014 at the latest. Thus, we limit our analysis to only these two years, 2010 and 2014. Since the balance sheet dates and consequently also the publishing dates of the annual reports vary across the sample, we decide to use the publishing dates, which represent the main part of the fiscal year in 2010 and 2014 respectively. For example, Toyota has its balance sheet date on the 31st May, so the annual report published in May

2015 represents the fiscal year 2014 since the main part of the fiscal year lies in 2014.

3.3 Sample

To capture a reasonable data quality, companies with a comparable business risk are chosen. According to previous literature, the level of risk disclosure is influenced by both industry and size of a company (Beretta & Bozzolan, 2004). Therefore, we concentrate on companies within one specific industry and within a similar firm size.

The automotive industry is very heterogeneous, consisting of OEMs, automotive suppliers and car dealer with different business models and risks. While for example OEMs' business is driven by customer demand and sales financing, automotive suppliers rely on new technologies, innovation and orders from OEMs. In order to achieve more significant results, the focus of this thesis is therefore solely based on OEMs.

To surmount any bias related to geographical reasons or disclosure requirements, we do not focus on one specific country, but rather include OEMs worldwide.

Thus, we start the research process with all worldwide listed automotive manufacturers provided by Reuters' database as "Auto & Truck Manufacturer (NEC)" and "Electrical (Alternative) Vehicles". Out of these 424 companies, only 101 companies are public. To maximize comparability, we settle further requirements: a market capitalization of greater than 100,000,000 United States Dollars, "car manufacturing" as the main business, listed on an exchange during the whole considered time period, available annual reports in English and no insolvency during the considered time period. The final dataset, fulfilling all above-mentioned requirements, is composed of 21 companies. The regional distribution is as follows: 6x Japan, 4x Germany, 2x India, 2x Hong Kong, 2x China, 2x France, 1x Malaysia, 1x South Korea, 1x United States (see table 1).

	Company Name	Country of Domicile	Reporting Standard	Premium	Good Reputation*
1	Bayerische Motoren Werke AG	Germany	IFRS	premium	yes
2	Brilliance China Automotive Holdings Ltd	Hong Kong	Hong Kong Financial Reporting Standards	non-premium	no
3	Daimler AG	Germany	IFRS	premium	no
4	Dongfeng Motor Group Co Ltd	China (Mainland)	IFRS	non-premium	no
5	Ford Motor Co	United States	U.S. GAAP	non-premium	no
6	Fuji Heavy Industries Ltd	Japan	Japanese GAAP	non-premium	no
7	Geely Automobile Holdings Ltd	Hong Kong	Hong Kong Financial Reporting Standards	non-premium	no
8	Great Wall Motor Co Ltd	China (Mainland)	China Accounting Standards	non-premium	no
9	Honda Motor Co Ltd	Japan	U.S. GAAP	non-premium	yes
10	Hyundai Motor Co	South Korea	Korean International Financial Reporting Standards	non-premium	no
11	Mahindra and Mahindra Ltd	India	Indian GAAP	non-premium	no
12	Mazda Motor Corp	Japan	Japanese GAAP	non-premium	no
13	Nissan Motor Co Ltd	Japan	IFRS	non-premium	no
14	Peugeot SA	France	IFRS	non-premium	no
15	Porsche Automobil Holding SE	Germany	IFRS	premium	no
16	Renault SA	France	IFRS	non-premium	no
17	Suzuki Motor Corp	Japan	Japanese GAAP	non-premium	no
18	Tan Chong Motor Holdings Bhd	Malaysia	Malaysian Financial Reporting Standards	non-premium	no
19	Tata Motors Ltd	India	IFRS	non-premium	no
20	Toyota Motor Corp	Japan	U.S. GAAP	non-premium	yes
21	Volkswagen AG	Germany	IFRS	non-premium	yes

* measured by Fortune's World's Most Admired

Table 1. Sample List.

We are aware of limitations implicated by this small number of sample companies, but we give more weight to the aim of having a highly comparable sample. Since hand-collected data is a time-consuming task, also other researchers based their study on samples between 30 and 73 firms over a period of only one year, and got, despite this limitation, significant results (Abraham & Cox, 2007; Bravo, 2016).

3.4 Definition of Variables

3.4.1 The Dependent Variable: Stock Return Volatility (SRV)

While all independent variables are measured at the end of the year of 2010 and 2014, respectively, the observation periods for stock return volatility are downstreamed to capture the effect of the respective disclosed annual reports. To avoid the influence of changing market conditions and maximize comparability, the same time period is used for all firms. Since the companies have several disclosure dates for their annual reports, we use an overlapping period for all companies starting with the first day of the month, after the last firm disclosed the annual report 2010 and 2014, respectively. The length of the observation period is limited to six months, which should lead to significant results due to the

observation of daily data. A longer period is not possible since the disclosure of the last annual report 2014 was less than a year ago. We compute the volatility by squaring daily stock returns, summing the squared terms over all trading days in the observation period and finally taking the squared root of this sum.

3.4.2 The Independent Variable: Risk Disclosure (RiDi)

The analysis of the risk-related information is based on all narrative sections of the annual report, including the notes. Annual reports are chosen since they are established as an influential source of information for investors (Lang & Lundholm, 1993; Marston & Shrives, 1991). Moreover, annual report disclosure is highly correlated with other ways of communication, such as press releases or quarterly reports (Botosan, 1997; Lang & Lundholm, 1993), therefore limiting the disclosure measures to annual reports should not cause any substantial bias.[2] The annual reports from 2010 and 2014 were downloaded from the companies' websites.

3.4.2.1 Measure of Risk Disclosure

Prior research studies used several content analysis techniques to measure the quality and quantity of risk disclosure. While some studies identified risk disclosure by counting all sentences which contain the word "risk" (e.g. Woods & Reber, 2003), others measured the level of risk disclosure by looking for specific words and word combinations (e.g. Lundqvist & Vilhelmsson, 2015), made use of whole sentences as a unit of measure (Beretta & Bozzolan, 2004; Bravo, 2016; Celik et al., 2006) or investigated annual reports with a financial risk disclosure index (e.g. Jankensgård, Hoffmann & Rahmat, 2014).

Given that there is no other study, at least to the best of our knowledge, that has measured risk disclosure in particular in the automotive manufacturing industry, we create our own industry-specific risk disclosure index, which we label RiDi. In this RiDi we only concentrate on risks that are significant and specific to the

[2] We made one exception for Nissan's 2014 annual report, since it explicitly states, that all information about risks is disclosed in their *Current State of Risk Management Report*, thus, this report is also taken into consideration.

automotive manufacturing industry. Risks to which companies are exposed to in general like financial risk (e.g. currency, interest rate, exchange rate) or operational risks, are not integrated. Furthermore, very specific risks to which only a few companies of the sample are imperiled to (e.g. joint venture risks or hazards due to the company's scale) are excluded to enable every company to have the same disclosure opportunities and maximize the comparability of the results (Marston & Shrives, 1991).

The risk disclosure identified in the thesis are categorized using checklists of professional accountancy firms (KPMG, 2015; Ernst & Young, 2015; PWC, 2015), Moody's Investor's Service (2011) and several annual reports, press releases and newspapers to capture the most relevant risks that affect the automotive manufacturing industry. As a result, the following six dimensions of risks are used to reflect and measure the level of risk disclosure.

a. Seasonality & Cyclicality

The automotive industry is a highly cyclical industry, which is sensitive to its product cycles and seasonality of demand for these products. For example, risks like metal price volatility, the fragmentation of markets, lack of plant flexibility, component failure or manufacturing overcapacity put a lot of emphasis and pressure on the automotive manufacturers. On top of that, different events, which differ between the countries like biannual registration of vehicles in the UK, the introduction of new model year vehicles in the US or even summer/winter holidays also have an effect on the sales. The new model portfolio is usually an indicator of the financial cash flow of the company while any delays may cause significant losses.

b. Earnings & Cash Flow Volatility

Automotive manufacturers' earnings and cash flows are typically more volatile compared to many other industries due to the direct correlation of consumer sentiment and automobile sales. Earnings and cash flows are heavily influenced by macroeconomic trends, specific issues affecting auto manufacturers' product offering (transformation from the combustion engine to other alternatives, the

recent trend of driverless cars, the new business concept of car sharing), product development costs, and necessary capital requirements. Profitability usually reflects the degree of success a company has achieved with its business model. For automotive manufacturers, in particular, critical areas are amongst others: production efficiencies, the ability to maintain a beneficial relationship with suppliers and a certain market share or the quality of vehicles, which can be identified in warranty expenditures. Periodic cyclical downturns or other drawbacks can lead to a higher earnings and cash flow volatility, which might concern investors. Therefore, management's ability to control and, if possible, mitigate this volatility is of particular importance.

c. *Market Risk (geographical)*

The industry shows a high geographical concentration. Currently, the biggest markets in terms of sales are China, North America, and Europe. Automotive manufacturers' cash flows are mainly determined by the success in these key markets. Nevertheless, growth rates are stagnating or unstable. Thus, expectations for new demands rise from emerging markets, particularly Brazil, Russia, and India in order to increase revenue.

d. *Quality & Reputation Risk*

Product recalls (mandatory or voluntary) are a clear indicator of quality or even safety issues. In fact, they also have a large-scale impact on the company's operations, but especially on the image and its reputation.

e. *Risks from Financial Services Activities*

Most auto manufacturers operate captive finance activities while some even in their own subsidiaries, which support the sales of cars. This type of business requires additional access to capital, a strong capital base, and a solid liquidity profile. In the case of a captive finance subsidiary, automotive manufacturers, who are acting as a parent, usually provide financial support, thus increasing their credit risk.

f. Political & Regulatory Influences

The importance of the automobile industry to a country's industrial output and employment leads to significant political and regulatory attention. On the one hand, regulations on environmental issues, import limitations, product restrictions or sanctions can cause considerable challenges and costs for automotive manufacturers. On the other hand, because of the importance of its industry, automotive manufacturers are also able to receive important support in difficult times, for example tax incentives offered by governments (e.g. recently reduced purchase taxes on small-engine cars in China, European government incentives to retire older cars or the restructuring of General Motors and Chrysler).

By the use of our new industry-specific research design, we test the level of risk disclosure with two different methods (see appendix A).

For the first method, we begin with a text-based search in annual reports for particular words and word combinations, which are related to the six dimensions of our risk disclosure index. Since all risk dimensions are present in every sample company, we decide to give every dimension the same weight. If a company discloses at least one of the proposed formulations for the risk identification and the corresponding risk management in a risk dimension, it gets one point respectively. Resultantly, a maximum score of 12 points can be achieved.

To conduct several coding rules for the first method, four randomly selected annual reports (two premium and two non-premium) are selected. Using the established list of words and word combinations, we perform a trial run with all companies from the sample. Analyzing the results, we detect further possibilities of improvement and therefore modify the search list. The list, which is used for the final conduction, can be found in appendix A.

In order to evaluate the first method as a tool to capture risk disclosure as well as to extend the insight into risk disclosure in a more qualitative manner, we also conduct a second method; an in-depth, manual investigation of every annual report concerning the six risk dimensions. The main guiding principle is that the

disclosure about the different risks and their corresponding risk management must be useful input for investors to be able to assess the risk position of the company. The scoring is similar to the first measure. For each dimension, a company can get 0 points (no disclosure at all), 1 point (either disclosure of the risk or the corresponding risk management) or 2 points (both, the disclosure of the risk and its corresponding risk management). In contrast to method 1, a company, which does not disclose exactly the determined words and word combinations, also has a chance to get a point if it discloses the relevant content but in a different way than proposed.

3.4.2.3 Validity & Discussion of Measures

Comparing the results of each dimension, there is only a 24 percent level of accordance between the two methods. Reasons for this variance can be detected in both directions, without a specific tendency. Besides, there is also no trend recognizable between the dimensions of risk identification or risk management, meaning that we are not able to detect one method which is superior in terms of identifying risk or risk management (figure 1 & 2).

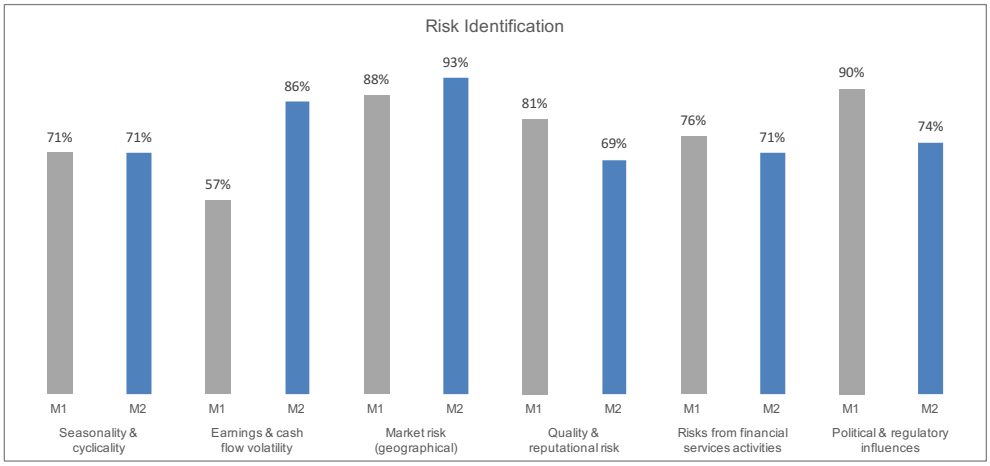


Figure 1. Risk Identification Score by Dimension & Measure.

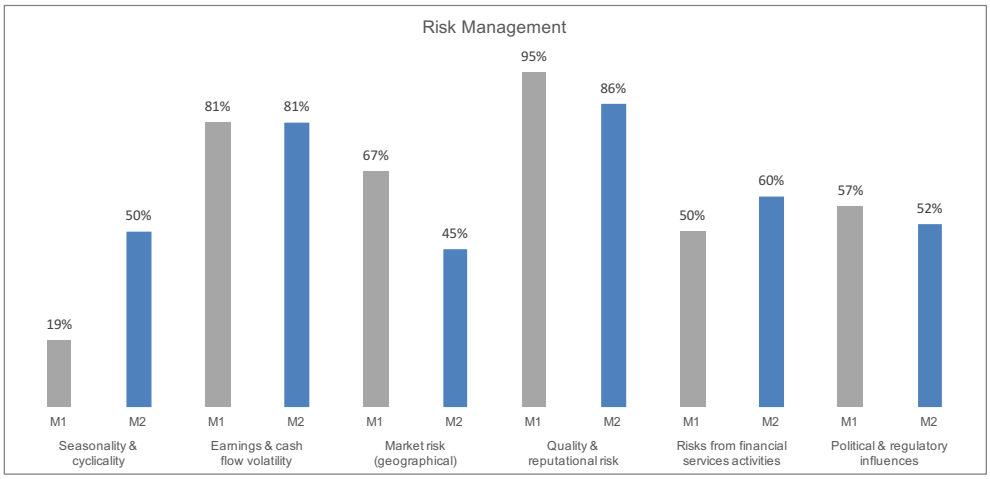


Figure 2. Risk Management Score by Dimension & Measure.

On the one hand, using the first method overestimates the score by counting words or wording combinations, which appear in a different context and do not relate to the topic in any way. On the other hand, the first method also underestimates the result, given that the companies use different synonyms or phrasings which are not included in the search list. Moreover, it is challenging to be able to predict possible words that are used in the six proposed risk dimensions, since firms tend to paraphrase sentences or use synonyms. The score of the first method is also diluted by the fact, that it counts words or word combinations, even though they are communicated in a negative context. An additional drawback of this method is, that the program is not able to detect any links to reports which are specifically announced to inform about risks (as seen with Nissan).

One can say that method 1 is able to detect the quantity and intensity of disclosure, but it also assesses “just talk” as a byproduct. While this type of measure has proven to be valuable in prior studies (Lundqvist & Vilhelmsson, 2015), in our specific case where risk disclosure is only aimed to be obtained in six specific dimensions, it does not confirm to be very accurate.

Even though we perceive that the chances of being more accurate are higher in the second method, it does have its flaws. Since this method is a manual investigation, it is influenced by our subjectiveness and by the fact that we might not be able to detect all possible content related to the dimensions.

Nevertheless, we decide to proceed with the results of method 2 to test our hypotheses, since we expect the weakness of this method to be weaker.

3.4.3 The Independent Variables: Reputation & Premium Image

With the intention of measuring corporate reputation, the "World's Most Admired" ranking by Fortune magazine is used as a proxy. This ranking is the result of an annual survey conducted by executives, directors and analysts which rates the companies based on different principles, ranging from social responsibility to investment criteria and has been used in previous literature to determine reputation (Bravo, 2016; Cao et. al., 2013). Reputation is used as a dummy variable which takes the value 1 if the firm is mentioned in the ranking and 0 otherwise.

In general, the automotive industry is segregated into different groups. However, this thesis only focuses on the differentiation between premium and non-premium. Out of the previously mentioned sample of 21 companies, the three firms namely BMW, Daimler and Porsche are considered premium. In this case, Premium Image is used as a dummy variable that takes a value 1 if the firm is a premium and 0 if the firm is a non-premium car manufacturer.

3.4.4 Control Variables

In order to measure the marginal impact of risk disclosure as accurately as possible, we also control for other factors that research has shown to be relevant for the volatility of stock returns:

Firm Size. Prior research found that small firms usually experience higher stock return volatility (Bushee & Noe, 2000; Bravo, 2016).

Book-to-market. Most empirical research found support, that firms with more growth options have lower stock return volatility, which indicates that there should

be a positive relation between book-to-market value and stock return volatility (Rubin et al., 2009; Jankensgård & Vilhelmsson, 2016).

Financial Leverage. The ratio of total debt to total assets is used as an indicator of the firm's risk. Due to the capital-intensive and cyclical nature of the auto manufacturing business, companies with excessive levels of underlying financial leverage may be at greater risk during economic downturns. According to the literature, leverage should be positively related to the stock return volatility (Bushee & Noe, 2000; Rajgopal & Venkatachalam, 2011).

Firm Performance. The literature predicts that a better firm performance leads to a lower stock return volatility (Rajgopal & Venkatachalam, 2011; Bravo, 2016).

Listing Age. Longer listed firms in stock markets have lower growth prospects and therefore are expected to have a lower stock return volatility (Chok & Sun, 2007; Xu & Malkiel, 2003).

Trading Volume. Previous empirical evidence suggests that trading volume is positively related to stock return volatility (Bushee & Noe, 2000; Bravo, 2016).

Dividend. Dividend is expected to be negatively correlated with stock return volatility since it reduces the chance of exploiting private information and thus increases the efficiency of price signals (Jankensgård & Vilhelmsson, 2016).

Table 2 summarizes all variables used in the study, including the methods of calculation and the corresponding data sources.

Variable	Definition	Data Source
Stock Return Volatility (SRV)	Average daily stock returns over a period of six months. Measured as the log of the standard deviation of daily stock returns.	Datastream (RI)
RiDi	Sum of points obtained on the defined risk dimensions in % of total.	Annual Reports, Risk Reports
Reputation	Dummy that takes the value one if the firm appears in the Fortune magazine ranking "world's 50 most admired companies"; 0 otherwise.	Website of Fortune: available at http://fortune.com/worlds-most-admired-companies/ [Accessed 13 May 2016]
Premium Image	Dummy that takes the value one if the firm is defined as "premium" and 0 otherwise.	Rosengarten, P. G. & Stürmer C. B. (2005). Premium Power, 2. Auflage, Weinheim: WILEY-VCH Verlag GmbH & Co. KGaA.
Firm Size	Log of Total Assets (year-end)	Datastream (WC02999)
Book-to-Market Value	Book value of equity divided by the market value of of equity (year-end)	Datastream (WC03501/WC08001)
Financial Leverage	Book value of debt divided by total assets (year-end)	Datastream (WC03255/ WC02999)
Performance	Return on Equity (year-end)	Datastream (WC01706/ WC03501)
Listing Age	Number of years since the date of the first IPO	Reuters
Trading Volume	Average monthly volume (in the considered time period) over the average shares outstanding (during this time period)	Datastream: Turnover by volume (VO) Common shares outstanding at the company's year end (WC 05301)
Dividend	Dummy that takes the value one if the firm pays a common dividend in the given year.	Datastream (WC04551)

Table 2. Description of Variables.

3.5 Empirical Model

The underlying data of this study has two dimensions; a cross-sectional and a time dimension. However, the intention to use different years is primary to detect changes in the level of risk disclosure, not to investigate changes in the effect of the level of risk disclosure on stock return volatility over the years. For this study, an estimation of panel data, for example through the "first difference" or "fixed effects" technique, would result in high errors or insignificant results since several independent variables are time independent. To improve the data quantity and quality, the authors decided to use a pooled Ordinary Least Square (OLS) estimation of the determinants of stock return volatility with cross-sectional data of the years 2010 and 2014.

To test our derived hypotheses, three statistical models are performed:

Model 1:

$$SRV = \alpha + \beta_1 RiDi + \beta_2 Listing\ Age + \beta_3 Trading\ Volume + \beta_4 Firm\ Size + \beta_5 Book - to - Market + \beta_6 Performance + \beta_7 Financial\ Leverage + \beta_8 Dividend + \varepsilon$$

Model 2:

$$SRV = \alpha + \beta_1 RiDi + \beta_2\, Reputation + \beta_3\, Listing\ Age + \beta_4\, Trading\ Volume + \beta_5\, Firm\ Size + \beta_6\, Book - to - Market + \beta_7\, Performance + \beta_8\, Financial\ Leverage + \beta_9\, Dividend + \varepsilon$$

Model 3:

$$SRV = \alpha + \beta_1 RiDi + \beta_2\, Premium\ Image + \beta_3\, Listing\ Age + \beta_4\, Trading\ Volume + \beta_5\, Firm\ Size + \beta_6\, Book - to - Market + \beta_7\, Performance + \beta_8\, Financial\ Leverage + \beta_9\, Dividend + \varepsilon$$

The coefficients $\beta_1, \dots, \beta_n$ measure the impact of each independent variable on the stock return volatility, ceteris paribus.

Model 1 is our basic model, which only includes our proposed control variables and RiDi as an independent variable. The intention of this model is to test hypotheses 1a and 1b, the relationship of risk disclosure and stock return volatility, disregarding any additional effects. Afterwards, hypotheses 2a and 2b are analyzed in two different settings, since reputation and a premium image are seen as substitutes. To investigate whether our suggestions in chapter 2.2.2. can be vindicated, we extend model 1 by adding reputation in model 2 and premium image in model 3 as independent variables, respectively.

4. Empirical Results

This chapter presents the outcomes of the tested hypotheses. Furthermore, it provides a discussion and possible explanations of the results and rounds off with a critical reflection on the assumptions and limitations.

4.1 Disclosure Index Scores

Table 3 displays the results of the disclosure index, which is categorized into the six previously described risk dimensions.

Overall, our results show a higher disclosure of risk identification compared to risk management. The most frequently cited risk categories in terms of risk identification and risk management are Market risk and Quality & reputational risk, respectively. Surprisingly, Market risk shows the lowest score in terms of risk management while Quality & reputational risk produces the lowest score in terms of risk identification.

Type of risk	# of companies disclose Identification	# of companies disclose Identification (%)	# of companies disclose Risk Management	# of companies disclose Risk Management (%)
Seasonality & cyclicality	30	71%	21	50%
Earnings & cash flow volatility	36	86%	34	81%
Market risk (geographical)	39	93%	19	45%
Quality & reputational risk	29	69%	36	86%
Risks from financial services activities	30	71%	25	60%
Political & regulatory influences	31	74%	22	52%

Table 3. Results of Risk Disclosure Index.

Analyzing the results of the disclosure index, one has to keep in mind, that the willingness to disclose information might be related to the individual significance and impact of the risk.

Figure 3 shows a comparison of the risk disclosure behavior between the years 2010 and 2014 in order to compare how the level of risk disclosure has changed within these years. It is clearly recognizable that the level of risk disclosure in these six dimensions never declined in 2014 compared to 2010. The highest increase between those two years in terms of identification and risk management

takes place in the dimensions Earnings & cash flow volatility and Seasonality & cyclicality, respectively.

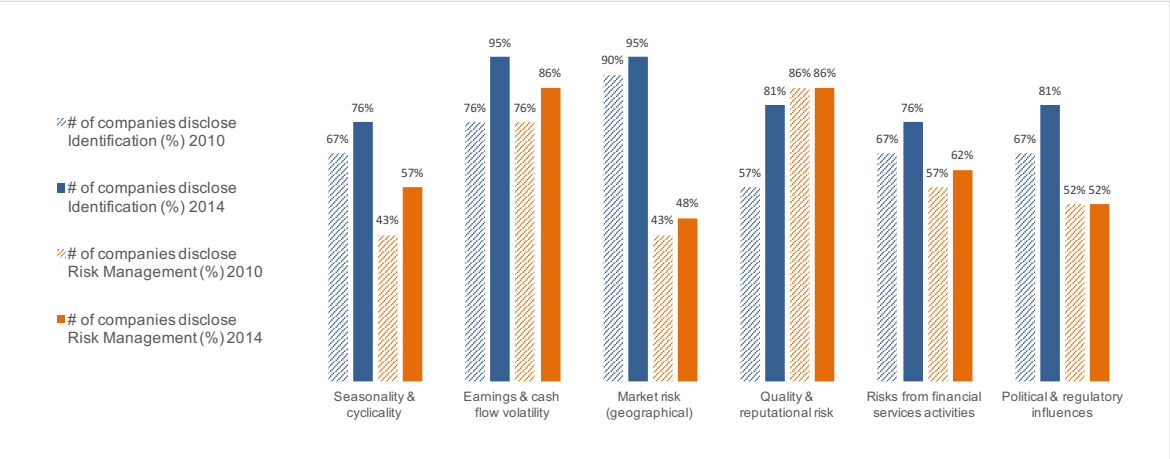


Figure 3. Comparison between 2010 & 2014.

The average score of both years for every company can be observed in figure 4. The three premium automotive manufacturers BMW, Daimler, and Porsche along with Nissan and VW score the highest (maximum of 12 points) average score in the years of 2010 and 2014. The two companies following, with an average score of 10.5, are Ford and Tata Motors, while Tang Chong obtains the average low score of 3.5.

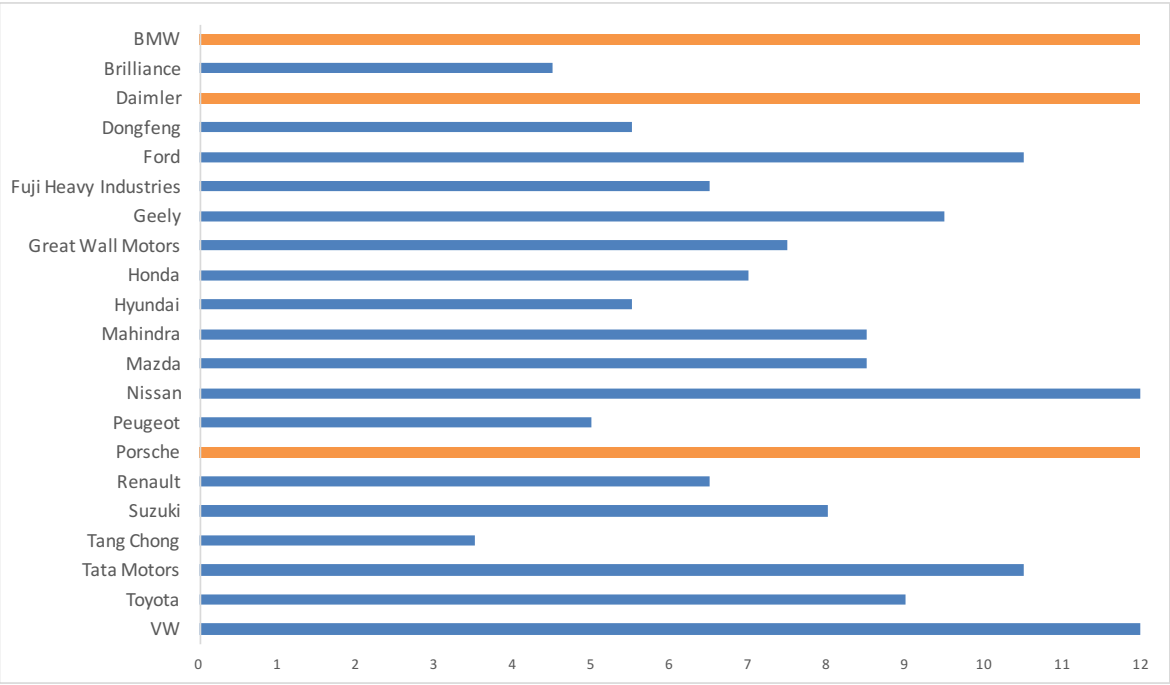


Figure 4. Average Score by Company.

4.2 Descriptive Statistics

Table 4 reports the descriptive statistics for all variables included in the different models. As we have already detected in the analysis of our disclosure index, there is a huge difference in the level of disclosed information about risks. While there are firms that achieved the maximum score, the firm with the lowest score only disclosed 8% of the defined risk and risk management information. On average, companies disclosed 70% of our demanded information. 17% of the companies are included in the reputation ranking, published by Fortune magazine, and 14% of the companies are premium. Generally, the variables are dispersed on an acceptable level without remarkable outliers.

Variable	Mean	Median	Maximum	Minimum	Std. Dev.
SRV	3.419	3.412	3.934	2.908	0.302
RiDi	0.70	0.67	1.00	0.08	0.25
Reputation	0.17	0.00	1.00	0.00	0.38
Premium Image	0.14	0.00	1.00	0.00	0.35
Listing Age	38	39	89	20	23
Trading Volume	83.374	65.831	320.344	0.968	80.320
Firm Size	7.595	7.609	8.621	5.948	0.706
Book-to-Market	0.827	0.737	2.145	-0.011	0.492
Performance	0.150	0.131	0.673	-0.128	0.130
Financial Leverage	0.691	0.365	8.271	0.000	1.715
Dividend	0.81	1.00	1.00	0.00	0.40

Table 4. Descriptive Statistics.

4.3 Correlations

Table 5 presents the correlations between all included variables in the different models. The highest correlation is -0.55 between trading volume and dividend. Since there is no correlation higher than 0.80 there is initial evidence that multicollinearity is not present.

	SRV	RiDi	Reputation	Premium Image	Listing Age	Trading Volume	Firm Size	Book-to-Market	Performance	Financial Leverage	Dividend
SRV	1.00										
RiDi	-0.06	1.00									
Reputation	-0.16	0.31	1.00								
Premium Image	0.08	0.50	0.18	1.00							
Listing Age	-0.47	0.28	0.54	0.08	1.00						
Trading Volume	0.17	-0.24	-0.33	-0.42	0.11	1.00					
Firm Size	-0.28	0.50	0.52	0.26	0.42	-0.01	1.00				
Book-to-Market	0.03	-0.04	0.09	0.09	0.13	0.00	0.30	1.00			
Performance	0.32	-0.05	-0.09	-0.10	-0.49	-0.10	-0.27	-0.51	1.00		
Financial Leverage	-0.24	-0.35	-0.07	-0.08	0.03	-0.20	-0.44	0.03	-0.12	1.00	
Dividend	-0.17	0.21	0.22	0.20	-0.02	-0.55	-0.01	-0.24	0.32	0.09	1.00

Table 5. Correlation Matrix.

As predicted and in line with other kinds of disclosure research, the level of risk disclosure is negatively correlated with stock return volatility. Also, reputation and stock return volatility show a negative association. Surprisingly, the correlation between premium image and stock return volatility is positive. This might be biased due to the small number of premium firms contained in the sample, which puts a higher weight onto the developments of individual companies. The correlations of the control variables and stock return volatility mainly agree with our expectations. The only two variables, which differ, are financial leverage and performance. Possible explanations for the divergences are provided in chapter 4.7. Since most of the results are in accordance with previous research and our expectations, the data we chose to estimate stock return volatility can be seen as valid.

4.4 Multivariate Analysis

In this section, we report our results from a multivariate analysis with stock return volatility as the dependent variable. We test our developed hypotheses with the three above-described models. To bypass the problem of heteroscedasticity all regressions are conducted using White's robust standards errors and covariance. Furthermore, stock return volatility is logarithmized to mitigate non-normality. Problems about multicollinearity and non-linearity are not present. Table 6 summarizes the results of the three models. Statistical significance at the 10%-, 5%- and 1%- level is denoted by *, **, *** respectively.

	Model 1	Model 2	Model 3
Intercept c	4.566 ***	5.184 ***	4.609 ***
RiDi	0.276 *	0.353 *	0.148
Reputation		0.376 **	
Premium Image			0.212
Listing Age	-0.004	-0.007 **	-0.004
Trading Volume	0.001	0.001 **	0.001
Firm Size	-0.181 **	-0.263 ***	-0.185 **
Book-to-Market	0.192 *	0.188 **	0.185 *
Performance	0.006	0.003	0.007
Financial Leverage	-0.048 **	-0.048 **	-0.049 **
Dividend	-0.102	-0.084	-0.096
R^2	0.446	0.538	0.485
Adjusted R^2	0.312	0.409	0.341
F (p-value)	3.325 ***	4.149 ***	3.354 ***

Table 6. Regression Analysis.

Model 1 only includes our selected control variables and RiDi to explain stock return volatility. The explanatory power of the model is 44.6%, which compares favorably with previous studies. In a first step, we look at the coefficient signs of all independent variables to proof whether previous research can be vindicated. The results are not entirely as expected. Whereas Firm Size, Listing Age, Trading Volume, Book-to-Market Value, and Dividend have the expected coefficient sign, the signs of Financial Leverage and Performance are contrary compared to previous research. Since there is a number of theories that intent to explain the development of stock return volatility, but no consensus for a fundamental understanding, divergences in these results can be anticipated. Stock return volatility depends on investors' sentiments, attitudes, and expectations; therefore, the historical numbers of Financial Leverage and Performance might not match with expectations that influence the stock return volatility. The variable RiDi is significant at the 10%-level and its coefficient sign positively associated with stock return volatility. As a result, hypothesis 1a has to be rejected, while hypothesis 1b is approved.

In Model 2, reputation is added as an independent variable to Model 1 to measure the complementary effect of risk disclosure and reputation on stock return volatility. In general, effects of combined variables are usually tested by adding an additional variable, calculated as the product of these two. Unfortunately, this procedure cannot be applied in our case, since our sample size is too small and

adding the product would cause multicollinearity and thus decrease the explanatory power of the model. Since there are other studies that solved this problem by interpreting the effect directly with the individual coefficients of the two variables (e.g. Bravo, 2016), we decided to proceed accordingly. The results of Model 2 confirm the proposed hypothesis 2a. Having a high reputation does indeed increase the effect of a higher level of risk disclosure on stock return volatility. The coefficient for risk disclosure increases from 0.276 to 0.353 and the adjusted R^2 extends from 31.2% to 40.9%. The relationship between both variables and the stock return volatility remains significant at the 10% level. With R^2 = 53.8%, Model 2 has the highest explanatory power of all considered models and the most significant control variables. As a result, we can state that risk disclosure and reputation jointly add explanatory power and play a supplementary role in the effect on stock return volatility.

Model 3 basically repeats model 2 but substitutes the variable reputation with premium image. The combined effect of disclosing risk information and having a premium image presents a lower increase of the stock return volatility compared to the effect of risk disclosure individually. Thus, model 3 does not support our hypothesis 2b. However, the results are insignificant, meaning that there is only little or no evidence for it.

All findings are further discussed in section 4.7.

4.5 Robustness

To check the robustness of our three models, we conduct two different tests.

In the first test, we transform the main independent variable RiDi into squared RiDi with the results presented in table 7. For all 3 models the transformation improves R^2 slightly. In Model 2, even the significance of the variable RiDi improves.

	Model 1	Model 1 (test)	Model 2	Model 2 (test)	Model 3	Model 3 (test)
Intercept c	4.566 ***	4.719 ***	5.184 ***	5.392 ***	4.609 ***	4.690 ***
RiDi	0.276 *		0.353 *		0.148	
RiDi^2		0.247 *		0.310 **		0.138
Reputation			0.376 **	0.387 **		
Premium Image					0.212	0.193
Listing Age	-0.004	-0.004	-0.007 **	-0.008 ***	-0.004	-0.004
Trading Volume	0.001	0.001	0.001 **	0.001 **	0.001	0.001
Firm Size	-0.181 **	-0.193 ***	-0.263 ***	-0.279 ***	-0.185 **	-0.190 **
Book-to-Market	0.192 *	0.190 *	0.188 **	0.184 **	0.185 *	0.184 *
Performance	0.006	0.006	0.003	0.002	0.007	0.006
Financial Leverage	-0.048 **	-0.052 **	-0.048 **	-0.053 ***	-0.049 **	-0.051 **
Dividend	-0.102	-0.096	-0.084	-0.075	-0.096	-0.092
R^2	0.446	0.459	0.538	0.556	0.485	0.488
Adjusted R^2	0.312	0.328	0.409	0.431	0.341	0.344
F (p-value)	3.325 ***	3.499 ***	4.149 ***	4.455 ***	3.354 ***	3.393 ***

* p-value < 0,1; ** p-value < 0,05; *** p-value < 0,01

Table 7. Robustness test 1: RiDi squared.

As a second robustness check, we conduct stepwise regressions, where we add control variables gradually. Tables 8 - 10 summarize the results. We start each model with excluding all control variables (step I). As one can see in the tables 8 - 10, the results explain stock return volatility only marginally (R^2 below 0.03) and are insignificant. The next steps show the more independent variables are added, the more R^2 and adjusted R^2 grow and the more RiDi becomes significant. The only variable that marginally impairs our results is the dummy variable “dividend” in step VII. However, we decide to include this variable since it may help to reduce the endogeneity problem (see chapter 4.6).

Model 1	I	II	III	IV	V	VI	VII	VIII (FINAL)
Intercept c	3.466 ***	3.599 ***	3.478 ***	4.021 ***	4.143 ***	3.973 ***	4.498 ***	4.566 ***
RiDi	-0.067	0.103	0.195	0.301 *	0.366 **	0.357 **	0.268 *	0.276 *
Listing Age		-0.007 ***	-0.007 ***	-0.006 ***	-0.007 ***	-0.005 **	-0.004	-0.004
Trading Volume			0.001 **	0.001 **	0.001 **	0.001 **	0.001	0.001
Firm Size				-0.086	-0.121 *	-0.125 *	-0.182 **	-0.181 **
Book-to-Market					0.120	0.191 *	0.202 *	0.192 *
Performance						0.006	0.005	0.006
Financial Leverage							-0.050 **	-0.048 **
Dividend								-0.102
R^2	0.003	0.230	0.293	0.319	0.352	0.388	0.436	0.446
Adjusted R^2	-0.022	0.191	0.237	0.246	0.262	0.283	0.320	0.312
F (p-value)	0.123	5.839 ***	5.248 ***	4.340 ***	3.907 ***	3.692 ***	3.753 ***	3.325 ***

* p-value < 0,1; ** p-value < 0,05; *** p-value < 0,01

Table 8. Robustness test 2: Model 1.

Model 2	I	II	III	IV	V	VI	VII	VIII (FINAL)
Intercept c	3.446 ***	3.631 ***	3.504 ***	4.549 ***	4.754 ***	4.620 ***	5.139 ***	5.184 ***
RiDi	-0.010	0.078	0.172	0.359 *	0.447 **	0.437 **	0.347 *	0.353 *
Reputation	-0.123	0.098	0.246	0.381 **	0.416 ***	0.384 **	0.382 **	0.376 **
Listing Age		-0.007 ***	-0.009 ***	0.009 ***	-0.010 ***	-0.009 ***	-0.008 ***	-0.007 **
Trading Volume			0.001 ***	0.002 ***	0.002 ***	0.002 ***	0.002 ***	0.001 **
Firm Size				-0.162 **	-0.214 ***	-0.209 **	0.265 ***	-0.263 ***
Book-to-Market					0.151 **	0.184 **	0.195 **	0.188 **
Performance						0.003	0.002	0.003
Financial Leverage							-0.049 **	-0.048 **
Dividend								-0.084
R^2	0.024	0.241	0.346	0.425	0.476	0.484	0.532	0.538
Adjusted R^2	-0.026	0.181	0.275	0.345	0.386	0.378	0.418	0.409
F (p-value)	0.487	4.015 **	4.888 ***	5.318 ***	5.293 ***	4.556 ***	4.680 ***	4.149 ***

* p-value < 0,1; ** p-value < 0,05; *** p-value < 0,01

Table 9. Robustness test 2: Model 2.

Model 3	I	II	III	IV	V	VI	VII	VIII (FINAL)
Intercept c	3.506 ***	3.627 ***	3.508 ***	4.101 ***	4.202 ***	4.019 ***	4.547 ***	4.609 ***
RiDi	-0.149	0.043	0.078	0.185	0.253	0.229	0.138	0.148
Premium Image	0.117	0.083	0.196	0.210	0.190	0.214	0.216	0.212
Listing Age		-0.006 ***	-0.007 ***	-0.006 ***	-0.006 ***	-0.005 **	-0.004	-0.004
Trading Volume			0.001 **	0.001 **	0.001 ***	0.001 ***	0.001 *	0.001
Firm Size				-0.093	-0.123 **	-0.129 **	-0.186 **	-0.185 **
Book-to-Market					0.106	0.183 *	0.194 *	0.185 *
Performance						0.007	0.006	0.007
Financial Leverage							-0.050 **	-0.049 **
Dividend								-0.096
R^2	0.017	0.238	0.328	0.359	0.384	0.428	0.476	0.485
Adjusted R^2	-0.033	0.177	0.255	0.269	0.278	0.310	0.349	0.341
F (p-value)	0.339	3.947 **	4.505 ***	4.025 ***	3.630 ***	3.628 ***	3.752 ***	3.354 ***

* p-value < 0,1; ** p-value < 0,05; *** p-value < 0,01

Table 10. Robustness test 2: Model 3.

In summary, the presented results show that our final models are robust to transformations and several specifications with regard to the relationship between stock return volatility, risk disclosure and the effect of reputation and premium image.

4.6 Endogeneity

A potential problem in estimating these results is endogeneity, which occurs when one of the explanatory variables correlates with the error term. Previous research assumed risk disclosure, in particular, to be most likely endogenous (Dobler, 2008; Jorgensen & Kirschenheiter, 2003; Jankensgård, Hoffmann & Rahmat, 2014). In our case endogeneity might be caused by measurement errors in our variable RiDi

or unobserved variables, which correlate with one of the independent variables. To at least mitigate this possible problem, we introduced the dummy variable “dividend”. Paying a dividend influences stock return volatility independent from all other included explanatory variables. Dividend can be seen as an “anchor”, which replaces all other information and leads to everything else becoming less volatile. The chance to exploit private information is reduced and thus price signals might be more efficient for firms paying a dividend.

4.7 Discussion of Results

The outcomes indicate that there is a significant and positive relationship between risk disclosure and stock return volatility. Regardless of firm-specific characteristics, companies that disclose more risk information tend to have a higher stock return volatility. Thus, hypothesis 1b is supported and the corresponding arguments confirmed whereas hypothesis 1a is rejected. In the following, we will discuss various interpretations of our results.

It seems that a higher level of risk disclosure leads to more uncertainty among investors and thus increases stock return volatility. While it is generally viewed in other studies that disclosure mitigates stock return volatility (Botosan, 1997, 2006; Bravo, 2016), this study gives evidence that risk disclosure, in particular from car manufacturers, produces the opposite. One possible explanation might be, that the already mentioned salience effect (Taylor & Thompson, 1982) is in fact present. The mere mentioning of risk, even though it is intending to restore confidence, may lead to an intensified risk awareness. Steering the focus to the automotive industry, product recalls and safety risks might even have a more prominent influence since they represent a hazard with a more serious, life-threatening impact compared to other industries. Another line of explanation may rest upon the fact that more disclosure about risks worries investors instead of letting them feel better informed due to the intrinsic complexity. A current debate broaches the issue of ‘clutter’ or excessive disclosure and concludes that investors have trouble to make sense of risk disclosure since they suffer from ‘information overload’ (CFA Institute, 2011; ERAG, 2012).

Furthermore, we find that reputation increases the effect of risk disclosures on stock return volatility. The effect of reputation on stock return volatility long remained unclear for academics (Gök & Özkaya, 2011), until Bravo (2016) discovered that reputation helps to reduce investor's uncertainty and therefore positively influences stock return volatility. However, our study presents the opposite. A higher reputation leads to a higher stock return volatility and therefore higher uncertainty. This supports our hypothesis 2a that disclosure of companies with a better reputation is more credible. In fact, a possible explanation might be, that a higher reputation leads to more attention combined with higher expectations. Thus, investors might be more sensitive. Since particularly the car manufacturing industry has experienced a lot of scandals during the last years, investors might be also exceptionally sensitive. Nevertheless, our findings might hold for other industries as well. So, there is still a need for further research to investigate the effect of reputation on stock return volatility more in depth.

Finally, our prediction about the impact of being a premium automotive manufacturer in hypothesis 2b does not reach statistical significance. However, there seems to be a trend which supports our assumption that having a premium image lowers the effect due to its loyal investors. While scandals and public recall reactions can quickly harm the quality reputation and therefore the overall reputation of a brand, the results indicate that premium brands are perceived as more stable as previously assumed. Nevertheless, due to the insignificant results, a meaningful conclusion cannot be drawn.

4.8 Research Limitations

While writing our thesis we encountered a number of limitations that impacted on the breadth of our results and have to be taken into consideration.

First of all, this study assumes, that investors solely base their decisions on publicly available information. Direct contact to the firm's management and the possibility to get more detailed information about the risk management is not given. Furthermore, it is solely based on annual reports, thus ignoring other

possible forms to communicate, e.g. interim reports, quarterly reports or press releases. According to Arvidsson (2012), the new age of technology opens up new possibilities to communicate like web pages, webcasts, and e-mails, which might in reality perceived to be more efficient and thus preferred to traditional annual reports.

Another overarching concern in a content analysis is the possibility of erroneous assumptions that the quantity of the risks being disclosed is used as a proxy for the quality of disclosure of the firm. Nevertheless, we do not strive to evaluate the quality of risk disclosure, but rather test the hypotheses set out above.

Furthermore, the above analysis might be composed of inadequacies due to the fact that the sample size is comparatively small, attributable to the focus on automotive manufacturers. However, increasing the size of the sample is not possible in our case without reducing comparability. The common drawback of a small size also arises in connection with data that has been collected by hand in a very time-consuming process.

Finally, a potential weakness of cross-sectional data, in general, is the problem of unobserved heterogeneity, which cannot be diminished by using fixed effects.

5. Conclusion

This chapter concludes our master thesis by summarizing the results and giving suggestions for future research.

The aim of this thesis was to measure the level of risk disclosure, as well as to investigate its effect on stock return volatility in the automotive manufacturing industry. This industry was chosen not only to maximize comparability but also to show the effect of risk disclosure in this high-risk setting. While previous research investigated the relationship between disclosure in general or forward-looking information and stock return volatility, we are, to the best of our knowledge, the first who explored the corresponding effect of risk disclosure.

The main finding of this thesis is that risk disclosure is positively related to the volatility of stock returns, which is contrary to prior research of other kinds of disclosure and thus signals the specific feature of risk disclosure. According to the literature, the positive relationship can be explained by a psychological phenomenon, which gives more weight to investors' concern than to the advantage of a lower information asymmetry. This finding might be helpful for managers who design disclosure policies to influence investors.

This study also demonstrates a significant impact of reputation on the effect of risk disclosure on stock return volatility. Thus, companies with a good reputation should disclose risk information cautiously in order not to jeopardize their reputation.

Unfortunately, we were not able to find a significant evidence for an effect of a premium image. The insignificant results show the tendency that a premium image rather counteracts the effect of risk disclosure on stock return volatility, which would support the theory that companies with a premium image benefit from loyal investors. Given that insignificant results do not allow to draw a final conclusion, this issue still remains an open research question and gives an impulse for future investigations.

Overall, our findings are an interesting starting point for future research. Since this study only focuses on one specific industry, general conclusions cannot be made. It would be of special interest to investigate the effect on other industries as well. Furthermore, we did not incorporate geographical differences in the behavior of investors. Since our sample includes companies worldwide, the effect of risk disclosure on stock return volatility might also be influenced by geographically conditioned expectations, needs, and attitudes of investors.

References

Abraham, S., & Cox, P. (2007). Analysing the determinants of narrative risk information in UK FTSE 100 annual reports, *The British Accounting Review*, vol. 39, no. 3, pp. 227-248

Archel, P., Husillos, J., Larrinaga, C., & Spence, C. (2009). Social disclosure, legitimacy theory and the role of the state, *Accounting, Auditing & Accountability Journal*, vol. 22, no. 8, pp.1284–1307

Arvidsson, S. (2012). The corporate communication process between listed companies and financial analysts: A focus on trends and challenges, *Corporate Communications: An International Journal,* vol. 17, no. 2, pp. 98-112

Beretta S., & Bozzolan S. (2004). A framework for the analysis of firm risk communication, *The International Journal of Accounting*, vol. 39, no. 3, pp. 265-288

Beyer, A., Cohen, D. A., & Beverly, R. W. (2010). The financial reporting environment. Review of the recent literature*, Journal of Accounting and Economics*, vol. 50, no. 2–3, pp. 296–343

Black, E. L., Carnes, D. A., & Richardson, V.J. (2000). The market valuation of corporate reputation, *Corporate Reputation Review*, vol. 3, pp. 21-31

Botosan, C. (1997). Disclosure Level and the Cost of Equity Capital, *The Accounting Review*, vol. 72, pp. 323-350

Botosan, C. (2006). Disclosure and Cost of Equity Capital: What Do We Know?, *Accounting and Business Research*, International Accounting Policy Forum, pp. 31-40

Bravo, F. (2016). Forward-looking disclosure and corporate reputation as mechanisms to reduce stock return volatility, *Spanish Accounting Review*, vol. 19, no. 1, pp. 122-131

Bushee, B., & Noe, C. (2000). Corporate disclosure practices, institutional investors, and stock return volatility, *Journal of Accounting Research*, vol. 38, pp. 171–202

Cao, Y., Cassell, C. A., Myers, L. A., & Omer, T. C. (2013), Does Company Reputation Matter for Voluntary Disclosure Quality? Evidence from Management Earnings Forecasts, working paper. Available at: http://dx.doi.org/10.2139/ssrn. 2034378 [Accessed 12 April 2016]

Celik, O., Ecer, A., & Karabacak, H. (2006). Disclosure of forward looking information: Evidence from listed companies on Istanbul Stock Exchange (ISE), *Investment, Management and Financial Innovations*, vol. 3, no. 2, pp. 197–216

Chok, J.I., & Sun, Q. (2007). Determinants of idiosyncratic volatility for biotech IPO firms, *Financial Management*, vol. 36, no. 4, pp. 107-122

Cormier, D., Ledoux, M. J., Magnan, M., & Aerts, W. (2010). Corporate governance and information asymmetry between managers and investors, *Corporate Governance. The International Journal of Business in Society*, vol. 10, no.5, pp. 574–589

De Mooji, M. (2004). Consumer behavior and culture, London: Sage.

Diamond, D., & Verrecchia, R. (1991). Disclosure, liquidity and the cost of capital, *Journal of Finance*, vol. 46, pp. 392-413

Dobler, M. (2008). Incentives for risk reporting – A Discretionary Disclosure and Cheap Talk Approach. *The International Journal of Accounting,* vol. 43, pp. 184-206

Ernst & Young (2015). International GAAP Disclosure Checklist. Available at: http://www.ey.com/Publication/vwLUAssets/EY-international-gaap-disclosure-checklist-28-february-2015/$FILE/EY-international-gaap-disclosure-checklist-28-february-2015.pdf [Accessed 2 May 2016]

Easley, D., & O'Hara, M. (2004). Information and the cost of capital, *Journal of Finance*, vol. 59, no. 4, pp. 1553–1583

Emm, E. E., Gay, G. D., & Lin, C. M. (2007). Choices and Best Practice in Corporate Risk Management Disclosure, *Journal of Applied Corporate Finance*, vol. 19, pp. 17-28

ERAG (European Reporting Advisory Group, 2012). Towards a Disclosure Framework for the Notes, working paper

Ganguin, B., & Bilardello, J. (2005). Fundamentals of Corporate Credit Analysis, Sydney: McGraw-Hill

Gök, O., & Özkaya, H. (2011). Does corporate reputation improve stock performance in an emerging economy? Evidence from Turkey, *Corporate Reputation Review,* vol. 14, no. 1, pp. 53-61

Hail, L. (2002). The impact of voluntary corporate disclosures on the ex-ante cost of capital for Swiss firms, *European Accounting Review*, vol. 11, no. 4, pp. 741-773

Hammond, S. A., & Slocum, J. W. (1996). The impact of prior firm financial performance on subsequent corporate reputation, *Journal of Business Ethics*, vol. 15, no. 2, pp. 159–165

Helm, S. (2007). The role of corporate reputation in determining investor satisfaction and loyalty, *Corporate Reputation Review*, vol. 10, pp. 22–37

Hirsh, E., Hedlund, S., & Schweizer, M. (2003). Reality is Perception: The Truth about Car Brands. *strategy+business,* Fall 2003, no. 32. Available at: http://www.strategy-business.com/article/03302?gko=fbb50 [Accessed 14 April 2016]

Jankensgård, H. (2014). A Tale of Beauties and Beasts: Testing the Optimal Disclosure Hypothesis, working paper, Lund University School of Economics and Management.

Jankensgård, H., Alviniussen, A., & Oxelheim, L. (2016). Why FX Risk Management Is Broken and What Boards Need to Know to Fix It, *Journal of Applied Corporate Finance*, vol. 28, no. 1, pp. 61-76

Jankensgård, H., Hoffmann, K., & Rahmat, D. (2014). Derivative Usage, Risk Disclosure, and Firm Value, *Journal of Accounting and Finance,* vol. 14, no 5, pp. 159-174

Jankensgård, H., & Vilhelmsson, A. (2016). Ownership Determinants of Stock Return Volatility, working paper, Lund University School of Economics and Management

J.D. Power (2013). Top 10 Reasons Why Car Buyers Choose a Specific Vehicle Model. Available at: http://www.jdpower.com/cars/articles/car-news/top-10-reasons-why-car-buyers-choose-specific-vehicle-model [Accessed 26 April 2016]

Jensen, M. C., & Meckling, W. H. (1976). Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure, *Journal of Financial Economics*, October, vol. 3, no. 4, pp. 305-360

Jorgensen, B., & Kirschenheiter, M. (2003). Discretionary Risk Disclosures, *The Accounting Review*, vol. 78, pp. 449-469

Johansson, S., & Thörnberg, S. (2011). Risk Disclosures in Listed Companies: Exploring the Swedish Context. Available at: http://www.uppsatser.se/uppsats/b4af2325f2/ [Accessed 24 March 2016]

Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk, *Econometrica*, vol. 47, pp. 263-291

KPMG (2015). Guide to annual financial statements - Disclosure checklist. Available at: https://home.kpmg.com/content/dam/kpmg/pdf/2015/09/isg-disclosure-checklist-20150910.pdf [Accessed 2 May 2016]

Lajili, K., & Zéghal, D. (2005). A Content Analysis of Risk Management Disclosures in Canadian Annual Reports, *Canadian Journal of Administrative Sciences*, vol. 22, no.2, pp. 125-142

Lang, M., & Lundholm, R. (1993). Cross-sectional determinants of analyst ratings of corporate disclosures, Journal of Accounting Research, vol. 31, no. 2, pp. 246–271

Lang, M., & Lundholm, R. (1996). Corporate disclosure policy and analyst behaviour, *The Accounting Review*, vol. 71, no. 4, pp. 467–492

Linsley, P.M., & Shrives, P.J. (2006). Risk Reporting: A study of risk disclosures in the annual reports of UK companies, *The British Accounting Review*, vol. 38, pp. 387–404

Leuz, C., & Verrecchia, R. (2000). The economics consequences of increased disclosure. *Journal of Accounting Research*, vol. 38, pp. 91–124

Leuz, Z., & Wysocki, P. (2008). Economic consequences of financial reporting and disclosure regulation: A review and suggestions for future research, working paper

Lundqvist, S., & Vilhelmsson, A. (2015). Risk Management Quality and Credit Risk, working paper, Lund University School of Economics and Management.

Lupton, D. (2013). Risk. London: Routledge

Marston, C. L., & Shrives, P. J. (1991). The use of disclosure indices in accounting research: A review article, *The British Accounting Review*, vol. 23, pp. 195-210

Michelon, G. (2013). Sustainability disclosure and reputation: A comparative study, *Corporate Reputation Review*, vol. 14, no. 2, pp. 79–96

Mishina, Y., Dykes, B.J., Block, E. S., & Pollock, T.G. (2010). Why "good" firms do bad things: The effect of high aspirations, high expectations, and prominence on the incidence of corporate illegality, *Academy of Management Journal*, vol. 53, pp. 701-722

Moody's Investor's Service (2011). Rating Methodology - Global Automobile Manufacturer Industry. Available at: https://www.moodys.com/researchandratings/rating-methodologies/003006001/methodology/rating-methodologies/003006001/4294966628%204294965566/4294966623/0/0/-/0/-/-/-/-1/-/-/-/en/global/pdf/-/rra [Accessed 12 March 2016]

Nagar, V., Nanda, D., & Wysocki, P. (2003). Discretionary disclosure and stock-based incentives, *Journal of Accounting and Economics,* vol. 34, pp. 283-309

Oxelheim, L. (1999). Applying "MUST" analysis and the role of government in CI, *Competitive Intelligence Review*, vol. 10, pp. 65-73

Ozenbas, D., & San Vicente Portes, L. (2013). Stock price volatility and firm capital structure decisions during the financial crisis, *The Journal of American Academy of Business*, Cambridge, vol. 19, no. 2, pp. 88–95

PWC (2015). IFRS and US GAAP: similarities and differences. Available at: http://www.pwc.com/us/en/cfodirect/assets/pdf/accounting-guides/pwc-ifrs-us-gaap-similarities-and-differences-2015.pdf [Accessed 2 May 2016]

Petkova, A.P., Wadhwa, A., Yao, X., & Jain S. (2014). Reputation and decision making under ambiguity: A study of U.S. venture capital firms' investments in the clean energy sector, *Academy of Management Journal,* vol. 57, pp. 422-448

Rajgopal, S., & Venkatachalam, M. (2011). Financial reporting quality and idiosyncratic return volatility. *Journal of Accounting and Economics*, vol. 51, no. 1–2, pp. 1–20

Rhee, M., & Haunschild, P. R. (2006). The Liability of Good Reputation: A Study of Product Recalls in the U.S: Automobile Industry, *Organization Science*, vol. 17, pp. 101-117

Rosengarten, P. G. & Stürmer C. B. (2005). Premium Power, 2. Auflage, Weinheim: WILEY-VCH Verlag GmbH & Co. KGaA

Schnietz, K. E., & Epstein, M. J. (2005). Exploring the financial value of a reputation for corporate social responsibility during a crisis, *Corporate Reputation Review*, vol. 7, pp. 327-345

Schwarzkopf, D. L. (2007). Investors' attitudes toward source credibility, *Managerial Auditing Journal*, vol. 22, no. 1, pp. 18–33

Shleifer, A., & Vishny, R. (1989). Management entrenchment: the case of manager-specific investments, *Journal of Financial Economics*, vol. 25, pp. 123-139

Rubin, A., & Smith, D. R. (2009). Institutional ownership, volatility and dividends, *Journal of Banking & Finance,* vol. 33, no. 4, pp. 627-639

Taylor, S., & Thompson, S. (1982). Stalking the Elusive Vividness Effect, *Psychological Review,* vol. 89, pp. 155-181

The CFA Institute (2011). User Perspectives on Financial Instrument Risk Disclosures Under International Financial Reporting Standards, discussion paper

Thompson, D., & Weissmann, J. (2012). The Cheapest Generation. Why Millennials aren't buying cars or houses, and what that means for the economy.

Venkatachalam, M. (2000). Discussion of corporate disclosure practices, institutional investors, and stock return volatility, *Journal of Accounting Research*, vol. 38, pp. 203–207

Wade, J. B., Porac, J. F., Pollock, T. G., & Graffin, S. D. (2006). The burden of celebrity: The impact of CEO certification contests on CEO pay and performance, *Academy of Management Journal*, vol. 49, pp. 643–660

Woods, M., & Reber, B. (2003). A comparison of UK and German reporting practice in respect of disclosure post GAS 5, unpublished conference paper, 6th Financial Reporting and Business Communication Conference, Cardiff Business School, Cardiff

Xu, Y., & Malkiel, B. G. (2003). Investigating the behaviour of idiosyncratic volatility, *Journal of Business*, vol. 76, no. 4, pp. 613-644

Zavyalova, A., Pfarrer, M. D., Reger, R. K., & Hubbard, T. D. (2016). Reputation as a benefit and a burden? How Stakeholders' organizational identification affects the role of reputation following a negative event, *Academy of Management Journal*, vol. 59, no. 1, pp. 253-276

Appendix

Appendix A – Risk Disclosure Index

1. Seasonality & cyclicality

Risk Identification

Measure 1

	within +/- x characters
product+cycle+risk	200
product+lifecycle+risk	200
product+life+cycle+risk	200
product+interrupt	200
product+disrupt	200
production+problem	200
segment+cycle+risk	200
vehicle+life+cycle	200
supply+chain+disrupt	200
production+risk	200
season+impact	200
season+risk	200

Measure 2

Information on product life cycle, e.g. maturity of product life cycle
Information on supply risk, e.g. supplier delivery risk, concentration of suppliers
Information on cyclical fluctuations
Information on production risk, e.g. production stoppage, downtimes, manufacturing equipment breakdowns
Information on late availability

Risk Management

	within +/- x characters
additional+site	200
multi-site+basis	200
backup+plan	200
supplier+preselection	200
supplier+pre-selection	200
alternative+raw+material	200

Information on measures to boost sales/ overrun competitors in case of delayed product availabilty, e.g. actions designed to strenghten brand awareness and loyalty, sales and marketing campaigns, financial incentives

Information on "backup-plans" for production disruptions, e.g. build models at additional sites, spare parts management on multi-site basis, alternative transportation, supplier preselection process, raw materials management procedures, use alternative raw materials as substitute

2. Earnings and cash flow volatility

Risk Identification

Measure 1

	within +/- x characters
influence+earning	200
influence+cash+flow	200
volatil+material	200
competit+risk	200
margin+risk	200
volatil+earning	200
volatil+cash+flow+risk	200

Measure 2

Information on risks that have a significant influence on the earnings and cash flows of the company e.g. volatility of raw material prices

Risk Management

	within +/- x characters
recovery+plan	200
contingency+plan	200
#cash flow at risk	direct
#cash-flow-at-risk	direct
cash-flow-at-risk	200
#value at risk	direct
#value-at-risk	direct
value-at-risk	200
risk+capacity	200
derivative+hedging	200
scenario+impact+earnings	200
scenario+impact+cash+flow	200

Quantification of the risks e.g. cluster the impact into "low", "medium" and "high"
Information about scenario analysis
Information about applying a cash-flow- or value-at-risk-approach

3. Market risk (geographical)

Risk Identification

Measure 1

	within +/- x characters
economic+risk	200
macroeconomic+risk	200
economic+uncertaint	200
economic+influence+sales	200
key+sales+market	200
emerging+market+risk	200
develop+country+risk	200
America+risk	200
Europe+risk	200
China+risk	200
Japan+risk	200
Brazil+risk	200
Russia+risk	200
India+risk	200

Measure 2

Information about world economy/market behavior/demand
Information about US economy/market behavior/demand
Information about the EU economy/market behavior/demand
Information about the Japan economy/market behavior/demand
Information about the Chinese economy/market behavior/demand
Information about the economy/market behavior/demand of emerging markets (e.g. India, Russia, Brazil)

Risk Management

	within +/- x characters
market+risk+scenario	200
forecast+development+market	200
analyze+market+risk	200
monitor+market+risk	200
region+diversi	200
geograph+diversi	200
production+diversi	200
production+shift	200

Information about the probability of occurrence
Information about the impact
Information about possible scenarios
Continously analyzing and monitoring of markets
Information about applying a cash-flow- or value-at-risk-approach
Alternative production locations

4. Quality and reputational risk

Risk Identification

Measure 1

	within +/- x characters
recall	200
reputation+risk	200
image+risk	200
safety+risk	200
antitrust+risk	200
warranty+claim	200
quality+risk	200
recall+impact	200
	200

Measure 2

Information on the risk of product recalls
Information on the quantity of product recalls e.g. quantification by adopting provisions for product warranties depending on "news"
Information about warranty reserves

Risk Management

	within +/- x characters
product+quality+review	200
product+quality+control	200
product+quality+management	200
meet+quality+standard	200
rais+quality+standard	200
maintain+product+quality	200
improve+product+quality	200
maintain+customer+satisfaction	200
improve+customer+satisfaction	200
impact+reputation	200
safety+campaign	200
minimise+warranty+claim	200
minimize+warranty+claim	200
product+warranties+provision	200

Measure 2

Information on measures the company takes to maintain/improve product quality and customer satisfaction

5. Risks from financial services activities

Risk Identification

Measure 1

	within +/- x characters
leas+risk	200
residual+value+risk	200
risk+financial+service	200
customer+insolven	200
customer+default+risk	200
refinancing+cost+risk	200

Measure 2

Information on risks relating to leasing and sales financing
Information about the probability of occurrence
Information about the impact

Risk Management

	within +/- x characters
creditworthiness+check	200
minimise+risk+residual+value	200
minimize+risk+residual+value	200
customer+scoring	200
provision+litigation	200
credit+history+customer	200
credit+history+consumer	200

Measure 2

Information on measures to mitigate credit risk e.g. Creditworthiness checks, scoring of customers, collateralization of receivables

6. Political and regulatory influences

Risk Identification

Measure 1

	within +/- x characters
politic+risk	200
politic+uncertaint	200
regul+risk	200
new+regul	200
risk+change+law	200

Measure 2

Information on new law influencing the company e.g. taxes, trade agreements
Information on new regulations influencing the company e.g. emissions, fuel consumption and safety
Information about the probability of occurrence
Information about the impact

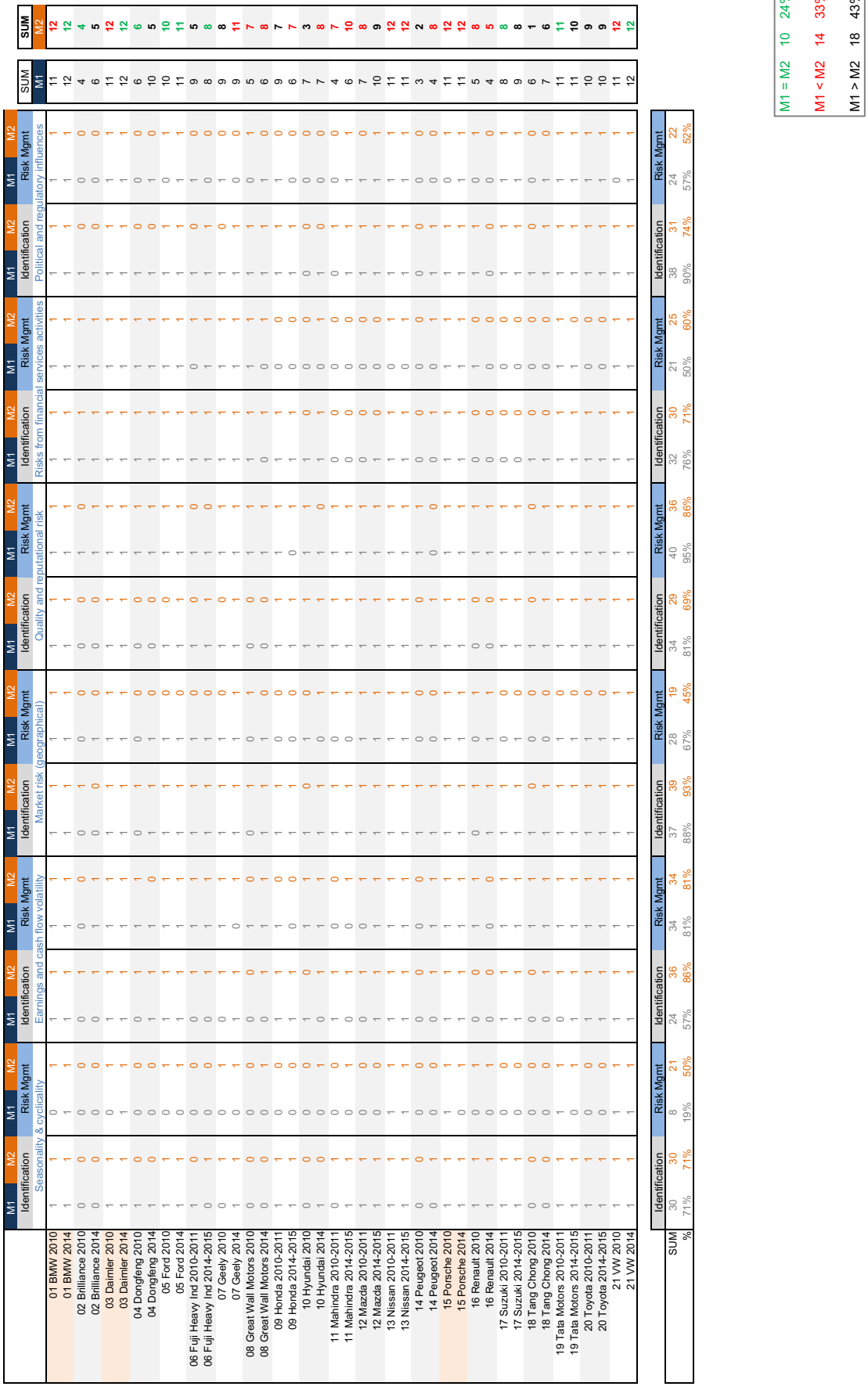
Risk Management

	within +/- x characters
fulfill+regulat	200
ensure+regulat	200
aware+regulat	200
comply+regulat	200

Measure 2

Information about actions to fulfill the requirements e.g. research and development
Information about scenario analysis

Appendix B – Risk Disclosure Index Score



	Identification	Risk Mgmt	Identification	Risk Mgmt	Identification	Risk Mgmt	Identification	Risk Mgmt	Identification	Risk Mgmt	Identification	Risk Mgmt
SUM	30	8	24	34	37	28	34	40	32	21	38	24
%	71%	19%	57%	81%	88%	67%	81%	95%	76%	50%	90%	57%
	Identification	Risk Mgmt	Identification	Risk Mgmt	Identification	Risk Mgmt	Identification	Risk Mgmt	Identification	Risk Mgmt	Identification	Risk Mgmt
SUM	30	21	36	34	39	19	29	36	30	25	31	22
%	71%	50%	86%	81%	93%	45%	69%	86%	71%	60%	74%	52%

M1 = M2 10 24%

M1 < M2 14 33%

M1 > M2 18 43%