

# **The disclosure of market risk information under IFRS 7**

## **Evidence from Swiss listed non-financial companies**

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### **Abstract**

Risk management has become considerably more important during the last years. Especially due to the use of more complex and innovative financial instruments, the identification, valuation and controlling of risks arising from financial instruments became a major task of an internal risk management for industrial, commercial and service-sector companies. Under IFRS 7, companies need to prepare disclosures about their market risk exposure at balance sheet date. Yet, there is no empirical research about neither the format Swiss non-financial companies disclose these information nor what the implications of these disclosures for (potential) stakeholders are. The paper addresses this gap and explores market risk disclosures within a sample of 116 Swiss listed non-financial company annual reports using content analysis and correlation analysis. Sensitivity analysis is the prevalent method to disclose market risks. Significant associations are found between the number/amount of market risk disclosures and company size. Likewise a significant association is found between the number/amount of risk disclosures and the company's risk proxied by the gearing ratio. No association is found between the number/amount of risk disclosures and the company's performance, however. Overall the (potential) stakeholder may rely on disclosures under IFRS to assess about the market risks that origin from financial instruments.

*Key Words:* Risk Reporting, IFRS 7, Financial Reporting, Market Risk, Sensitivity Analysis, Financial Risk Management, Value at Risk, Disclosure, Firm Risk

*JEL Classification:* G32, G38, M41, M48

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## 1. Introduction

Risk management has become considerably more important during the last years and reflects an essential part of good corporate governance. One major challenge of the on-going risk debate is the adequate communication of risk information by companies to its stakeholders (Linsley and Shrives 2006). The annual report of a company is actually the main mean of conveying useful information for (potential) stakeholders to decide about investments, credits and other issues (Amran et al. 2009). Especially since the occurrence of a few major corporate scandals like Parmalat and Enron, there is a remarkable increased demand for more risk related disclosures in the annual report (Cole and Jones 2005). This extra demand regarding risk related disclosures is actually reflected as well in the International Financial Reporting Standards (IFRS). Companies reporting according to IFRS are obliged to comply with IFRS 7 since January 2007. Non-financial companies need to disclose comprehensive information concerning their financial instruments and the related risks that origin from these instruments.

A main category of financial risks to be disclosed under IFRS 7 is market risk. Market risk is defined as the unexpected risk of loss arising from changes in fair values or future cash flows due to fluctuations in market price changes such as interest rates, currencies, equity prices and commodity prices.<sup>2</sup> For non-financial companies, market risk represents a significant risk type concerning the use of financial instruments. The identification, valuation and controlling of risks arising from financial instruments is a major task of an adequate internal risk management for industrial, commercial and service-sector companies (Prokop 2008). In the absence of such market risk disclosures, it has been argued by the IASB that stakeholders are unable to assess an entity's relevant risk exposure arising from financial instruments. Greater transparency regarding these risks allows stakeholders to make more precise judgements about risk and return. Therefore, the IASB decided to reform the reporting over financial instruments by issuing IFRS 7 in August 2005.<sup>3</sup> The empirical results of a study conducted with UK institutional investors support the decision of the IASB, as a significant number of respondents called for more detailed and precise risk information rather than general statements about the entity's risk policy (Solomon et al. 2000).

This paper draws on stakeholder theory and the need for adequate risk disclosures to assess the potential risk of a company. The study investigates the market risk disclosure practices as well as the disclosed risk exposures and its impact on both, current net earnings and equity of non-financial companies listed on the main standard of the Swiss Exchange, reporting according to IFRS. It is probably the first study to address the nature of market risk disclosure under IFRS 7 within Swiss annual reports. Prior studies focused either on qualitative, general (voluntary) risk disclosure in annual reports using content analysis (e.g., Abraham and Cox 2007; Elzahar and Hussainey 2012; Lajili and Zéghal 2005; Linsley and Shrives 2006; Othman and Ameer 2009) or analyzed market risk disclosure based on another financial reporting standard (Chen-Miao Lin et al. 2010; Bhamornsiri and Schroeder 2004).

The research aims of this study are to show what statistical methods Swiss companies apply to disclose market risk and to test for relationships between quantitative and qualitative market risk disclosure and (i) company size, (ii) company risk and (iii) performance using content analysis as well as correlation analysis. The purpose of these tests is to evaluate the potential usefulness of these disclosures, i.e. if (potential) stakeholders may rely on disclosures under IFRS 7 to assess about the market risk faced by a company.

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<sup>2</sup> See Appendix A of IFRS 7.

<sup>3</sup> See IFRS 7.IN1-3.

The remainder of the paper is structured as follows. Section 2 broadly discusses the disclosure requirements of IFRS 7 and the relevant literature within this context. Section 3 introduces the development of the hypotheses to be tested within this paper and section 4 describes the data and sample used and the research methods employed. Section 5 presents the results, followed by a discussion and interpretation in the final section 6.

## 2. Theoretical background and literature

### 2.1 Disclosure requirements of IFRS 7

By issuing the “International Financial Reporting Standard 7, Financial Instruments: Disclosures” in August 2005, the IASB bundled the disclosure requirements concerning financial instruments for the first time in a single standard valid for all entities, including entities that have few financial instruments as well.<sup>4</sup> Since the endorsement of IFRS 7 by the EU<sup>5</sup> on January 11, 2006, Swiss listed companies are obliged to adopt IFRS 7 for annual periods beginning on or after 1 January 2007, with prior year comparatives required. Some of the requirements of IFRS 7 will be familiar due to the fact that it is partially a replacement of “IAS 32, Financial Instruments: Presentation”, while others – especially the requirements to provide quantitative and qualitative market risk disclosures – are new (Prokop 2008).

IFRS 7 requires companies to present sufficient qualitative and quantitative information to allow stakeholders to make estimates of the company’s market risk exposures. According to Table 1, companies may choose between univariate sensitivity analysis and multivariate Value at Risk (VaR) analysis to disclose quantitative market risk exposure.

Table 1

Qualitative and quantitative market risk disclosure requirements of IFRS 7

Paragraph	Regulation issue	Disclosure requirements
7.33	Qualitative disclosures	An entity need to disclose a narrative for each type of risk, about the risk exposures and how they arise; the objectives, policies and processes for managing the risks and methods used to measure risk and the changes from the previous reporting period.
7.34	Quantitative disclosures	An entity need to disclose summary quantitative data about the market risk exposures (currency risk, interest rate risk and other price risk) faced at reporting date. This information should be based on information provided internally to the key management personnel of the entity.
7.40	Sensitivity analysis (univariate)	A sensitivity analysis for each type of market risk to which an entity is exposed at reporting date. Illustration of how profit or loss and equity would have been affected by changes in the relevant risk variable, as well as the methods and assumptions used in preparing such an analysis.
7.41	Value at risk analysis (multivariate)	Instead of the univariate sensitivity analysis, a multivariate value at risk approach may be applied. This method better reflects interdependencies between risk variables and shows potential diversification effects. Methods and assumptions used in preparing such an analysis must be disclosed as well.

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<sup>4</sup> See IFRS 7.IN4.

<sup>5</sup> See “VO (EG) Nr. 108/2006 der Kommission”; as of 11 January 2006.

Sensitivity analysis requires companies to disclose how profit or loss and equity would have been affected by a ‘reasonable change’<sup>6</sup> in the relevant risk variable, as well as the methods and assumptions used in preparing such an analysis. The following example illustrates this kind of disclosure method: Airesis SA reported in the notes of the annual report 2011 among other things that a raise of the prime interest rate about 100 basis points, with everything else being equal, would have affected the group’s financial statements: -311 TCHF effect on Earnings before Taxes (EBT) and -311 TCHF effect on equity.

Value at Risk (VaR) shows the potential loss in future earnings, fair values or cash flows from changes in market prices over a specified period of time with a specified likelihood of occurrence (Lin et al. 2010). A company deciding to use VaR methods is obliged to disclose the statistical model used (historical simulation, variance/covariance or Monte Carlo simulation) as well as some important model parameters like holding periods and confidence intervals. Geberit AG is an example company using VaR. In the annual report 2011, it reported among other things that foreign exchange rate risk as of December, 31 would not exceed 5.5 MCHF of unrealized gains/losses for the next 30 days with a likelihood of 95%. The VaR analysis is based on variance/covariance approach.

For non-financial companies, market risk represents a major risk type within the scope of IFRS 7, besides the two other risk categories credit risk and liquidity risk (Prokop 2008). However, it has to be noted that the exposure on translating the financial statements of subsidiaries into the presentation currency (translation risk) does not need to be included in the sensitivity analysis (Brücks et al. 2006). Finally, risks disclosed within the scope of IFRS 7 may not provide a comprehensive view on the risk level of a non-financial company. Important risk categories like strategic and operating cash flow risks are not captured by IFRS 7 (Schmidt 2007).

## *2.2 Literature review*

A growing number of published risk disclosure studies are being observed in the recent decade (e.g., Abraham and Cox 2007; Beattie et al. 2004; Beretta and Bozzolan 2004; Lajili and Zéghal 2005; Mohobbot 2005; Oliveira et al. 2011). Studies to date on general, holistic risk disclosure have mainly focused on the nature of disclosures (e.g. forward or backward-looking disclosures, monetary or non-monetary disclosures) and the amount (e.g. number of sentences or words) in the whole annual reports using content analysis. The study of Linsley and Shrives (2006) on risk disclosures explored 79 UK company annual reports. It was found a significant association between the number of risk disclosures and company size as well as the level of environmental risk. As the study found a lack of coherence in the risk narratives, the conclusion drawn was that stakeholders are unable to adequately assess the risk profile of a company.

Beattie et al. (2004) extensively studied disclosures across several industry sectors for a sample of 27 companies. The paper focused not solely on risk-disclosures, but they were provided as well due to the holistic analysis of the entire annual reports. Backward-looking information significantly dominated forward-looking risk disclosures. Finally, it was stated that only 7% of the forward-looking disclosures were quantified. Beretta and Bozzolan (2004) studied annual reports for a sample of 85 companies listed on the Italian Stock Exchange. A major conclusion is the prevalence of risk disclosures relating to past and present risks rather than to future risks. Moreover, impacts of future risks are not specified being negative or positive. Lajili and Zéghal (2005) analysed compulsory and voluntary risk reporting for a sample of companies listed on the Canadian stock exchange according to 12 risk factors.

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<sup>6</sup> IFRS 7 does not provide a clear indication what a “reasonable change” means. The change may be e.g. based upon some statistical measure like a one year historical standard deviation.

Bivariate tests revealed no relationship between the quantity of compulsory and voluntary risk reporting and company size, profit, beta factor, or leverage. Abraham and Cox (2007) investigated the relationship between the quantity of narrative risk information in UK FTSE 100 annual reports and ownership, governance, and US listing characteristics. It was concluded that corporate risk reporting is negatively related to share ownership by long-term institutions, and thus the results of the study put forth that this important class of institutional investor has investment preferences for companies with a lower level of risk disclosure.

After analysing 81 Portuguese companies (42 listed and 39 unlisted), Oliveira et al. (2011) concluded that companies in the non-finance sector adopt generic risk reporting practices by disclosing mainly backward-looking risk disclosures that lack comparability and transparency. Consequently, the usefulness of risk disclosures is impaired. These findings are consistent with prior studies that focus on qualitative risk disclosures as e.g. Beretta and Bozzolan 2004 and Lajili and Zéghal (2005). By reporting qualitative and backward-looking risk disclosures, Portuguese managers reduce exposure to litigation costs. It was argued that although quantitative and forward-looking information would be more relevant to stakeholders, such disclosure is less common because of the potential inaccuracy and exposure to litigation costs. In general, the studies mentioned above have found that risk disclosures in annual reports are generic, mainly backward-looking and rarely quantified. These results are not compatible with the information needs of stakeholders to assess the risk profile of a company adequately (Oliveira et al. 2011).

Only few studies have analysed specifically *market risk* disclosures in annual reports. However, a number of risk-related papers have been published primarily in the USA due to the issue of the Securities and Exchange Commission (SEC) Financial Reporting Release (FRR) Number 48 on Derivative and Market Risk Disclosures in January 1997, which required companies to disclose their quantitative market risk information. Rajgopal (1999), one of the earlier risk disclosure studies, examined the relationship between commodity price exposures and the market's view of oil and gas price sensitivity. The study identified evidence that the US Securities and Exchange Commission's new market risk disclosure rules reflect company's exposure to risk, when establishing an association between oil and gas producers share price movements in response to oil and gas prices, and proxies for the tabular and sensitivity analysis format.

Guo (2002) examined if company's bond default risk and costs of debt capital are associated with the expanded risk disclosures mandated by the SEC 1997 release. The sample includes companies that chose VaR and sensitivity analysis for risk disclosure. The study analysed 59 companies that issued new debt subsequent to providing risk disclosure information as mandated by FRR No. 48 and concludes that changes in bond default risk and cost of debt are negatively, but insignificantly, associated with market risk disclosure. A major finding of the study is companies choosing VaR for market risk disclosure have a significantly lower cost of debt and bond default risk than companies using sensitivity analysis, and companies that use hedging strategies effectively have lower bond default risk and cost of debt capital. Linsmeier et al. (2002) studied the effect of FRR No. 48 on trading volume and stock returns. A sample of 222 non-financial companies using sensitivity analysis, VaR, and tabular format for disclosure was investigated. Positive trading volume sensitivity is found to absolute changes in interest rates, foreign currency exchange rates and commodity prices prior to the effective of FRR No. 48. After FRR No. 48 became effective, declines in trading volume sensitivity to these market rates and commodity prices were found. It was concluded that FRR No. 48 provides useful information to investors and thus leads to a reduction in trading volume sensitivity to changes in rates and commodity prices.

Lin et al. (2010) analysed the association between a company's choice of reporting methods in compliance with FRR No. 48 and total risk, the cost of equity, and company specific risk. Based on regression results, companies using VaR have significantly higher total risk and company specific risk than companies using sensitivity analysis. Companies using the combination of VaR and other method(s) show higher total risk, market risk, and company specific risk than companies using sensitivity analysis. Overall, the study revealed that companies choosing VaR or VaR combined with other method(s) have higher risk. It was concluded that, however, the causation could be other way around, i.e. companies with higher risk may like to choose a method which reveals less information to the market such as VaR.

Finally, very few studies were found in respect of the investigation of a company's risk disclosure behavior related to a particular reporting standard requirement such as local GAAP, US GAAP or IFRS. The study conducted by Othman and Ameer (2009) explored the market risk disclosure practices among a sample of 429 Malaysian listed companies. A major finding is that most of the sample companies (328 out of 429) show compliance with "FRS132: Financial Instruments – Disclosure and Presentation", in relation to disclosing the financial risk management policy. Interest rate risk is the most mentioned risk type, whereas credit risk is the least disclosed risk type. It was concluded that "the variation in terms of nature and extent of compliance disclosure among Malaysian companies reflects the critical need for some standardized reporting format or guidelines from the standard setting and regulatory bodies" (Othman and Ameer 2009, p. 68).

Evidence of German publicly traded companies reporting market risk under IFRS 7 in the annual reports is presented in the study from Fürst et al. (2009). The sample consists of 112 annual reports for the reporting period 2007 and 122 for the reporting period 2008 of non-financial companies listed on DAX, MDAX, SDAX or TecDAX. The paper analyzed the methods and parameters used (VaR or sensitivity analysis, historical simulation, variance/covariance approach, Monte Carlo simulation, sensitivity levels and holding periods ) to disclose market risk within the scope of IFRS 7. The study concludes that sensitivity analysis is the prevalent method to disclose market risk in German listed companies. It is also stated that very different parameters with regard to holding periods, sensitivity levels and confidence levels are used. Is it probably the first study to address the market risk disclosure methods applied to comply with IFRS 7. However, the study does not provide any meaningful results due to the missing development of theory-based hypotheses and statistical tests.

### 3. Research questions and hypotheses development

Prior studies drew upon different theories to explain the motives for voluntary or mandatory<sup>7</sup> risk disclosures in annual reports. Signalling theory was used by Elzahar and Hussainey (2012) and suggests for example that companies in the same industry sector are more likely to adopt the same level of disclosure. The reason is if a company within an industry discloses less risk information, it may be interpreted as a signal of hiding bad news (Craven and Marston 1999). Agency theory was employed by Abraham and Cox (2007) and Lajili and Zéghal (2005). It explains how information asymmetry between shareholders can be reduced by monitoring the opportunistic attitudes of managers (Jensen and Meckling 1976). According to this theory, a larger company for example needs to disclose more information to different groups of stakeholders leading to reduced agency costs and information asymmetries (Elzahar and Hussainey 2012; Watts and Zimmermann 1983). Hassan (2009) based the study on institutional theory notion of social legitimacy and Oliveira et al. (2011) employed a combination of legitimacy theory, agency theory and resources-based perspective. Amran et al.

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<sup>7</sup> Mandatory risk disclosure requirements base on accounting standard settings or regulatory developments.

(2009) employed stakeholder theory to determine the motivation for risk related disclosures. Stakeholders are groups or individuals who are interrelated with a company, and therefore risk disclosure is seen as a part of the dialogue between the company and its stakeholder (Freeman 1984, Gray et al. 1996). Stakeholders such as investors need to gather as much information as possible for adequate decision-making (Amran et al. 2009). Finally, other theoretical assumptions to explain the drivers for risk related disclosures ground in proprietary cost theory (e.g., Mohobbot 2005).

The present study draws on both stakeholder theory and agency cost theory to develop the hypotheses. Stakeholder theory was chosen because annual reports are a major mean to communicate with different groups or individuals like creditors, debt holders and investors. Stakeholder theory accounts for the strong interrelatedness between a company and its stakeholders (Amran et al. 2009). Agency cost theory was chosen because of the assumption that larger companies and highly levered companies need to disclose more risk information to different stakeholders to reduce information asymmetries and to satisfy the creditors (Jensen and Meckling 1976; Watts and Zimmermann 1983).

### *3.1 Methods being used to disclose quantitative market risk exposures*

Fürst et al. (2009) showed for German companies that an overwhelming number of risk exposures are reported by the mean of sensitivity analysis. Thus, it may be argued that this fact is also valid for Swiss non-financial companies. Moreover, the disclosure requirements of IFRS 7 need to comply with the so called “management approach”. Hence, internal risk management processes and methods are directly connected to the risk disclosure policies. Because mainly financial companies (i.e. banks, e.g., Grünberger 2008) use VaR methods to present financial risks, it is assumed that Swiss non-financial companies prefer the less complex univariate sensitivity analysis approach. Therefore, the first hypothesis is presented as follows:

**H1.** The number of sensitivity analysis disclosures will be significantly greater than the number of VaR disclosures.

### *3.2 Risk disclosures and the level of the company risk*

Linsley and Shrives (2006) argue that companies with higher level of risk will disclose more risk information as the directors are forced to explain the causes of the higher risk. On the other hand, companies having higher risk “may not to want to draw attention to their ‘riskiness’ and, conversely, therefore may be reluctant to voluntarily disclose significant amounts of risk information” (Linsley and Shrives 2006, p. 391). Prior studies have not been decisive. Linsley and Shrives (2006), Amran et al. (2009) and Elzahar and Hussainey (2012) found no significant relationship between risk disclosures and the level of company risk. However, Oliveira et al. (2011) reported a positive and significant relationship between the risk disclosures and company risk, proxied by leverage. From an agency theory perspective, high levered companies and companies with high risk exposures induce higher agency costs and therefore need to disclose more risk information to the creditors (Jensen and Meckling 1976). Therefore, the second set of hypotheses is:

**H2(a).** There is a positive association between the level of disclosed market risk sensitivity and the level of risk within a company.

**H2(b).** There is a positive association between the number of market risk disclosures and the level of risk within a company.

### 3.3 Risk disclosures and company size

A couple of risk disclosure studies proved the existence of a positive relationship between the number of risk disclosures and company size, either included as a control variable or a variable of interest (Beretta and Bozzolan 2004; Beattie et al. 2004; Linsley and Shrives 2006; Oliveira et al. 2011; Elzahar and Hussainey 2012). However, Hassan (2009) found no significant association between the number of risk disclosures and company size. Based on stakeholder theory, one may argue the larger the company, the more stakeholders are involved. To satisfy a greater number of stakeholders, the company needs to disclose more risk information. This study extends the existing body of disclosure literature by testing also for a relationship between the *quantitative* level of disclosed market risk sensitivity and company size. The rationale behind this assumption is, *ceteris paribus*, the larger a company, the greater is their relative risk bearing ability related to market risk exposures. Therefore, the third set of hypothesis is presented as follows:

**H3(a).** There is a positive association between the level of disclosed market risk sensitivity and the company size.

**H3(b).** There is a positive association between the number of market risk disclosures and the company size.

### 3.4 Risk disclosures and performance

For non-financial companies, no previous studies have tested the relationship between the *quantitative* level of disclosed market risk sensitivity under IFRS 7 and the performance of a company. Meyer and Fiechter (2009) empirically investigated the relationship of market risk disclosures and the performance of 86 banks for the year 2008. It was concluded that banks reporting a higher VaR compared to a reference group showed lower earnings before taxes (EBT). The rationale behind this result is the assumption that higher VaR disclosures result in larger losses during the reporting period 2008. However, this finding is not consistent with the financial concept of the risk/return trade-off, implying that higher risk is also related with higher (potential) returns (Markowitz 1952). Low levels of risk exposures are associated with low potential returns. In contrast, high levels of risk are associated with high potential returns. Therefore, the last hypothesis is presented in the null form:

**H4.** There is no association between the level of disclosed market risk sensitivity and the company's performance.

## 4. Data and research method

### 4.1 Data

The sample of Swiss companies to investigate the analysis of disclosure methods applied (VaR, sensitivity analysis) comprises 116 non-financial firms reporting according to IFRS listed on the main standard of the Swiss Exchange as at 31 December 2011. Accordingly, 116 annual reports with a year-end date nearest to 31 December 2011 were collected from the firm's website. Financial firms (i.e. banks and insurance companies) were excluded from this study for two reasons. Firstly, financial firms can be considered as risk management entities and therefore may be expected to make significantly different market risk disclosures (Linsley and Shrives 2006). Secondly, risks arising from financial instruments are the dominant risk type for financial companies, other than in non-financial companies (Prokop 2008). Hence, the aim of this paper is to investigate the usefulness of IFRS 7 specifically to stakeholders of non-financial companies.



#### 4.2 Research method

The analysis of risk disclosures for the sample companies was performed on the IFRS 7 market risk sections in the notes of the annual reports. Two different approaches were chosen to gather risk information. Firstly, content analysis was employed. Content analysis is a widely accepted and often applied method within the risk disclosure literature (e.g., Beattie et al. 2004; Elzahar and Hussainey 2012; Lajili and Zéghal 2005; Linsley and Shrives 2006; Mohobbot 2005). A large body of papers heavily draw on the checklist and coding framework developed by Linsley and Shrives (2006). A well-recognised issue in content analysis is the assumption that quantity of disclosure is an adequate proxy for disclosure quality. This study does not seek to assess the quality of disclosures under IFRS 7, but rather to investigate if the number of disclosures is related with the above presented hypotheses. This study follows Linsley and Shrives (2006) and uses sentence counting in performing content analysis.<sup>8</sup> Milne and Adler (1999) support the use of sentences to provide meaningful data for further analysis.

Secondly, all quantitative net market risk exposures arising from financial instruments (affecting net income and company's equity) reported were collected; i.e. currency risk, interest rate risk, equity price risk and other price risk. Since there is no explicit rule offered by IFRS 7 how to determine the sensitivity levels, all sensitivities disclosed were transformed to 1%-sensitivities to changes in a risk variable for further analysis. It is important to note that the reported risk exposures do not affect necessarily profit and loss similarly as the company's equity.<sup>9</sup> Capital market and accounting data are collected from Thomson database. After eliminating companies with missing market or accounting data, incomplete disclosed market risk exposures<sup>10</sup> or statistical outliers, the final sample consists of 67 companies to test hypotheses H2 - H4. Pearson correlation coefficients are calculated to test the outlined hypotheses.

#### 4.3 Variable definition

Table 2 gives an overview over the used key variables in this study. There is a well-established, on-going academic discussion on choosing an appropriate proxy for firm risk. It is beyond the scope of this paper to thoroughly discuss the adequate proxy to measure firm risk. For example, the beta factor derived from the capital asset pricing model is considered problematic due to well-known limitations. Fama and French (1992) developed a three-factor model to partially overcome the drawbacks from beta factor by introducing beta, book-to-market-ratio and size to better explain the cross-section of returns.<sup>11</sup> Therefore and based on previous studies, four widely accepted proxies for firm risk, beta factor, price-to-book ratio, gearing ratio and asset cover, are used (Amran et al. 2009; Elzahar and Hussainey 2012; Linsley and Shrives 2006; Mohobbot 2005). Following Amran et al. (2009), Linsley and Shrives (2006) and Mohobbot (2005), total sales and market capitalization have been selected to measure the company size. As both variables follow a log-normal distribution, they were converted to the natural logarithm for reasons of meaningful significance tests.

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<sup>8</sup> In this study, a decision rule from Linsley and Shrives 2006 is applied: Tables (quantitative and qualitative) providing risk information should be interpreted as one line equals one sentence.

<sup>9</sup> E.g. changes of fair values from cash flow hedges under IAS 39 do not affect profit and loss until the planned transaction is due.

<sup>10</sup> To account for the fact that equity price risk exposures and other price risk exposures have been rarely disclosed, these risk types were excluded from the study.

<sup>11</sup> See Lin et al. 2010 for an adoption of the three-factor model in a risk disclosure study.

Table 2  
Measurement and definition of variables

Variables	Used proxies	Definition
Firm size	Market value	Average over 2011
	Sales	Year-end sales
Firm risk	Beta factor	Average beta factor 2011
	Market-to-book-ratio	Book value/market value of firm
	Gearing ratio	Long-Term debt/capitalization
	Asset cover	Net assets/total debt
Performance	ROA	Net income/total assets
	ROE	Net income/equity

Finally, the measurement of a company's relative performance is required. The two suggested performance measures are based on accounting data available from the annual reports. Similar to Mohobbot (2005) and Meyer and Fiechter (2009), return on assets (ROA) and return on equity (ROE) are used in this study.

## 5. Empirical Results

### 5.1 Methods applied to disclose quantitative market risk

Table 3 shows the methods applied to disclose market risk exposures for the sample companies. Only nine companies report their market risks by applying VaR. Currency risk based on sensitivity analysis is the most often disclosed risk type (89.7%), followed by interest rate risk sensitivities (72.4%). Only 10.3% of the sample companies show univariate equity price risk sensitivities; 0.9% commodity price risk sensitivities, respectively. Commodity price risks and equity price risks are classified as immaterial or not mentioned at all by the directors in the annual reports.

Table 3  
Market risk disclosure (N=116)

	No disclosure*		Sensitivity Analysis		VaR Analysis	
	Number	%	Number	%	Number	%
Currency Risk	3	2.6%	104	89.7%	9	7.8%
Interest Rate Risk	26	22.4%	84	72.4%	6	5.2%
Equity Price Risk	100	86.2%	12	10.3%	4	3.4%
Commodity Price Risk	112	96.6%	1	0.9%	3	2.6%

\*Classified as immaterial or not mentioned

Table 4 summarizes the model parameters used by the nine companies using VaR analysis.

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Table 4

Analysis of VaR methods applied (N=9)

Firm	Industrial Classification	Currency Risk					Interest Rate Risk					Equity Price Risk					Commodity Price Risk				
		Disclosures			VaR		Disclosures			VaR		Disclosures			VaR		Disclosures			VaR	
		Conf	Hold	Div	His	V/C	Conf	Hold	Div	His	V/C	Conf	Hold	Div	His	V/C	Conf	Hold	Div	His	V/C
Syngenta AG	Chemicals	99	30	69	Y												99	360	25	Y	
		99	360	67	Y												99	360	10	Y	
		99	30	32	Y																
Geberit AG*	Construction & Materials	95	30			Y	95	30			Y										
BKW AG	Electricity	99	360			Y	99	360			Y	99	360			Y	99	1			
Barry Callebaut AG	Food Producers	95	1	45	Y												95	10		Y	
Nestlé AG**	Food Producers	95	1	20	Y		95	1		Y		95	1		Y						
Nobel Biocare Holding AG	Health Care Equipment & Services	95	360	29	Y																
Bucher Industries AG***	Industrial Engineering	90	30	53		Y	90	30			Y										
Novartis AG****	Pharmaceuticals & Biotechnology	95	10			Y	95	10			Y	95	10			Y					
Roche Holding AG*****	Pharmaceuticals & Biotechnology	95	20		Y		95	20		Y		95	20		Y						

\*Disclosure of total VaR (Interest Rates VaR and FX VaR combined)

\*\*Disclosure of total VaR (Interest Rates VaR, FX VaR and Equity Price VaR combined)

\*\*\*Disclosure of total VaR (Interest Rates VaR and FX VaR combined)

\*\*\*\*Disclosure of stresstests (Worst case scenarios)

\*\*\*\*\*Disclosure of total VaR (Interest Rates VaR, FX VaR and Equity Price VaR combined)

The nine companies are not dominated by a specific industry sector. However, all companies are larger than the mean firm of the sample. VaR analysis is carried out for currency risks by every company, followed by six companies reporting VaR for interest rate risk. As IFRS does not offer a comprehensive guideline how to conduct VaR analysis, there are remarkably different parameters applied (holding periods [Hold], confidence intervals [Conf]). Five companies base their analysis on historical simulation; four companies employ the variance/covariance (V/C) approach. Five companies disclose the diversification effect (Div) gained by risk aggregation. In respect to the first hypothesis, a clear majority of the sample companies adopt sensitivity analysis, therefore H1 is supported.

## 5.2 Tests of hypotheses H2 - H4

Descriptive statistics are presented in Table 5 for the final sample of 67 companies. Missing data were excluded to follow a complete case approach (Hair 2010). The mean number of sentences disclosed within the market risk section of IFRS 7 in the annual report is 42. A large variation of disclosed sentences is being observed (minimum of 7, maximum of 87 sentences). Natural logarithms have been calculated for the 1%-sensitivities to changes in currency and interest rates (C P&L and I P&L represent currency risk and interest rate risk affecting the profit and loss statement; C Equity and I Equity show currency risk and interest rate risk affecting the company's equity).<sup>12</sup>

Table 5

Descriptive statistics (N=67)

	Minimum	Maximum	1. Quartil	Mean	3. Quartil	Std. Deviation
Number of Disclosures*	7	87	25	42	55	19.91
Nat Log C P&L	4.01	17.66	12.13	12.89	13.99	2.20
Nat Log C Equity	9.25	16.44	12.27	13.28	14.49	1.74
Nat Log I P&L	8.29	17.94	12.45	13.80	14.92	1.82
Nat Log I Equity	6.91	17.27	12.88	13.92	14.95	1.70
Nat Log C+I P&L	8.29	18.21	13.11	14.36	15.50	1.73
Nat Log C+I Equity	6.91	17.48	13.52	14.35	15.51	1.70
Beta	0.13	3.16	0.60	0.95	1.23	0.55
Price to Book Ratio	-0.58	5.28	0.93	1.75	2.26	1.18
ROA	-42.54	24.71	1.87	3.94	8.76	10.60
ROE	-49.37	57.06	2.93	7.83	16.48	15.85
Asset Cover**	-0.42	368.75	1.17	14.73	5.75	49.18
Gearing Ratio***	-0.34	1.83	0.03	0.35	0.63	0.43
Nat Log Market Cap	2.33	10.28	5.64	6.64	7.68	1.60
Nat Log Sales	0.45	9.97	5.76	6.84	8.12	1.80

\*Number of sentences in the market price risk section of IFRS 7

\*\*Net assets/debt

\*\*\*Long-term debt/(long-term debt + preferred stock + common stock)

Pearson correlation coefficients have been calculated to test the hypotheses H2 - H4 and are presented in Table 6. To test two forms of H2, i.e. the association between the level of firm risk and the level of market risk disclosures, only gearing ratio shows significant correlation at the 1% level of significance to both the interest rate risk sensitivities and the number of disclosures. This positive correlation implies that higher levered (therefore assumed riskier) companies indeed bear a higher degree of

<sup>12</sup> All data series comprising risk sensitivities were positively tested for log-normal distribution and therefore transformed to their natural logarithm.

market risk and thus, explain these higher risks by a larger number of sentences in the annual report market risk section of IFRS 7. Price to book ratio is only positive correlated with currency exposure affecting the company's equity (at the 5% level of significance). Beta factor as well as asset cover indicate no association between market risk disclosure and firm risk. The results of the tests for H1 are indecisive since only gearing ratio and partially price-to-book ratio show significant correlations to the market risk disclosures.

Table 6  
Pearson correlation coefficients (N=67)

Variable	Nat Log C P&L		Nat Log C Equity		Nat Log I P&L		Nat Log I Equity		Nat Log C+I P&L		Nat Log C+I Equity		Number of Disclosures	
	Pearson	p-value	Pearson	p-value	Pearson	p-value	Pearson	p-value	Pearson	p-value	Pearson	p-value	Pearson	p-value
Beta	0.152	0.226	0.119	0.366	0.093	0.459	0.038	0.783	0.139	0.265	0.102	0.421	-0.028	0.821
Price to Book Ratio	0.160	0.200	<b>0.252*</b>	<b>0.050</b>	0.025	0.841	0.140	0.303	0.124	0.318	0.134	0.288	0.213	0.084
Asset Cover	0.004	0.974	0.180	0.177	0.064	0.616	0.059	0.679	0.027	0.835	0.005	0.972	0.020	0.876
Gearing Ratio	0.102	0.428	0.147	0.267	<b>0.446**</b>	<b>0.000</b>	<b>0.405**</b>	<b>0.003</b>	<b>0.404**</b>	<b>0.001</b>	<b>0.372**</b>	<b>0.003</b>	<b>0.368**</b>	<b>0.003</b>
ROA	0.115	0.362	0.132	0.316	0.114	0.363	0.190	0.164	0.151	0.226	0.093	0.463	0.158	0.205
ROE	0.079	0.532	0.024	0.855	-0.049	0.696	-0.036	0.795	0.017	0.891	-0.052	0.685	0.085	0.496
Nat Log Market Cap	<b>0.437**</b>	<b>0.000</b>	<b>0.561**</b>	<b>0.000</b>	<b>0.642**</b>	<b>0.000</b>	<b>0.626**</b>	<b>0.000</b>	<b>0.698**</b>	<b>0.000</b>	<b>0.660**</b>	<b>0.000</b>	<b>0.401**</b>	<b>0.001</b>
Nat Log Sales	<b>0.489**</b>	<b>0.000</b>	<b>0.551**</b>	<b>0.000</b>	<b>0.651**</b>	<b>0.000</b>	<b>0.615**</b>	<b>0.000</b>	<b>0.703**</b>	<b>0.000</b>	<b>0.645**</b>	<b>0.000</b>	<b>0.327**</b>	<b>0.007</b>

**\*\*Correlation is significant at the 0.01 level**

**\*Correlation is significant at the 0.05 level**

The third set of hypotheses, H3, investigates if a positive association between the level of market risk disclosure and the company size exists. Both measures of size, sales and market capitalization, are highly correlated with every independent variable outlined in Table 5 at the 1% level of significance. The results of correlation coefficient analysis are consistent for the two forms of hypotheses presented under H2, i.e. number of market risk disclosures and 1%-sensitivities to a change in a risk variable are positively and significantly associated with company size. To test H4, i.e. if there is no association between the level of disclosed market risk sensitivity and the company's performance, Pearson correlation coefficients have been calculated again. No significant correlation was found between neither return or assets and any independent variable nor return on equity and any independent variable. The result supports the fourth hypothesis and implies that the performance for the sample firms does not depend on the number of market risk disclosures and the presented 1%-risk sensitivities within the annual reports.

In order to explore absolute differences between companies reporting high quantitative market risk exposures and a reference group, t-Tests have been computed.<sup>13</sup> Table 7 presents the results of the differences between the high risk group and the reference group with respect to the potential impairment of profit and loss and the company's equity, respectively.<sup>14</sup> It can be concluded that the mean high risk company (risks affecting P&L) discloses 10 sentences more to explain its currency and interest rate risks than the mean company of the reference group (at the 5% level of significance). Similarly, the mean high risk company (risks affecting the company's equity) discloses 9.3 sentences more to explain its currency and interest rate risk than the mean company of the reference group (at the 5% level of significance). In addition, the mean high risk company is significantly larger than the mean company of the reference group (at the 1% level of significance, for both the P&L and equity group).

<sup>13</sup> It has also been tested if there are differences in the means within different industry sectors. The sample was therefore grouped according to the Global Industry Classification Standard (GICS). However, no significant differences between the ten industry groups could be found.

<sup>14</sup> Four variables showed significant t-Tests; i.e. number of disclosures, sales and market capitalization as a proxy for firm size and gearing ratio as a proxy for company risk.

Table 7

Comparison of P&amp;L risk groups and equity risk groups (N=66)

Variable	High Risk Group (P&L)	Reference Group (P&L)	Difference (P&L)	High Risk Group (Equity)	Reference Group (Equity)	Difference (Equity)
Number of Disclosures						
Minimum	15.000	7.000		15.000	7.000	
Maximum	87.000	84.000		87.000	84.000	
Mean	46.909	36.909	10.000*	46.333	37.000	9.333*
Std. Deviation	19.322	19.643		19.152	19.386	
Nat Log Sales						
Minimum	5.068	0.451		1.182	0.451	
Maximum	9.974	8.199		9.974	8.734	
Mean	7.940	5.759	2.181**	7.683	5.943	1.740**
Std. Deviation	1.205	1.655		1.205	1.655	
Gearing Ratio						
Minimum	0.000	-0.341		0.000	-0.341	
Maximum	1.826	0.992		1.826	0.992	
Mean	0.512	0.174	0.388**	0.461	0.212	0.249*
Std. Deviation	0.485	0.277		0.502	0.299	

\*\*Difference is significant at the 0.01 level

\*Difference is significant at the 0.05 level

Moreover, companies disclosing higher market risk exposures are significantly higher levered than companies of the reference group. A mean company shows a gearing ratio of 0.512 (P&L group), about three times higher than a mean company of the reference group, namely 0.174 (at the 1% level of significance). Finally, a mean company exposed to high market risk within the equity group is levered by a ratio of 0.461, compared to the mean company of the reference group that is levered only by a ratio of 0.212, again at the 1% level of significance.

## 6. Discussion and conclusions

The aim of this paper was to examine the qualitative and quantitative market risk disclosures for a sample of 116 (67 for hypothesis tests H2 - H4, respectively) Swiss listed non-financial companies and thus, to extend the empirical knowledge of how companies disclose market risk. It is presumably the first study to address the nature of market risk disclosure within Swiss annual reports for non-financial companies with regard to the requirements of “International Financial Reporting Standard 7, Financial Instruments: Disclosures”. The present study tested for associations between market risk disclosure and company size, company risk and performance. Prior risk disclosure studies focused mainly on total narrative risk disclosures in annual reports, not on a combination of *qualitative* and *quantitative* risk disclosures (e.g., Lajili and Zéghal 2005; Linsley and Shrives 2006; Othman and Ameer 2009).

In line with the German study from Füst et al. (2009), sensitivity analysis is the prevalent method used to report market risk sensitivities in annual reports. Thus, the first hypothesis is strongly supported. There is a remarkable cut between the number of disclosures of the two risk type's currency risk and interest rate risk, and the number of disclosures of the two risk type's equity price

risk and commodity price risk. One could argue, *inter alia*, this is caused by the defined terms in Appendix A of IFRS 7 standard. The term “market risk” refers explicitly to currency risk and interest rate risk. Equity price risks are classified by many directors being immaterial, whereas commodity price risk is actually disclosed very rarely. It was also noted that of the nine companies applying VaR, no company computes VaR using Monte Carlo simulation. This finding goes in line with Fürst et al. (2009) as well. The required effort and knowledge may be too high in order to adopt MC simulation. Furthermore, VaR analysis is mainly used by financial companies due to their more relevant financial risk positions compared to non-financial companies.

The outcome of the overall hypothesis tests are presented in Table 8. A positive correlation between gearing ratio and both number of risk disclosures and quantitative market risk exposure was found. This implies that firms with a high debt/equity ratio are basically willing to accept more *quantitative* market risk exposure. However, the other used proxies in the present study for company risk showed not a decisive association with market risk disclosure. This finding partially differs from the results of the study undertaken by Linsley and Shrives (2006). No significant correlation was found using gearing ratio and asset cover in their study. Linsley and Shrives (2006) is the first known study that measured this relationship with respect to the number of risk disclosure narratives in UK annual reports. The authors argue that they may be possibly the first researchers testing this relationship due to the difficulties associated with measuring a company’s risk adequately. Mohobbot (2005) found no correlation between market-to-book ratio and gearing ratio and the number of disclosures as well.

Consistent with the large body of risk disclosure studies, number of narrative risk disclosures is highly correlated with the company size (e.g., Elzahar and Hussainey 2012; Lajili and Zéghal 2005; Linsley and Shrives 2006). It has to be noted that prior studies did mainly not focus on risk disclosures required by a specific accounting standard. Apparently, this relationship between number of disclosures and company size does hold as well for the specific IFRS 7 disclosure behavior. This paper tested also for the association between *quantitative* market risk disclosures and the company size and found a highly significant correlation as well. The findings imply that larger firms show higher quantitative market risks indeed, but these higher risk exposures are better explained by means of more narratives (number of disclosures). From a stakeholder’s point of view, this is a desirable finding. Finally, it has been concluded that firms disclosing higher quantitative market risk and a larger number of market risk disclosures, do not significantly better perform, as measured by the two variables return on assets and return on equity. It can be argued, based on the risk/return trade-off postulated by Markowitz (1952), that higher risk is likewise related to higher (potential) returns, but also to higher (potential) possible losses. The findings support this fact; assuming a gain/loss symmetry of currency and interest rate exposures. Overall, (potential) stakeholders gain insight into the market risk disclosed under the requirements of IFRS 7. In summary, the more market risk exposure is showed to a reader of an annual report, the better explained are these risks and the basically more risky is the company under consideration. Hence, stakeholder may rely on disclosures under IFRS 7 to assess about the market risks that origin from financial instruments.

Table 8  
Summary of hypothesis tests

Hypothesis		Outcome
H1	Number of SA* disclosures > VaR disclosures	Supported
H2(a)	Level of disclosed market risk - company's total risk	
	using beta	No association
	using price to book ratio	Indeterminate association
	using asset cover	No association
H2(b)	using gearing ratio	Positive association
	Number of disclosures - company's total risk	
	using beta	No association
	using price to book ratio	No association
H3(a)	using asset cover	No association
	using gearing ratio	Positive association
	Level of disclosed market risk - company's size	
	using market cap	Positive association
H3(b)	using sales	Positive association
	Number of disclosures - company's size	
	using market cap	Positive association
	using sales	Positive association
H4	Level of disclosed market risk - company's performance	
	using return on assets	No association
	using return on equity	No association

\*Sensitivity analysis

Limitations of the presented analysis include the relatively small sample size to test H2 - H4 and the linearity assumptions made by transformation different percental risk sensitivities to the 1% sensitivities. It is also acknowledged that only data could be collected from two market risk types, i.e. currency risk and interest rate risk revealed only by means of sensitivity analysis. Moreover, it has been accepted that risks classified as “immaterial” could not be quantified and therefore were excluded from further analysis. Further on, three inherent characteristics of IFRS 7 may reduce the usefulness of this accounting standard to assess the “true” risks arising from financial instruments. Firstly, exposures on translating the financial statements of subsidiaries into the presentation currency of a company do not need to be included in the sensitivity analysis. Secondly, disclosures under IFRS 7 are mainly not forward-looking (reporting date related). Thirdly, IFRS 7 does not offer a comprehensive framework to disclose market risk. These facts raise room for accounting policy; e.g. it is the director’s decision of what is an immaterial risk exposure and many used model parameters like assumed correlations between risk variables are not disclosed. Finally, it must be noted that IFRS 7 does not provide a comprehensive view on the risk level of a non-financial company (strategic risks and operating cash flow-at-risks are not considered).

Further research could be done to close the existing gap of empirical investigation whether mandatory risk disclosure within specific accounting standards basically augment the usefulness of annual reports to adequate decision-making of stakeholders. It would also be interesting to compare the results presented in this study to further cross-country empirical investigation on the usefulness of IFRS 7. Especially industry-specific studies including all risk categories within the scope of IFRS 7 would extend the existing risk disclosure literature in a meaningful way.



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