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Company Risk-Taking

-A Study of How Gender Diversity and Employee Representation on Board of Directors Influence Companies' Risk-Taking

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Abstract

Title:	Company risk-taking: a study of how gender diversity and employee representation on board of directors influence companies' risk-taking.
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Authors:	Pamela Billgren and Michelle Wihlborg.
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Key words:	Board composition, gender diversity, employee representation, total risk, idiosyncratic risk, and panel data.
Purpose:	The purpose of this thesis is to study possible correlation between companies' risk-taking and the board composition factors gender diversity and employee representation. The study is examining the following two issues; How does gender diversity and employee representation on board of directors influence companies' risk-taking?
Theoretical perspectives:	Employee representation on board of directors, Definition of gender (female and male characteristics), and Risk definition and measurements.
Empirical foundation:	This study examines the 30 most traded companies in Germany (DAX), Sweden (OMX30) and the U.S.A. (Dow Jones Index) for the time period 2001-2005.
Methodology:	The total risk is measured as the standard deviation of the monthly stock return, and the idiosyncratic risk is measured as the standard deviation of the residuals of the CAPM model. The regressions are conducted using panel data to test the two hypotheses of gender diversity and employee representation.
Conclusion:	We do not find any clear evidence that gender diversity and employee representation on board of directors influence companies' risk-taking. Merely one of the regressions presents significance for the variable employee representation and that is the regression for idiosyncratic risk amongst the Swedish companies. Since this study presents more significant variables in the regressions involving idiosyncratic risk than the ones involving total risk, we can conclude that the idiosyncratic risk is a better risk measurement than total risk.

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1 Introduction

This chapter contains a presentation of the background concerning the research fields of how the features of board members influence companies' risk level. The remaining part of the chapter discusses the research problem, which will be followed by the purpose and the research question of the dissertation. In the end of the chapter the theoretical limitations and the outline are presented.

1.1 Background

A hot topic within finance today is the question of board composition, especially gender diversity, and its effect on companies. Today, some countries have implemented quotas in order to enhance the share of women on board of directors. A country that has implemented this kind of quota is Norway (Schulzs, 2008) and several other countries are in a discussion concerning gender quotas on board of directors (Westlund, 2009). Another issue of board composition is employee representation. Previous studies have focused on extending the concept of corporate governance to include other stakeholders than the shareholders, such as suppliers and employees (Luoma & Goodstein, 1999). Depending on companies' board structure, stakeholders have varying degree of influence (amongst others, Li, 1994; Hops & Leyens, 2004). Today, employees are considered by many companies to be as important stakeholder group as shareholders (Han, 2009). By extending the domain of corporate governance to include employee representation on board of directors may result in that the decision-making might be less profit oriented and more beneficial for employees. Distinct differences between countries, when it comes to employee representatives in the board of directors, exist. For example, in some countries employees have the legal right to be represented on the board of directors (Li, 1994; Adams & Ferreria, 2007), while in other countries employee representation on board of directors is non-existing. For instance, countries like Germany and Sweden have implemented regulation concerning employee representation, giving the employees better possibilities to influence companies' decision-making. A country that does not have a law of this kind and is known for not including employee representatives in their board of directors is the United States (Roe, 1993; Li, 1994).

Risk is another widely discussed subject with focus on everything from credit risks (Avaramov, Jostova & Philipov, 2005) to hedging price risks (Petersen & Thiagarajan, 1997)

and strategic risks (Miller & Bromiley, 1990). One of the main concerns of a financial company is how to control and manage the risk within the company (Bochaud, 2000). However, it can be hard to give a proper definition of risk since individuals might consider risk from different perspectives depending on their situation (Drew & Kendrick, 2005). Several researchers claim that there are major differences between men and women when it comes to risk-taking (Barber & Odean, 2001; Xiao, 2008). Women tend to be more risk averse than men, especially when it comes to financial decisions (Bymes, Miller & Schafer, 1999). Furthermore, it is also stated that there are specific differences between men and women in their work style. For instance, men are more aggressive, visible and noticed in their work, while women are more cautious. Women, at the same time as they want to succeed, focus on making the work environment more satisfying for everyone within the company (Rigg & Sparrow, 1994; McLoughlin, 1992). Another discussed area of risk is how employee representatives on board of directors might have an impact on the decision-making of board of directors (Strøm, 2007; Fuerst, 2006). Since employees are a part of the daily operating activities they possess valuable information that could be of interest for the board of directors in its decision-making.

1.2 Problem

A large amount of the existing research on board composition focuses on gender diversity on board of directors and its influence on firm performance. Also, risks of different kinds that can be in question for the actual business are widely discussed. However, little emphasis has been made on combining these issues. Today, we are moving towards a more global society, which entails new risks for companies. As mentioned, a main concern in financial firms is to be able to control and manage these new risks (Miller & Bromiley, 1990). In order to do so in the most optimal way, it is important to understand how specific factors influence the risks of companies. Adams and Ferreria (2008) conclude that women have a significant impact on the board input and the company output; however, that the average effect of gender diversity on board of directors on firm performance is negative. By creating a picture to which extent women influence the risk-taking in companies can be used as an indicator for shareholders when deciding which companies to invest in, and when electing new board members. Furthermore, in some countries employee representatives have the legal right to take positions on companies' board of directors. Employee representatives tend to have an entirely different perspective of risk than the other, for example outside, board members (Luoma & Goodstein,

1999). Since there are major differences concerning employee representation on board of directors between markets, it is essential to give a clear picture of how employee representation influences companies' risk-taking.

1.3 Purpose

The purpose of this thesis is to study possible correlation between companies' risk-taking and the board composition factors gender diversity and employee representation in German, Swedish and U.S. listed companies. The study is examining the following two questions:

- How does gender diversity on board of directors influence companies' risk-taking?
- How does employee representation on board of directors influence companies' risk-taking?

1.4 Limitations

This study is limited to the 30 most traded companies listed on the German (DAX), Swedish (OMX) and U.S. (Dow Jones Index). The differences in board structure in companies, origin from these three countries, are the motivation for choosing German, Swedish and U.S. companies. The examined time period is limited to 2001-2005, which means that the data is not influenced by the recent financial crisis.

One assumption made in this study is the fact that men are men and women are women. Hence, no consideration is taken to the fact that some men tend to show female characteristics, and that some women tend to present male characteristics.

1.5 Outline

This thesis is based on five chapters. In the first chapter, introduction, the background and the problem of the topic are presented, followed by the purpose and the limitations. In the second chapter, the theoretical framework, theories connected to the topic are presented, followed by the formed hypotheses. The third chapter, empirical method, presents the sample selection and

the operationalisation of the variables used in the study. The fourth chapter, analysis and discussion, presents the empirical findings and the analysis of these. The fifth chapter, conclusion, include the conclusions of the study, the contribution, and finally some suggestions for future research.

2 Theoretical Framework

This chapter contains a presentation of the theoretical framework used in this thesis. The chapter introduces literature concerning employee representation on board of directors, definitions of characteristics of females and males and risk measures. Finally, the chapter presents the reader to the hypotheses developed from the theories.

2.1 Employee Representation on Board of Directors

Laws and political constraints have lead to the fact that companies origin from different countries have different board structures (Roe, 1990; Hops & Leyens, 2004). Generally, German and Swedish companies have an intense ownership of shares with a power control that is decentralised. Conversely, American companies usually adopt board systems consisting of a non-concentrated share ownership and where the senior managers possess the power (Roe, 1993; Frank & Mayer, 2001).

The relationship between the shareholders (principals), represented by the board of directors, and the employees (the agents) can be considered as a contract where the agent performs an act on the behalf of the principal (Jensen & Meckling, 1976). Fama (1980) argues that companies consist of agents and principals with different interests, which causes interest conflicts. However, since both parties lose in an interest conflict, both of them have strong incentives to minimize these issues (Fama & Jensen, 1983). One example of an interest conflict, which might arise between the two parties, is the level of risk that the company incorporates (Jensen & Smith, 1985). Jensen and Smith (1985) argue that the agent, whose investments consist of it developing the company's human capital, is more risk averse, and therefore demands a higher risk premium than the principal, which have the opportunity to spread its risk in a portfolio.

Employee representatives on the board of directors can be considered as either a resource or as a burden (Levinson, 2001). As part of the company's daily operating activities, employees possess information that could be of interest for the board of directors in its decision-making. Information received by the board of directors, given by the employees, can either complement or separate from the information given by the CEO (Strøm, 2007). According to Fauver and Fuerst (2006) and Strøm (2007) including employee representatives on board of

directors diminishes the managerial agency costs, since the employee representatives act as well-informed monitoring units. These monitoring units reduce the risks of, for example, excessive wages to the elected board members (Fauver & Fuerst, 2006). Conversely, including employee representatives on board of directors tends to lead to more time consuming decision-making (Strøm, 2007).

2.1.1 Country differences

In many countries, employees are considered to be an equally important stakeholder group as shareholders are (Han, 2009). For example, in Germany, employees have the legal right to be represented on the company's board of directors (Li, 1994; Adams & Ferreira, 2007). In fact, German companies that employee 2,000 or more employees are forced by law to include a number of employee representatives that equals half the company's supervisor board (Hops & Leyens, 2004). In Sweden, the labour unions are strong, and nine out of ten employees are included in collective settlements. Despite a recent decrease of labour union members, with its 70 percent of all employees being members in a labour union, Sweden has together with Denmark and Finland the world's highest union membership (Kjellberg, 2010). Employee representation in Swedish companies is, as in Germany, legally compulsory (Li, 1994). In Sweden employees that are working in companies that employ 25 or more employees have the right to request two permanent board members and two alternate. In companies that employ 1,000 or more, the employees have the legal right to claim three board members and three alternate (Brandinger, 2004). Thus, according to Brandinger (2004), due to the fact that board of directors' working tasks and responsibilities differ widely between German and Swedish companies, a comparison cannot be made between the regulations in these countries. An opposite example to the German and Swedish companies is the American companies. Generally, U.S. companies have an entirely different board structure than companies in countries such as Germany and Sweden (Roe, 1993). According to Li (1994) is it rare to have employee representation on board of directors in U.S. companies.

2.2 Definition of Gender

In prior research there is a discussion concerning the distinction between gender and sex (Newman, L. K., 2002). The definition of gender refers to how men and women are being formed through social and cultural processes and the definition of sex refers to biological sex

i.e. congenital structural and psychological characteristics (Meier-Pesti & Penz, 2008; Alvesson & Billing, 1997). Theories that support the biological reasons declare that the difference between males and females in financial risk-taking is sex differences, for instance genes and hormones. Furthermore, a presentation of typical female and male characteristics follows below.

2.2.1 Female Characteristics

As described in the literature classic female characteristics are emotional, soft, immaterial, helpful, responsive and socially concerned (Cleveland, Stockdale &Murphy, 2000; Rigg & Sparrow, 1994). Woods (2008) explains female characteristic as nurturance, affiliation and relationship orientation. Further, Woods (2008) argues that these characteristics do not have a positive impact on the career advancement of women in management. According to Morrison and van Glinow (1990) women's features, behaviours, socialisations and attitudes might be deficient or inappropriate as managers. Literature that examines the relationship between gender and risk declare that women are more risk averse than men (Bymes, Miller & Schafer 1999; Eckel & Grossman 2002). In investment situations women feel that they have little ability and knowledge (Barber & Odean, 2001). Xiao (2008) strengthen this statement by saying that women are less risk willing, which in turn is related to their confidence. Prior research reports about significant differences between men and women in their management style. For instance, McLoughlin (1992) writes that women in management tend to have wider goals and wants to succeed, but at the same time they want to make the work environment more satisfying for everyone in the company. Furthermore, Marshall (1984) claims that women believe that, "challenge and satisfaction in a particular job are more important than recurrent promotion for it's own sake" (p. 23), and according to Eagly and Carlie (2003) women adopt a more democratic leadership style.

2.2.2 Male Characteristics

Generally, male characteristics are goal orientated, forcefulness and strength in decision-making (Wood, 2008). According to Rigg and Sparrow's (1994) research, men are more likely to be competitive, aggressive and demanding than women. Men often values power, efficiency, achievements and competency high (Colwill & Townsend, 1999). In comparison to women, male communication is more direct towards providing answers and is more direct

toward solutions. The positive outcome of this might be that the communication within a company is convergent and that it has a solution-oriented thinking. However, the negative outcome can be that men do not explore problems sufficiently by reaching solutions to them too quickly (Colwill & Townsend, 1999). Prior research states that men are less risk averse than women. Even if men know that it is a bad idea to take a certain risk, they are prepared to take it (Bymes, Miller & Schafer, 1999). Barber and Odean (2001) write that psychologists find that in areas, such as finance, men are more overconfident than women, which results in that men trade to a larger extent and also more aggressive. Rigg and Sparrow (1994) conclude that there are differences between managerial styles of men and women and that men are more visible and noticed both in a positive and in a negative way.

2.3 Risk

Today, there are several kinds of risks that a firm might face and the literature presents a number of definitions of risk (Drew & Kendrick, 2005). One of the main concerns for many financial firms has become to estimating and controlling financial risks. Throughout the years several researchers have studied theories concerning financial risks (Bouchaud, 2000). Some studies refer to risk and some studies refer to uncertainty. For instance, Baird and Thomas (1985) propose that strategic planners rarely possess proper information about future probabilities. For that reason several strategic decisions involve uncertainty rather than risk. Furthermore, more traditional studies give a definition of risk as the condition where the consequences of decisions and the probabilities of those outcomes are unknown (Knight, 1921). According to March and Shapira (1987) risks are mostly associated with negative outcomes. Depending on industry companies face different risks, such as credit risks, operational risks, strategic risks or financial risks (Chavez-Demoulin, Embrechts & Nešlehová, 2006; Miller & Bromiley, 1990; Baird & Thomas, 1985). A reason for why it might be hard to give a proper definition of risk can be that different individuals might view risks and uncertainties differently depending on their situation (Drew & Kendrick, 2005). Drew and Kendrick (2005) summarises that in order to classify risk one might need to look at the context, for example, at the industry and the chosen strategy.

When it comes to companies' risk there are several studies of firm-specific risks, for example the idiosyncratic risk (Nguyen, 2011; Goyal & Santa-Clara, 2003). This kind of firm-specific risk might be important for several reasons. For instance, high levels of idiosyncratic risk is an

indication of low correlations between stocks, which leads to an increase in number of securities that is needed in order to generate a well-diversified portfolio. Another reason might be that the stock option prices can depend on the total volatility of the underlying stock and in this case the idiosyncratic volatility might be the largest factor of risk. Another common risk measure within previous research is the total risk of a company, which measure how much the stock return fluctuates each month (Nguyen, 2011; Anderson & Fraser, 2000). Anderson and Fraser (2000) explain that total risk can also be considered as the combined risk of all kinds of risk factors that might affect companies.

2.4 Development of hypotheses based on the literature review

Generally, women and men have very different working styles (Riggs & Sparrow, 1994). Typically, women are less confident than men when making investments, leading them to question their own knowledge and skills (Barber & Odean, 2001; Xiao, 2008). Furthermore, Xiao (2008) argues that women are more risk averse than men, which is related to the their confidence level. According to Eagly and Carlie (2003) men are more competitive and aggressive in their behaviour. The higher the ratio of males on the board of directors is, the higher the risk-taking of the company should be. With the purpose of examining the discussion concerning gender diversity on board of directors and companies' risk-taking, the following hypothesis is developed:

Hypothesis 1: The ratio of males on board of directors influences companies' risk-taking positively.

Several countries have legislated about the fact that companies must include employee representatives on their board of directors. Swedish and German companies are examples of companies where employee representatives have the legal right to participate as board members (Li, 1994; Adams & Ferreria, 2007). Employees tend have a different perspective on risk and a consequence of this is that it affects the decision-making made by the board of director. Based on the presented literature of employee representatives on board of directors and risk-taking the following hypothesis is developed:

Hypothesis 2: Employee representation on board of directors influences companies' risk-taking negatively.

3 Empirical method

In this chapter the empirical method that is used in this thesis is presented. The empirical method includes the sample selection followed by the operationalisation of the dependent, independent and the control variables. In the end of the chapter a description of panel data with related tests is presented.

3.1 Sample Selection

This study is conducted on a sample consisting of data from the 30 most traded companies listed on the German (Börse Frankfurt) and Swedish (Stockholm OMX) stock exchange market, as well as in the U.S. (Dow Jones Index). The board structures in these countries differ significantly, which makes it interesting to examine companies, origins from these countries, for possible differences in their risk-taking. To avoid possible influences from the recent financial crisis, the sample data is collected between January 1st 2001 and December 31st 2005.

For the study to work, two critical requirements are set. The first requirement is that the relevant data of the companies in the sample has to be complete. For instance, companies with lacking information concerning employee representation on their board of directors are excluded from the study. The second requirement is that all companies in the sample have to have been listed during the whole time horizon that is being studied. Since we study, amongst others, the standard deviation of stock returns, it is crucial that complete information concerning this can be collected.

The initial sample of this study consisted of 90 companies; however, due to varying reasons, such as incomplete information, the final sample consists of 67 companies. The information for the study is collected from the companies' annual reports and from Thomson Reuters DataStream. The data is mainly collected yearly; however, the companies' stock prices is collected daily and then translated into yearly data.

3.2 Operationalisation

Operationalisation of variables is the definition of how variables are transformed into

measurable factors (Saunders *et al*., 2009). The variables of this study are operationalised according to our benchmarking article written by Nguyen (2011) concerning corporate governance and risk-taking. The dependent variable is companies' risk-taking; however, the independent variable of Nguyen's study is replaced in this study by the two variables gender diversity and employee representation on board of directors. The control variables are the size of the firms total assets, the ratio of book equity to total asset (henceforth called equity), dividends to equity, market to book value of assets, return on asset, ratio of fixed assets, and age of the company.

3.2.1 Dependent Variable

The risk variable, which is the dependent variable in this study, is examined by using two different risk measures, namely total risk and idiosyncratic risk. Nguyen (2011) uses four risk measures, namely total risk, systematic risk, idiosyncratic risk and relative idiosyncratic risk. However, in this study, merely total and idiosyncratic risk is used. The reason for not including the other two risk measures is the fact that total risk includes the systematic risk, and that the relative risk is just a ratio of idiosyncratic risk to total risk. Both the total and the idiosyncratic risk measurements are commonly used when estimating influences on company risks. Total risk can be considered as the combined risk of all factors that might influence a company, and is measured by taking the standard deviation of the companies' monthly stock return (Andersson & Fraser, 2000; Nguyen, 2011).

The idiosyncratic risk measures the firm-specific risk, which equals the risk that companies face of not achieving the return that the shareholders' expect given the market return for the same period of time (Spiegel & Wang, 2005). According to Goyal and Santa-Clara (2003) estimations of the idiosyncratic risk can be used when forecasting future stock returns. Nguyen (2011) uses Fama and French (1993) three-factor model when estimating the idiosyncratic risk. However, in this study, another method of estimating the idiosyncratic risk is used. Instead, the idiosyncratic risk is measured as the standard deviation of the residuals of the CAPM model

$$(R_{i,t} - R_{f,t}) = \alpha + \beta(R_{m,t} - R_{f,t}) + \varepsilon_t$$

where $R_{i,t}$ is the excess return of stock *i* at time *t*, $R_{f,t}$ is the risk free rate of interest, i.e. the

one year risk free rate of interest in each country (EURIBOR, Sweden Treasury Bill, U.S. Treasury Bill) at time t where T is the time period of 250 working days for the daily returns, $R_{m,t}$ is the excess market return and ε_t is the residuals. The excess stock return is given by estimating the following formula

$$R_{i,t} = \frac{P_{i,t} - P_{i,t-1}}{P_{i,t-1}} \tag{1.1}$$

where $P_{i,t}$ is the price of stock *i* at time *t*. The excess market return is given by estimating equation (1.1) using the average stock return for each stock market (DAX, OMX30 and the Dow Jones Index).

3.2.2 Independent Variables

To measure the gender diversity on the companies' board of directors (henceforth called gender), we construct a ratio. This ratio is calculated as the share of men on the board of director, divided by the number of total number of board members. When calculating the ratio, women are given the number zero, while men are given a one. This means that companies with a ratio of zero have a board of directors consisting merely of women, while companies with a ratio of one have a board of directors consisting merely of men.

Employee representation on board of directors (henceforth called employee) is operationalised as the proportion of the total number of board members. In Germany and Sweden it is regulated by law that companies must include employee representatives on their board of directors, while in the United States no such law exists. According to the literature the proportion of employee representation should be lower in the United States than in Germany and Sweden.

3.2.3 Control Variables

In this study, a number of control variables are included, which are based on our benchmarking article written by Nguyen (2011). The control variables are used, together with the independent variables, to explain the dependent variables. The chosen control variables are considered to have a possible affect the companies' risk-taking.

Size is defined as the natural logarithm of a company's total assets. The size might be a factor that influences the risk-taking due to the fact that a large company is expected to be less risky because it has a greater ability to diversify across a larger product line. *Equity* is defined as the ratio of book equity to total asset. The risk presented for the shareholders are lower if the company in question has more equity and less debt. There are two different types of variables that define the growth opportunities in companies, which in turn affect their risk-taking. These are the *dividends to equity* and the *market to book value of assets*. Dividends to equity is defined as the ratio of dividends to book value of equity. Companies with more growth options (i.e. high dividends to equity and low market to book value of assets) might be considered to have a high-risk profile. *Return on assets* is defined as the ratio of operating profits to total assets. This variable affects the risk-taking because companies with larger profits are expected to take on more risk. *The ratio of fixed to total assets* (henceforth called ratio of fixed assets) is defined as the ratio of fixed assets to total assets and is used as a measure in order to control for the risk that involves the operational leverage. A high ratio of fixed assets means that more capital is tied up in the company, often in low risk assets, such as properties and plants, which means that the company has less capital to spend on other, more risky, investments. Additionally, the *age of the firm* is defined as the number of years since it was founded. The age of the firm is expected to be of importance for the risk-taking. Younger companies might "be forced" to, for example take on debts, in order to continue to exist since they have not yet built up a good reputation and credibility, while older companies might have built up a reputation and credibility, which gives them the possibility to easier gather capital from, for example the shareholders.

3.3 Panel data

If the data contains both time-series and cross-sectional elements it can be used as panel data. "A panel data will embody information across both time and space" (Brooks, 2008, pp, 287). There are several advantages with using panel data, for instance one can approach a wider range of issues and be able to solve more complex problems than one can do with time-series or cross sectional data alone. Another advantage with using panel data is if it is of interest to examine how variables or the relationship between the variables changes over time. If one would use merely time-series data for this type of examination it would require a large amount of observations in order to conduct a significant hypothesis test (Brooks, 2008). However, when one can combine the time-series data with the cross-sectional data the number

of degrees of freedom increase and likewise the power of the test. When combining the data in this way possible problems of multicollinearity amongst the included variables diminish (Harris & Sollis, 2003).

For this study, the following regression is constructed

$$\text{Risk}_t = \beta_0 + \beta_1\text{Gender}_t + \beta_2\text{Employee}_t + \beta_3\text{Size}_t + \beta_4\text{Equity}_t + \beta_5\text{DTE}_t + \beta_6\text{ROA}_t + \beta_7\text{RFA}_t + \beta_8\text{Firm Age}_t + \varepsilon_t$$

where Risk_t is the measured risk (i.e., either total or idiosyncratic risk) over the observed period of time, Gender_t and Employee_t are the independent variables measured for all companies in the sample over a period of time, Size_t, Equity_t, DTE_t, ROA_t, RFA_t and Firm Age_t are the control variables measured for all companies in the sample over a period of time, and ε_t is the error term. To estimate this model, Ordinary Least Square (OLS) is used. The reason to this is that OLS is "BLUE", which means that it is the best linear unbiased estimator (Brooks, 2008, pp. 44). From the regressions we receive the significance of each variable, and its influence on the dependent variable.

3.3.1 Model accuracy

There are two different types of techniques to analyse panel data. The most common in financial research is fixed and random effects. Entity based fixed effect models allow the explanatory variables, including the intercept, to vary cross-sectionally, but not over the observed period of time. In contrast, time-fixed effect models permit the explanatory variables, as well as the intercept, to vary over time, but not cross-sectionally. The random effects model, or error components model, suggests different intercept terms for each entity. These intercept terms do not change over time, and the relationship between the dependent and the independent variables are assumed to be unchanged both cross-sectionally and throughout the observed time period (Brooks, 2008).

In order to receive correct and unbiased results from the regressions there cannot be any correlations between the error terms. To remove possible correlations and reducing the standard error estimates, White robust covariance is used in all the regressions. In practical terms, the White tests include dummy variables for the fixed effects. This means that for a

regression that contains cross-sectional fixed effects, dummy variables are included as period-fixed effects, and vice versa. There are three different varieties of this method, namely the *cross-sectional method*, *the period method*, and *the diagonal method*. The first method, the White cross-sectional method, assumes that the errors are contemporaneously correlated. If there are fixed effects in the periods this method is used to correct for correlations such as heteroscedasticity. The second method, the White period method, assumes that the errors in for a cross-section are heteroscedastic and serially correlated. By using the White period method these kinds of correlations, if there are fixed effects in the cross-section, are corrected for. The last method, the White diagonal method, is used when there is fixed effects in both cross-sectional and period.

4 Analysis and discussion

In this chapter the descriptive statistics of the gathered data and the results of the empirical findings are presented. This is followed by an analysis and discussion of the results.

4.1 Descriptive statistics

Before one can run regressions and investigate relationships between variables it is important to distinguish if the data is valid and that it will give unbiased results. A way to control this is to consider the distribution of the data. Firstly, a correlation matrix is conducted in order to control for possible correlation between the variables that are included in the model. If one or more variables are correlated with each other the final regression can give a biased result. The result of the correlation matrix is presented in table A2.1, appendix 2. As can be seen in the correlation matrix the control variable market to book value of assets has a correlation with three other variables, where it has a correlation around 0,5. Because of this correlation, the control variable market to book value of assets is excluded from the regression. We believe that excluding this variable it will not affect the final result significantly since market to book value of assets is just one of two control variables that measure growth opportunities.

To be able to include the other variables in the constructed regression the variables must be normally distributed, or as close as possible, to being normally distributed. The descriptive statistics of the properties of the created regressions are presented in table 1-4 below. Table 1 presents descriptive statistics of the variables where the data from all countries are included (i.e., Germany, Sweden and the United States). Variables that are included in the regression are gender, employee, size, equity, dividends to equity, return on assets, ratio of fixed assets and firm age. In order to know if the data is normal distributed a Jaque-Bera test is conducted. If any of the companies possess values that can be considered as outliers, the company is excluded from the sample in order for the data to be correct distributed. In cases where the outliers consist of more than two companies we have chosen to accept them, given that the outliers do not differ extremely from the other companies. Furthermore, in table 2-4 descriptive statistics are presented for each country individually.

Table 1. Descriptive Statistic for All Data Combined
(DTE is the dividends to equity, RFA is the ratio of fixed assets and ROA is return on assets)

	Gender	Employee	Size	Equity	DTE	ROA	RFA	Firm age
Mean	0,858	0,204	10,645	0,332	0,058	0,080	0,533	101,537
Median	0,867	0,182	10,610	0,319	0,046	0,062	0,569	99,000
Std, Dev,	0,100	0,202	1,696	0,192	0,046	0,072	0,215	59,822
Skewness	-0,804	0,273	0,306	0,291	1,527	0,701	-0,517	0,914
Kurtosis	3,911	1,447	3,153	2,493	6,308	3,051	2,768	5,189
Observations	335	335	335	335	335	335	335	335

None of the variables in the risk model are entirely normally distributed. However, equity, gender, ratio of fixed assets, return on assets and size have the most resemblance to a normal distribution. These variables have both skewness close to zero and kurtosis close to three, which is an indication of normal distribution. The variable dividends to equity has a slightly positive skewness and higher kurtosis. This means that it has a high peak around its mean and decline rapidly with heavy tails.

Furthermore descriptive statistics for each country individually are presented in the following tables. In the first examination, the German companies are examined, which is shown in table 1.

Table 2. Descriptive Statistic for the German Companies.
(DTE is the dividends to equity, RFA is the ratio of fixed assets and ROA is return on assets).

	Gender	Employee	Size	Equity	DTE	ROA	RFA	Firm age
Mean	0,893	0,416	10,807	0,291	0,041	0,059	0,499	117,616
Median	0,913	0,450	10,651	0,283	0,037	0,050	0,510	117,000
Std, Dev,	0,085	0,121	1,864	0,163	0,026	0,061	0,188	68,151
Skewness	-0,820	-1,911	0,591	0,161	0,597	0,769	0,059	1,134
Kurtosis	2,889	6,244	2,916	2,509	2,804	4,714	2,957	5,522
Observations	125	125	125	125	125	125	125	125

The variables in the regression containing the German companies, and which have a resemblance to a normal distribution are dividends to equity, equity, gender, ratio of fixed assets and size. All of these variables have skewness close to zero and kurtosis near three. Nevertheless, there are variables that are not normally distributed, namely, employee, firm age and return on assets. The reason why the variable employee representation is not normally distributed might be that most of the German companies have around 50 percent employee representatives on their board of directors, while some, sporadic company, has not included or reported employee representatives on their board of directors. This can create outliers in the

sample, which makes the distribution not normal. The variable return on assets for the German companies is not far from being normally distribution; however, it differ some from the other variables.

In the second examination, the Swedish companies are examined, which is presented in table 3.

Table 3. Descriptive Statistic for the Swedish Companies.
(DTE is the dividends to equity, RFA is the ratio of fixed assets and ROA is return on assets).

	Gender	**Employee**	**Size**	**Equity**	**DTE**	**ROA**	**RFA**	**Firm age**
Mean	0,839	0,182	9,694	0,343	0,061	0,076	0,491	86,433
Median	0,866	0,200	9,304	0,337	0,057	0,068	0,532	88,500
Std, Dev,	0,137	0,113	1,760	0,202	0,053	0,070	0,255	52,838
Skewness	-0,747	-0,613	0,549	0,047	1,852	0,788	-0,500	0,239
Kurtosis	2,885	2,094	2,639	2,248	7,943	3,738	2,060	2,251
Observations	90	90	90	90	90	90	90	90

Once again, none of the variable in the risk model for the Swedish companies is perfectly normally distributed. However, only one variable differ more from the normal distribution than the other variables, namely dividends to equity. In this case it has a positive skewness and have a quite high kurtosis, which gives heavy tails. As mentioned previously, in the cases where the outliers consist of more than two companies, we have decided to accept them.

In the final examination, the American companies are examined, which is presented in table 4.

Table 4. Descriptive Statistic for the American Companies.
(DTE is the dividends to equity, RFA is the ratio of fixed assets and ROA is return on assets).

	Gender	**Employee**	**Size**	**Equity**	**DTE**	**ROA**	**RFA**	**Firm age**
Mean	0,837	0	11,191	0,366	0,072	0,103	0,599	96,117
Median	0,846	0	10,820	0,370	0,058	0,093	0,626	95,500
Maximum	1,000	0	14,072	0,807	0,209	0,261	0,928	206,000
Skewness	0,005	NA	1,242	0,331	0,743	0,401	-0,889	0,385
Kurtosis	2,281	NA	3,764	2,263	2,643	1,824	3,781	2,551
Observations	120	120	120	120	120	120	120	120

It can be seen in table 4 that there is no result for the variable employee representation. The reason for this is that employees has no legal right to participate in the board of directors and that it is rarely any employee representation on the board of directors in companies in the United States. In this study, none of the observed American companies have employee

representation on their board of directors. The results for normal distribution in the variables for the American companies are quite equal the other countries, i.e. most of the variables are close to being normally distributed, but there are some variables that have values further away. For instance, return on assets and size are two variables that deviate from the normal distribution. The variable return on assets has not a large skewness; however the kurtosis is quite small so the distribution indicates small tails. Furthermore, the size has accepted kurtosis but a positive skewness.

To summarise the descriptive statistics we can conclude that there are some variables that are not entirely normally distributed. It is important to take consideration to the fact that not all variables are normally distributed when running the regressions for the risk measures; however, the discussed values are accepted for this study. The reason for this is that there can be errors in the data, for example incorrect information due to the human factor during the collection of information from annual reports. A common reason for why the variables are not normally distributed is that there are some outliers in the data.

4.2 Empirical Findings

In this study eight regressions are conducted. Two of the regressions represent all observations, and the two risk measures. The other six regressions present each country and the two risk measures. For each regression, tests are conducted to control for possible fixed and random effects. To test for fixed effects a likelihood ratio test is used, while a Hausman test displays random effects in the regressions. The Hausman test examines whether the random effect model is applicable, while the likelihood ratio test examines the significance of the dummy variables for cross-sectional and period-fixed effects.

4.2.1 Panel data regression for all countries

Before testing for possible fixed or random effects a regular regression, consisting of all observations, is conducted. This presents one significant coefficient, namely employee representation. The R-square value of this regression is considerable low (0.12). However, it is necessary to run tests to control for possible fixed or random effects. For the regression consisting of all the data, the Hausman test for the total risk gives a p-value of 0.0282, which indicates that the fixed effect specification, and not the random effect model is the most

suitable to use. The likelihood ratio test, which is conducted on the regression, shows that there exist cross-sectional fixed effects. Only one coefficient, namely firm age, is significant at the 95%-significance level in the regression where consideration is taken to the cross-sectional fixed effects. The firm age coefficient is low, 0.014, indicating that this variable influences the total risk of the observed companies to a low degree. The coefficient for ratio of fixed assets presents a p-value of 0.10, which means that at the 90%-significance level, this variable is significant. The R-square value of this regression is 0.447, which indicates that the explanatory variables in our regression are not sufficient to explain the total risk of the observed companies. One of the variables, dividends to equity, has a p-value around 0.95, which could influence the result of the regression. Therefore, a new regression is conducted, with the exception of the variable dividends to equity. As for the first regression, the new regression presents, only one significant coefficient, namely the coefficient for firm age; however, the p-values for the other coefficients have decreased. For example, the p-value for the variable ratio of fixed assets in the new regression is approximately 0.08. The result presents an R-square value after excluding the variable dividends to equity that is equal to the R-square value of the first regression.

The regression including the idiosyncratic risk, but without respect for fixed or random effects presents several significant coefficients, namely gender, size, dividends to equity, return on assets, and firm age. However, the R-square value of this regression is, as for the original total risk regression, very low (0.166). Further, for the idiosyncratic risk the Hausman test has a p-value of 0.0, indicating that the fixed effect model is most appropriate to use. The likelihood ratio test also presents a p-value of 0.0, which means that the regression contains both cross-sectional and period fixed effects. As for the total risk regression, this regression only gives one significant coefficients, namely return on assets. According to the results of this regression, return on assets affects the idiosyncratic risk in the observed companies in a negative way, indicating that the higher the return on asset, the lower idiosyncratic risk. The R-square value of this regression is 0.52, which is, as for the regression for the total risk, to be considered as relatively high. Since none of the non-significant coefficients have a p-value that is outstandingly high, a regression that excludes variables is not conducted.

4.2.2 Panel data regressions for each country separately

As for the two regressions that contain all observations, regular regressions is conducted for each country. The result of the two regressions examining total risk and which contain German and Swedish companies, show no significant coefficient and a very low R-square value (0.04 and 0.08 respectively). However, the regression for total risk that contains American companies presents two significant coefficients, namely equity and return on assets. Also, this regression has a higher R-square value than for the other two regressions (0.16). However, the R-square value of the regression that contains American companies is yet very low. Further, the total risk regressions for all companies in each country have a p-value of the Hausman test that is less than 5%, which suggest that the fixed effect specification is the most suitable model to use. However, the likelihood ratio tests present different results. In the regressions, involving the German and the Swedish companies, there are cross-sectional fixed effects, while there are no fixed effects in the regression consisting of the American companies. For the regression with the American companies, this means that a regular regression can be used. Furthermore, the results of the three regressions continue to differ. For example, the regression consisting of the Swedish companies presents only one significant coefficient, namely firm age (-0.047). Another example of differences is the fact that the regressions for total risk in Swedish and American companies both present low R-square values (26% and 16% respectively), while the R-square value of the regression for German companies is very high (91%).

The regression for idiosyncratic risk, without respect to possible fixed and random effects, and which contains German companies, presents one significant coefficient, namely return on assets. However, the R-square value of this regression is as low as 0.1446. In contrast to this result, the regressions, without respect to fixed and random effects, that contains Swedish and American companies presents several significant coefficients. The regression containing Swedish companies presents four significant coefficients, namely employee representation, equity, ratio of fixed assets, and firm age. A fifth coefficient, namely the one for variable return on assets, has a p-value of 0.105, which might be accepted at the 90%-significance level, although not at the 95%-level. The regression containing American companies also presents four significant coefficients, namely the once representing the size, equity, return on assets, and ratio of fixed asset variables. In opposite to the regression that contains the German companies, the two regressions with observations from the Swedish and American

companies, show relatively high R-square values (0.36 and 0.429887 respectively). Further, for the three regressions, concerning the idiosyncratic risk of the companies in each country, different models are used. The regression involving Swedish companies has a p-value that is higher than 5% (0.2283), which indicates that the random effect model is the most appropriate model to use. Both the regressions that consist of German and American companies have a p-value of the Hausman test is less than 5%, which suggests that the fixed effect specification is the most suitable to use. However, the likelihood ratio test shows that the regression consisting of German companies contains both cross-sectional and time-fixed effects, while the regression consisting of American companies contains time-fixed effects. The regression consisting of German companies gives no significant coefficient; however, the two other regressions give several significant coefficients. The regression involving Swedish companies presents four significant coefficients, namely employee representation, equity, ratio of fixed assets, and firm age. The result of the regression consisting of American companies also presents four significant coefficients, namely equity, dividends to equity, return on assets and firm age. The regression involving Swedish companies presents an R-square value of 0.36. The R-square values for the regressions containing German and American companies presents R-square values which can be considered as relatively high, namely 0.68. This means that these two regressions are, to a large extent, explained by the variables included in the regressions.

4.3 Analysis

In this section the empirical findings are analysed and discussed. The eight regressions that have been conducted are analysed, first for all the countries together and then each country separately. For each sample, i.e. all data combined, the German, the Swedish, and the American companies separately, two regressions are conducted. The first regression, also called regular regression, does not take consideration to effects that might influence the results, while the second regression, or adjusted regression, uses the White test or the random effect model.

4.3.1 Analysis of all data combined

After testing the regressions for fixed and random effects it can be determined if, and in that case what type of effects, each regression possess. For example, when using the total risk as a

risk measure in the risk model the result indicates that there are period-fixed effects. All possible effects, such as heteroscedasticity, are corrected for by using the White cross-sectional test. The result of the regression is presented in table A3.1 in appendix 3, where it is shown that the age of the firm affects the total risk. According to the theory we would expect the age of the firm to have a negative effect on the risk, meaning that older companies takes less risks. However, in this regression, firm age has a positive effect on risk, which means that the older a company becomes, the more risks its takes on. One can assume that older companies are well established in the market, which allows them to take risky decisions without any devastating consequences if they fail. In contrast to this, younger companies usually have not yet built up enough credibility and reputation, which restrict them from make such risky decisions. None of the other variables in this regression are considered to be significant. However, there are one other variable that can be discussed, namely the ratio of fixed assets since it is close to 90%-significance level. The result indicates that companies that hold more fixed assets compared to their size have higher total risk. Based on theory, this result is not what we expected. Instead, in the theory it is argued that companies with high fixed assets have less risk. The ratio of fixed assets is used as a measure in order to control for the risk that involves the operating leverage, which in this regression indicates that it is more risky for companies to hold a large amount of fixed assets compared to a low amount. Since the total risk is the standard deviation of the stock return one can assume that the value of the stock decreases when the company in question choose to take on more debt to finance the fixed assets. Since just a few variables are significant, one can look closer into the R-squared value. A perfect R-square value is one, which indicates that the included variables in the regression explain the dependent variable completely. However, when combining time-series and cross-sectional data it is common that the R-square value is fairly low. Acceptable R-square values, when using panel data, are approximately 0,25 or higher. In this regression it is 0,44, which is considered as an acceptable value. If the R-square value would be higher we would expect more of the variables to be significant to the total risk.

As can be seen in table A3.1 appendix 3 the dividends to equity in a firm differs distinctively from the others in its p-value. To see if this is a variable that interfere the significance of the other variables the regression is conducted in the same way one more time, although, this time the dividends to equity is excluded. As can be seen in table A3.2 appendix 3 the R-square value is not changing; however, one can see that, for example, the ratio of fixed assets is now close to being significance at the 95%-significance level. The other variables remain the same,

which means that the dividends to equity does not interfere to a large extent in the regression. These regressions are conducted including the White test. A question is whether the results change if we conduct a regression without the White test that corrects for any effects, such as heteroscedasticity. The result for this regression is shown in table A3.3 appendix 3, where it can be seen that the R-square value drop drastically. This denotes that the variables with heteroscedasticity do not fit the model at all. All of the variables receive much lower significance; however, employee representation on the board of directors indicates high significance. Considering the extremely high coefficients for employee representation, which indicates that when the share of employee representatives on board of directors increases the risk increases radically, we can suspect that the regression is not reliable. This result contradicts theory, which argue that employee representation should lower the companies' risk. These arguments, as well as the fact that we have not corrected for any heteroscedasticity, we cannot consider the result of this regression to be valid.

The other dependent variable that is a measure of a companies risk is the idiosyncratic risk. The same tests are conducted for the idiosyncratic risk as for the total risk. The result is that there are period-fixed effects. For this reason we need to use the White cross-sectional test in order to correct for any heteroscedasticity. The result of the final regression is presented in table A4.1 appendix 4, where it can be seen that only the return on assets is significant. This time the return on assets are negatively related, which indicates that when the return on assets increases the risk decreases. This result contradicts theory since companies with larger profits are expected to take on more risk. At the same time since the idiosyncratic risk is the risk that firms face of not achieve the return that the shareholder's expect given the market return for the same period of time, it is correct that the idiosyncratic risk should decrease if the return on assets increases. Idiosyncratic risk is also commonly used when forecasting future stock return and if there is an increase in the return on assets the idiosyncratic risk will decrease, which can give an indication on greater future stock return. Once again, in order to determine if the regression gives valid coefficients one might look at the R-square and in this regression it is an acceptable value of 0,523, which denote that the regression are valid and the coefficients are correct. Furthermore, if we do not correct for any heteroscedasticity in the error terms with White's test we get the results that can be seen in table A4.2 appendix 4. Almost all of the variables are significant, but the R-square value has decreased to a very low value that is not acceptable for a valid model. Even if several of the variables are significant the variables do not fit the created risk model.

4.3.2 Analysis of the Data for Each Country Separately

In this sub-chapter the affect on the two risk measurements are discussed for each country. Firstly, an analysis of the observed companies in each countries and its influence on total risk is made. Secondly, an analysis of the influence on the idiosyncratic risk-taking in the observed companies for each country separately is conducted.

4.3.2.1 Total Risk

Two of the three regressions that include the total risk of the companies include cross-sectional fixed effects, while the third regression has no effects. The regressions consisting of the German and Swedish companies both involve cross-sectional fixed effects, while the regression consisting of the American companies possesses no effects. Hence, the two regressions of the German and Swedish companies are conducted with the White cross-sectional test, which remove the cross-sectional fixed effects, such as heteroscedacity.

In neither one of the two regressions containing the German companies, there are significant variables. Instead, in both the regressions all p-values are high, indicating that the included variables do not affect the total risk of the German companies. However, the R-square values of the two regressions involving the German companies differ widely. In the regular regression, where no consideration to possible effects is made, the R-square value is merely 0.04. This result indicates that, more or less, none of the included variables explain the total risk of the German companies. However, the R-square value of the regression conducted with the White cross-sectional test, is 0.91. An R-square value that is as high as 0.91 means that the total risk of the German companies is almost exclusively explained by the included variables. Though, the result of the regression with the high R-square value raises a question mark. As mentioned, none of the variables are significant in neither regression, and some of the variables even receive higher p-values in the adjusted regression, yet the R-square value increases drastically. The result of the adjusted regression indicates that it is other, non-included, variables that affect the German companies' total risk. Examples of non-included variables are microeconomic factors, such as price changes for industry-specific products.

The two regressions testing for total risk, that involve the Swedish companies, present different results. In the regression where no consideration is made to the cross-sectional fixed effects, no significant variables are presented. Furthermore, the R-square value of this

regression is low, merely 0.08, which means that barely any of the included variables explain the total risk of the Swedish companies. However, due to the fact that no consideration is made about the cross-sectional fixed effects that exist in the regression, the result is not reliable. The second regression conducted with the Swedish companies uses the White cross-sectional test. This adjusted regression shows that as a company aging, its total risk decreases. This result corresponds well with theory, which states that younger companies are forced to take more risk, while older, and perhaps more established companies have a higher credibility and better possibilities to gather new capital. The R-square value of the adjusted regression that contains the observed Swedish companies is considerably higher than the first regression (0.268 compared to 0.08). An R-square value of 0.268 is acceptable, although it is to be considered as fairly low.

According to the Hausman and the likelihood ratio tests, there are neither fixed nor random effects in the regression that contains the American companies. This regression includes two significant coefficients, namely equity and return on assets. According to the result, equity affects the American companies' risk-taking positively, i.e. as the amount of equity increases, so does the total risk of the company. Nguyen (2011) argues that the higher equity companies have, the lower their total risk is. Thus, the result of this study does not correspond with theory. The other variable of significance, namely return on assets, presents a negative coefficient. This means that as the return on assets increases for the American companies, the total risk of these companies decreases. The coefficient of the variable return on assets does also present opposite result from theory. According to Nguyen (2011) the risk of a company should increase as the return increases. In other words, the study conducted on the American companies and their total risk presents conflicting results with theory. The R-square value of this regression is 0.16, which is considered a low value. A reason to the low R-square value of the regression might be the fact that the total risk, which is measured as standard deviation of companies' monthly stock return, is affected by outside factors that the company might not influence. Since the stock return is based on the stock price, it can be argued that it is the market's expectations of, for example the return on assets that affects the total risk of the American companies, rather than the variable return on asset itself.

4.3.2.2 Idiosyncratic Risk

In all of the three regressions for idiosyncratic risk in the companies for each country, there are effects that influence the results of the regressions. In the regression consisting of the German companies there are both cross-sectional and time-fixed effects. This means that in order to get reliable results, it is necessary to conduct the regression together with the White diagonal test. As for the total risk amongst the German companies, the results of the two idiosyncratic regressions are poor. However, one difference exists. In the regular regression for idiosyncratic risk amongst the German companies, where no consideration to the fixed effects is made, there is one significant variable. The variable return on assets shows a low p-value, indicating that this affect the idiosyncratic risk negatively. However, the R-square value of this regression is 0.14, which is considered very low. Hence, due to the low R-square value and the fact that no consideration is made to the effects that influence the regression, the result of the regression is not trustworthy. The R-square of the adjusted regression presents a higher R-square value (0.68). As for the total risk amongst the German companies, an R-square value of 0.68 indicates that a number of other variables affect the German companies' idiosyncratic risk.

The regression consisting of Swedish companies possesses random effects. This regression presents several significant variables. According to the results, employee representation affects the idiosyncratic risk amongst the Swedish companies negatively. This corresponds with theory, in which it is argued that employees are more risk averse than other board members. The other significant variables are equity, ratio of fixed assets and firm age. This means that these variables, as the employee representation variable, affect the idiosyncratic risk of the Swedish companies negatively. It can be argued that there exists a relationship, although not correlation, between the variables equity and ratio of fixed assets. According to the results, both these variables affect the idiosyncratic risk of the Swedish companies negatively. However, an increase in the ratio of fixed assets might not lead to a decrease of the idiosyncratic risk. If a company increases its ratio of fixed assets with borrowed capital, then the gathered idiosyncratic risk might not decrease. The reason for this is that the company's debt-to-equity ratio increases, i.e. the equity, as a ratio of the company's total assets decreases. In other words, the financing of the increase of the ratio of the fixed assets is important to take into consideration when estimating companies' idiosyncratic risk. The effect of the firm age is very small, although the risk of a company usually does not change drastically from one year to another. Instead, the risk tends to change gradually over a longer

period of time. The R-square value of this adjusted regression is to be considered at an acceptable level (0.36). As can be seen in tables A8.1 and A8.2 in appendix 8, there are no major differences between the adjusted regression and the regular, where no consideration is taken to any effects. The variables employee representation and ratio of fixed assets have a slightly higher p-value in the regular regression than the once in the adjusted regression; however, they remain significant. The opposite occurs for the variables equity and firm age, which have a marginally higher p-value in the adjusted regression. The R-square value of the regular regression is, as for the adjusted 0.36. This indicates that the adjustments made in the regressions do not have a significant impact on neither the R-square value nor the p-values for the included variables.

In the final regression, consisting of American companies, time-fixed effects exist. This means that two regressions are conducted to test for the idiosyncratic risk amongst the American companies, namely one regular and one adjusted. In the adjusted regression, there are four significant variables, namely equity, dividends to equity, return on assets, and firm age. With the exception of equity, the variables have negative coefficients, which means that they affect the idiosyncratic risk of the American companies negatively. Since the variable dividends to equity is estimated as a ratio of equity, it is not unexpected that they both affect the idiosyncratic risk positively. However, Nguyen (2011) argues that the higher equity a company has, the lower its risk should be, and that companies with high dividends to equity tend to have a high-risk profile. In other words, the result of the adjusted regression is to some extent contradicting to theory. Based on theory, the variable equity should affect the idiosyncratic risk negatively, i.e. the coefficient should be negative. However, the result presents a positive coefficient for the variable dividends to equity, which corresponds with theory that the risk increases as the dividends increases. According to theory, the risk is supposed to decrease as the return on assets increases. Hence, the result of the adjusted regression for variable return on assets corresponds with theory. The variable firm age shows significance, although its affect on the idiosyncratic risk of the American companies is very small. Thus, the same discussion can be made in this context as the discussion made concerning the regression including the Swedish companies. Usually, companies do not change their risk-taking over a night, but changes are made gradually. Therefore, the small coefficient is for firm age is corresponding well with theory. The R-square value of the adjusted regression involving the American companies is considerably high (0.68), which indicates that the included variables explain the idiosyncratic risk-taking amongst the

American companies to a large degree. A second regression is conducted with the American companies, namely one that does not consider any effects. The result of this regression is to some extent coherent with the adjusted regression. Both the variables equity and return on assets are significant, and the p-values remain at the same level. However, in the regular regression, two other variables also showed significance, namely size and ratio of fixed assets. The R-square value of this regression is fairly high (0.429887); however, since the regression does not consider the existing fixed effects, the result of it is not reliable.

4.3.3 Summary of Analysis

As discussed, some regressions present results with no or few significant variables. Also, some of the regressions present R-square values that are considerably low. Therefore, we argue that outside factors, such as micro- and macroeconomic factors influences the total and idiosyncratic risk amongst the observed companies to a larger extent than the included variables. As discussed, the market's expectations of a certain variable might affect the risk more than the variable itself. Other influences on companies' total and idiosyncratic risk might be price changes, which affect the stock price in either positive or negative direction, and political decisions that makes it easier or tougher for companies to compete within a certain market, board composition factors, such as size of the board, age of the board members, and finally, the industry that the company is active in.

As mentioned in the limitations, we made an assumption that men are men and women are women, and therefore no consideration was taken to the fact that some men tend to show female characteristics, and that some women tend to present male characteristics. However, previous research presents the fact that some men have female characteristics, while some females show male characteristics. This factor might influence the results concerning gender diversity on board of directors. However, in thus study none of the regressions presented significant result for the variable gender. Hence, this limitation did not affect the results of this study.

With the results of this study, it is not possible to find any significant country similarities or differences. The reason to this is that all regressions in this study present low R-square values and few significant coefficients, as well as the fact that none of the regressions involving the German companies showed any significant result. The regression for idiosyncratic risk, and

which involves the Swedish companies, is the only regression that presents a significant coefficient for the included independent variables. As mentioned, none of the American companies in this study have employee representation on their board of director. Also, Brandinger (2004) claims that the working tasks and responsibilities of the employee representatives on German and Swedish companies' board of directors differ widely. Hence, it can be argued that employee representatives on Swedish board of directors have greater influence on the decision-making than employee representatives on board of directors in German companies. From this result, we argue that German companies feel a pressure, by the law, to include employee representatives on their board of directors, and due to this, the thoughts and opinions of the employee representatives are neglected. However, Swedish companies might not feel the same pressure to include employee representatives on their board of director, but instead they might have realised the potential of including them.

Based on the results of this study, it can be argued that the idiosyncratic risk is a better risk measure than the total risk. The regressions for idiosyncratic risk, with the observations of Swedish and American companies, present more significant variables and higher R-square value than the one for total risk. None of the regressions that consist of the German companies present any significant variable, and the two regressions that include all observations show similar results. Therefore, we argue that the regressions consisting of all companies are affected by the poor result of the regressions involving the German companies.

5 Conclusion

In this chapter the conclusion of this thesis and the contribution are presented. In the end of the chapter suggestions for future research are given.

5.1 Conclusion

The purpose of this study is to examine possible correlation between companies' risk-taking and the board composition factors gender diversity and employee representation. Hence, a research question was formulated and in order to explore the answer the research question, two hypotheses were developed from the reviewed literature:

Research question: How does gender diversity and employee representation on board of directors influence companies' risk-taking?

Hypothesis 1 The ratio of males on board of directors influences companies' risk-taking positively.
Hypothesis 2: Employee representatives on board of directors influence companies' risk-taking negatively.

Based on the literature review, we expected significant results for both the variables gender and employee representation. However, the results show no such outcomes. Merely one of the regressions present significance for the variable employee representation and that is the regression for idiosyncratic risk amongst the Swedish companies. Therefore, no generalisation of the result is possible to make. Hence, in this thesis we are not able to present any significant result to answer the neither the examined hypotheses nor the research question of this study. Instead, other variables associated with board composition, for example age of the board members, might influence the risk-taking of the companies to a larger extent than gender diversity and employee representation.

As mentioned, we can conclude that the idiosyncratic risk is a better risk measurement than total risk. The results of this study present more significant variables in the regressions involving idiosyncratic risk than the ones involving total risk. A reason for this might be that the idiosyncratic risk measure is firm-specific, while the total risk is, as mentioned, include

both the systematic and the idiosyncratic risk. Hence, the risk measurements that are more specific, with focus on merely the examined company, might present better results.

Based on the literature review, we expected to find both differences and similarities between the three observed countries. The board structure differences between the German, the Swedish, and the American companies lead us to believe that employee representation should influence the risk-taking differently, though the result indicated the opposite. Additionally, when the data was collected we found that the share of women on the German board of directors is very low, while it is relatively high in both the Swedish and American board of directors. As mentioned, none of the regressions presented a significant coefficient for the variable gender.

Finally, we can conclude that none of the included variables influence the companies' risk-taking, and that outside factors and other variables associated with board of directors affect the risk-taking more than we expected.

5.2 Contribution

In chapter one, references to previous research are presented; however, none of these studies examines the correlation between board composition and companies' risk-taking. Therefore, the focus of this study is to examine the relatively unexplored area of how gender diversity and employee representation on board of directors influences companies' risk-taking. The results of this study can hopefully contribute to the discussion concerning whether it is the companies that attracts a certain type of investors or if it is the investors that elect board members with the same vision as themselves.

5.3 Future Research

During the execution of this thesis, new perspectives of future research have occurred. It would be interesting to conduct the same study, but for a longer period of time and with a larger sample (i.e. a larger number of companies). By doing the study over a longer period of time it would be possible to see if the risk changes over time with the different variables.

Additionally, one can explore the risk taking in companies in other markets. For instance, compare companies all over Europe. Another idea is to compare differences between companies in different continents, such as Europe and Asia, to see how the risk-taking differs between these.

It is also possible to add other variables, which might be more significant to the risk measure. Suggestions for other variables might be the age of the board members and size of the board. There might be differences between younger and older individuals when it comes to decision-making and risk. Another variable that would be interesting to study is the industry. By dividing the observed companies into different industries and examine whether there are differences in risk-taking depending on which industry they are in. Furthermore, it can even be possible to investigate if there is other ways to measure risk taking in companies.

To summarise the suggestion for future research we believe it would be interesting to more or less do the same study but to develop and extend the sample size. By doing this we believe that the study will give more significant results.

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Appendix 1: List of the Observed Companies in the Study

Table A 1.1 List of Observed Companies Listed on DAX, OMX30 and Dow Jones Index.

DAX	**OMX30**	**Dow Jones**
Adidas AG	ABB Ltd	3M Co
Allianz SE	Assa Abloy	American Express Co
BASF SE	AstraZeneca	Bank of America Corporation
Bayer AG	Boliden	Boeing Co
Beiersdorf AG	Electrolux	Caterpillar Incorporation
BMW AG	Getinge	Chevron Corporation
Commerzbank AG	Investor	Cisco Systems Incorporation
Daimler AG	Nordea Bank	Coca Cola Co
Deutsche Bank AG	Scania	E I Du Pont De Nemours And Co
Deutsche Post AG	Securitas	General Electric Company
E.ON AG	SEB	Hewlett Packard Co
Fresenius SE	Skanska	Home Depot Incorporation
Heidelbergcem	SKF	Intel Corporation
Henkel AG & C	SSAB	International Business Machine
Infineon Tech	Swedbank	Johnson & Johnson
K+S AG	Svenska Cellulosa	JPMorgan Chase and Co
Linde AG	Svenska Handelsbanken	McDonalds Corporation
Man SE	Tele2	Merck & Co Incorporation
Merck KGAA	TeliaSonera	The Procter & Gamble Co
Metro AG		Travelers Companies Incorporation
RWE AG		United Technologies Corporation
SAP AG		Verizon Communications Incorporation
Siemens AG		Wal-Mart Stores Incorporation
Thyssenkrupp AG		Walt Disney Co
Volkswagen AG VZ		

Appendix 2: Correlation Matrix

Table A 2.1 Correlation Matrix Including the Independent and Control Variables.

	Dividend to equity	Employee	Equity	Firm age	Gender	Market to book value	Ratio of fixed asset	Return on assets	Size
Dividend to equity	1,0000	-0,0972	-0,0683	-0,1455	-0,1886	0,0937	-0,1359	0,2746	-0,3052
Employee	-0,0972	1,0000	-0,2481	0,1634	0,0029	0,0297	-0,1621	-0,2311	-0,0868
Equity	-0,0683	-0,2481	1,0000	-0,1041	0,0674	0,5041	0,2475	0,3391	-0,5668
Firm age	-0,1455	0,1634	-0,1041	1,0000	0,2167	0,1714	-0,0671	0,0817	-0,1646
Gender	-0,1886	0,0029	0,0674	0,2167	1,0000	0,0228	0,1149	-0,1780	-0,0240
Market to book value	0,0937	0,0297	0,5041	0,1714	0,0228	1,0000	-0,0901	0,5331	-0,4906
Ratio of fixed assets	-0,1359	-0,1621	0,2475	-0,0671	0,1149	-0,0901	1,0000	-0,0967	-0,0861
Return on assets	0,2746	-0,2311	0,3391	0,0817	-0,1780	0,5331	-0,0967	1,0000	-0,2364
Size	-0,3052	-0,0868	-0,5668	-0,1646	-0,0240	-0,4906	-0,0861	-0,2364	1,0000

Appendix 3: Regressions on Total Risk for All Observed Companies

Table A 3.1 Results of Regression on Total Risk with Period-Fixed Effects Adjusted with White Cross-Sectional Test.

Dependent Variable: TOTAL_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 14:09
Sample: 2001 2005
Periods included: 5
Cross-sections included: 67
Total panel (balanced) observations: 335
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-34.25089	28.78461	-1.189903	0.2350
GENDER	-6.538678	8.439022	-0.774815	0.4390
EMPLOYEE	73.76158	49.65433	1.485501	0.1384
SIZE	2.607178	1.686271	1.546121	0.1231
EQUITY	16.85398	11.79294	1.429159	0.1539
DIVIDEND_TO_EQUITY	1.006844	19.53883	0.051530	0.9589
RETURN_ON_ASSETS	8.404308	8.395509	1.001048	0.3176
RATIO_OF_FIXED_ASSET	7.735675	4.726609	1.636623	0.1027
FIRM_AGE	0.014051	0.004361	3.221932	0.0014

Effects Specification

Period fixed (dummy variables)

R-squared	0.447215	Mean dependent var	14.80392
Adjusted R-squared	0.426614	S.D. dependent var	39.45398
S.E. of regression	29.87543	Akaike info criterion	9.669983
Sum squared resid	287398.3	Schwarz criterion	9.817994
Log likelihood	-1606.722	Hannan-Quinn criter.	9.728991
F-statistic	21.70876	Durbin-Watson stat	2.467681
Prob(F-statistic)	0.000000		

Table A 3.2 Results of Regression on Total Risk with Period-Fixed Effects Adjusted with White Cross-Sectional Test, where the Variable Dividends to Equity is Excluded.

Dependent Variable: TOTAL_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 14:53
Sample: 2001 2005
Periods included: 5
Cross-sections included: 67
Total panel (balanced) observations: 335
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-34.09046	29.52828	-1.154502	0.2491
GENDER	-6.584516	8.198768	-0.803110	0.4225
EMPLOYEE	73.71852	49.84116	1.479069	0.1401
SIZE	2.601379	1.708824	1.522321	0.1289
EQUITY	16.77035	12.08495	1.387706	0.1662
RETURN_ON_ASSETS	8.664155	9.151976	0.946698	0.3445
RATIO_OF_FIXED_ASSET	7.756124	4.448496	1.743538	0.0822
FIRM_AGE	0.014086	0.003846	3.662217	0.0003

Effects Specification

Period fixed (dummy variables)

R-squared	0.447214	Mean dependent var	14.80392
Adjusted R-squared	0.428389	S.D. dependent var	39.45398
S.E. of regression	29.82918	Akaike info criterion	9.664015
Sum squared resid	287398.9	Schwarz criterion	9.800640
Log likelihood	-1606.722	Hannan-Quinn criter.	9.718483
F-statistic	23.75573	Durbin-Watson stat	2.467621
Prob(F-statistic)	0.000000		

Table A 3.3 Results of Regression on Total Risk without Any Adjustments for Fixed and Random Effects.

Dependent Variable: TOTAL_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 14:12
Sample: 2001 2005
Periods included: 5
Cross-sections included: 67
Total panel (balanced) observations: 335

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-29.54027	29.46419	-1.002582	0.3168
GENDER	31.16724	22.11937	1.409047	0.1598
EMPLOYEE	60.01303	11.66403	5.145135	0.0000
SIZE	0.406614	1.458837	0.278725	0.7806
EQUITY	8.391089	16.06122	0.522444	0.6017
DIVIDEND_TO_EQUITY	-8.554125	50.31439	-0.170013	0.8651
RETURN_ON_ASSETS	-34.27322	37.19294	-0.921498	0.3575
RATIO_OF_FIXED_ASSET	2.033714	11.30149	0.179951	0.8573
FIRM_AGE	0.003641	0.037998	0.095815	0.9237

R-squared	0.120557	Mean dependent var	14.80392
Adjusted R-squared	0.098976	S.D. dependent var	39.45398
S.E. of regression	37.45062	Akaike info criterion	10.11042
Sum squared resid	457231.0	Schwarz criterion	10.21289
Log likelihood	-1684.496	Hannan-Quinn criter.	10.15127
F-statistic	5.586161	Durbin-Watson stat	2.522479
Prob(F-statistic)	0.000001		

Appendix 4: Regressions on Idiosyncratic Risk for All Observed Companies

Table A 4.1 Results of Regression on Idiosyncratic Risk with Period-Fixed Effects Adjusted with White Cross-Sectional Test.

Dependent Variable: IDIOSYNCRATIK_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 14:51
Sample: 2001 2005
Periods included: 5
Cross-sections included: 67
Total panel (balanced) observations: 335
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.95E-05	0.000657	-0.105750	0.9159
GENDER	0.000125	0.000318	0.392043	0.6954
EMPLOYEE	-0.000233	0.000243	-0.958098	0.3389
SIZE	2.09E-05	3.81E-05	0.549246	0.5833
EQUITY	-0.000240	0.000438	-0.547320	0.5846
DIVIDEND_TO_EQUITY	0.000242	0.000477	0.507255	0.6124
RETURN_ON_ASSETS	-0.002824	0.001235	-2.286763	0.0230
RATIO_OF_FIXED_ASSET	0.000319	0.000328	0.971808	0.3321
FIRM_AGE	2.20E-06	1.82E-06	1.204727	0.2294

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.523325	Mean dependent var	0.000315
Adjusted R-squared	0.378087	S.D. dependent var	0.000427
S.E. of regression	0.000337	Akaike info criterion	-12.95078
Sum squared resid	2.91E-05	Schwarz criterion	-12.05133
Log likelihood	2248.256	Hannan-Quinn criter.	-12.59220
F-statistic	3.603244	Durbin-Watson stat	2.516309
Prob(F-statistic)	0.000000		

Table A 4.2 Results of Regression on Idiosyncratic Risk without Any adjustments for Fixed and Random Effects.

Dependent Variable: IDIOSYNCRATIK_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 11:09
Sample: 2001 2005
Periods included: 5
Cross-sections included: 67
Total panel (balanced) observations: 335

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000939	0.000311	3.022621	0.0027
GENDER	0.000507	0.000233	2.173907	0.0304
EMPLOYEE	-0.000155	0.000123	-1.262667	0.2076
SIZE	-6.05E-05	1.54E-05	-3.935237	0.0001
EQUITY	-0.000208	0.000169	-1.228638	0.2201
DIVIDEND_TO_EQUITY	-0.001474	0.000530	-2.778511	0.0058
RETURN_ON_ASSETS	-0.001227	0.000392	-3.128116	0.0019
RATIO_OF_FIXED_ASSET	3.70E-06	0.000119	0.031090	0.9752
FIRM_AGE	-1.31E-06	4.01E-07	-3.277826	0.0012

R-squared	0.166390	Mean dependent var	0.000315
Adjusted R-squared	0.145933	S.D. dependent var	0.000427
S.E. of regression	0.000395	Akaike info criterion	-12.80976
Sum squared resid	5.08E-05	Schwarz criterion	-12.70730
Log likelihood	2154.636	Hannan-Quinn criter.	-12.76891
F-statistic	8.133770	Durbin-Watson stat	1.562365
Prob(F-statistic)	0.000000		

Appendix 5: Regressions on Total Risk for the Observed German Companies

Table A 5.1 Results of Regression on Total Risk with Period-Fixed Effects Adjusted with White Cross-Sectional Test (German Companies).

Dependent Variable: TOTAL_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 14:56
Sample: 2001 2005
Periods included: 5
Cross-sections included: 25
Total panel (balanced) observations: 125
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	29.64573	15.38952	1.926358	0.0566
GENDER	0.067756	4.181060	0.016206	0.9871
EMPLOYEE	-0.172915	5.492243	-0.031484	0.9749
SIZE	0.253785	1.403422	0.180833	0.8568
EQUITY	1.406536	14.95733	0.094037	0.9252
DIVIDEND_TO_EQUITY	59.23857	115.1279	0.514546	0.6079
RETURN_ON_ASSETS	-14.60858	14.37415	-1.016309	0.3117
RATIO_OF_FIXED_ASSET	-0.848133	15.43465	-0.054950	0.9563
FIRM_AGE	0.004893	0.009156	0.534424	0.5941

Effects Specification

Period fixed (dummy variables)

R-squared	0.910845	Mean dependent var	34.51487
Adjusted R-squared	0.901293	S.D. dependent var	54.97987
S.E. of regression	17.27342	Akaike info criterion	8.634400
Sum squared resid	33417.54	Schwarz criterion	8.928544
Log likelihood	-526.6500	Hannan-Quinn criter.	8.753895
F-statistic	95.35333	Durbin-Watson stat	3.127275
Prob(F-statistic)	0.000000		

Table A 5.2 Results of Regression on Total Risk without Any Adjustments for Fixed and Random Effects (German Companies).

Dependent Variable: TOTAL_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 14:57
Sample: 2001 2005
Periods included: 5
Cross-sections included: 25
Total panel (balanced) observations: 125

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.179853	92.90105	0.023464	0.9813
GENDER	95.00493	62.91906	1.509955	0.1338
EMPLOYEE	-24.94539	47.18067	-0.528721	0.5980
SIZE	-2.826704	4.161394	-0.679269	0.4983
EQUITY	-28.27723	49.31722	-0.573374	0.5675
DIVIDEND_TO_EQUITY	193.6211	245.4947	0.788698	0.4319
RETURN_ON_ASSETS	-77.33998	99.56794	-0.776756	0.4389
RATIO_OF_FIXED_ASSET	-5.986515	28.39498	-0.210830	0.8334
FIRM_AGE	-0.031902	0.085346	-0.373793	0.7092

R-squared	0.043836	Mean dependent var	34.51487
Adjusted R-squared	-0.022107	S.D. dependent var	54.97987
S.E. of regression	55.58425	Akaike info criterion	10.94295
Sum squared resid	358394.7	Schwarz criterion	11.14659
Log likelihood	-674.9346	Hannan-Quinn criter.	11.02568
F-statistic	0.664759	Durbin-Watson stat	2.678280
Prob(F-statistic)	0.721486		

Appendix 6: Regressions on Idiosyncratic Risk for the Observed German Companies

Table A 6.1 Results of Regression on Idiosyncratic Risk with Cross-Sectional and Period-Fixed Adjusted with White Diagonal Test (German Companies).

Dependent Variable: IDIOSYNCRATIK_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 14:59
Sample: 2001 2005
Periods included: 5
Cross-sections included: 25
Total panel (balanced) observations: 125
White diagonal standard errors & covariance (d.f. corrected)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.015403	0.015841	0.972396	0.3335
GENDER	0.000165	0.000635	0.260719	0.7949
EMPLOYEE	-0.000257	0.000239	-1.077748	0.2841
SIZE	3.59E-05	9.39E-05	0.382184	0.7032
EQUITY	-0.000291	0.000502	-0.578909	0.5641
DIVIDEND_TO_EQUITY	0.002047	0.002251	0.909408	0.3656
RETURN_ON_ASSETS	-0.001284	0.001111	-1.156507	0.2506
RATIO_OF_FIXED_ASSET	0.000179	0.000165	1.084475	0.2811
FIRM_AGE	-0.000132	0.000133	-0.990604	0.3246

Effects Specification

Cross-section fixed (dummy variables)
Period fixed (dummy variables)

R-squared	0.681519	Mean dependent var	0.000357
Adjusted R-squared	0.551231	S.D. dependent var	0.000307
S.E. of regression	0.000206	Akaike info criterion	-13.89673
Sum squared resid	3.73E-06	Schwarz criterion	-13.05955
Log likelihood	905.5455	Hannan-Quinn criter.	-13.55663
F-statistic	5.230870	Durbin-Watson stat	1.367874
Prob(F-statistic)	0.000000		

Table A 6.2 Results of Regression on Idiosyncratic Risk without any Adjustments for Fixed and Random Effects (German Companies).

Dependent Variable: IDIOSYNCRATIK_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 15:01
Sample: 2001 2005
Periods included: 5
Cross-sections included: 25
Total panel (balanced) observations: 125

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000915	0.000491	1.863056	0.0650
GENDER	-7.85E-05	0.000333	-0.235831	0.8140
EMPLOYEE	-0.000134	0.000250	-0.536727	0.5925
SIZE	-2.67E-05	2.20E-05	-1.215227	0.2267
EQUITY	0.000351	0.000261	1.346458	0.1808
DIVIDEND_TO_EQUITY	-0.000646	0.001298	-0.497642	0.6197
RETURN_ON_ASSETS	-0.001493	0.000527	-2.834074	0.0054
RATIO_OF_FIXED_ASSET	-0.000103	0.000150	-0.685459	0.4944
FIRM_AGE	-6.81E-07	4.51E-07	-1.507517	0.1344

R-squared	0.144620	Mean dependent var	0.000357
Adjusted R-squared	0.085628	S.D. dependent var	0.000307
S.E. of regression	0.000294	Akaike info criterion	-13.35675
Sum squared resid	1.00E-05	Schwarz criterion	-13.15311
Log likelihood	843.7967	Hannan-Quinn criter.	-13.27402
F-statistic	2.451530	Durbin-Watson stat	0.848944
Prob(F-statistic)	0.017277		

Appendix 7: Regressions on Total Risk for the Observed Swedish Companies

Table A 7.1 Results of Regression on Total Risk with Period-Fixed Effects Adjusted with White Cross-Sectional Test (Swedish Companies).

Dependent Variable: TOTAL_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 15:04
Sample: 2001 2005
Periods included: 5
Cross-sections included: 18
Total panel (balanced) observations: 90
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.00948	8.352744	1.557510	0.1235
GENDER	-48.13207	34.80357	-1.382963	0.1707
EMPLOYEE	2.679908	13.28375	0.201743	0.8406
SIZE	2.808367	2.279958	1.231763	0.2218
EQUITY	19.67655	18.03762	1.090862	0.2787
DIVIDEND_TO_EQUITY	-40.68619	75.99714	-0.535365	0.5939
RETURN_ON_ASSETS	-13.17687	10.31075	-1.277974	0.2051
RATIO_OF_FIXED_ASSET	15.56063	16.66853	0.933533	0.3535
FIRM_AGE	-0.047310	0.014877	-3.180030	0.0021

Effects Specification

Period fixed (dummy variables)

R-squared	0.268003	Mean dependent var	7.145290
Adjusted R-squared	0.153925	S.D. dependent var	27.02416
S.E. of regression	24.85745	Akaike info criterion	9.397077
Sum squared resid	47577.75	Schwarz criterion	9.758160
Log likelihood	-409.8685	Hannan-Quinn criter.	9.542687
F-statistic	2.349306	Durbin-Watson stat	2.184002
Prob(F-statistic)	0.012544		

Table A 7.2 Results of Regression on Total Risk without any Adjustments for Fixed and Random Effects (Swedish Companies).

Dependent Variable: TOTAL_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 15:02
Sample: 2001 2005
Periods included: 5
Cross-sections included: 18
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	35.41218	43.00558	0.823432	0.4127
GENDER	-23.67785	27.84686	-0.850288	0.3977
EMPLOYEE	-7.563236	27.61620	-0.273870	0.7849
SIZE	-0.488442	2.237555	-0.218293	0.8278
EQUITY	20.84338	25.37933	0.821274	0.4139
DIVIDEND_TO_EQUITY	-72.08491	57.99778	-1.242891	0.2175
RETURN_ON_ASSETS	-77.14510	53.81732	-1.433462	0.1556
RATIO_OF_FIXED_ASSET	6.648169	19.73575	0.336859	0.7371
FIRM_AGE	-0.027721	0.080629	-0.343816	0.7319

R-squared	0.080006	Mean dependent var	7.145290
Adjusted R-squared	-0.010857	S.D. dependent var	27.02416
S.E. of regression	27.17047	Akaike info criterion	9.536778
Sum squared resid	59796.99	Schwarz criterion	9.786759
Log likelihood	-420.1550	Hannan-Quinn criter.	9.637585
F-statistic	0.880510	Durbin-Watson stat	2.190572
Prob(F-statistic)	0.536588		

Appendix 8: Regressions on Idiosyncratic Risk for the Observed Swedish Companies

Table A 8. 1 Results of Regression on Idiosyncratic Risk with Random Effects (Swedish Companies).

Dependent Variable: IDIOSYNCRATIK_RISK
Method: Panel EGLS (Cross-section random effects)
Date: 05/16/11 Time: 15:09
Sample: 2001 2005
Periods included: 5
Cross-sections included: 18
Total panel (balanced) observations: 90
Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002044	0.000930	2.198019	0.0308
GENDER	-4.16E-05	0.000602	-0.069160	0.9450
EMPLOYEE	-0.001674	0.000597	-2.803071	0.0063
SIZE	-5.33E-05	4.84E-05	-1.101216	0.2741
EQUITY	-0.001986	0.000549	-3.618209	0.0005
DIVIDEND_TO_EQUITY	-0.000802	0.001254	-0.639532	0.5243
RETURN_ON_ASSETS	-0.001890	0.001164	-1.624353	0.1082
RATIO_OF_FIXED_ASSET	0.000873	0.000427	2.045805	0.0440
FIRM_AGE	-4.24E-06	1.74E-06	-2.429303	0.0173
	Effects Specification			
			S.D.	Rho
Cross-section random			0.000000	0.0000
Idiosyncratic random			0.000587	1.0000
	Weighted Statistics			
R-squared	0.360198	Mean dependent var		0.000376
Adjusted R-squared	0.297008	S.D. dependent var		0.000695
S.E. of regression	0.000583	Sum squared resid		2.75E-05
F-statistic	5.700216	Durbin-Watson stat		2.400063
Prob(F-statistic)	0.000010			
	Unweighted Statistics			
R-squared	0.360198	Mean dependent var		0.000376
Sum squared resid	2.75E-05	Durbin-Watson stat		2.400063

Table A 8. 2 Results of regression on Idiosyncratic Risk without any Adjustments for Fixed and Random Effects (Swedish Companies).

Dependent Variable: IDIOSYNCRATIK_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 15:06
Sample: 2001 2005
Periods included: 5
Cross-sections included: 18
Total panel (balanced) observations: 90

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.002044	0.000922	2.216627	0.0295
GENDER	-4.16E-05	0.000597	-0.069746	0.9446
EMPLOYEE	-0.001674	0.000592	-2.826802	0.0059
SIZE	-5.33E-05	4.80E-05	-1.110539	0.2701
EQUITY	-0.001986	0.000544	-3.648841	0.0005
DIVIDEND_TO_EQUITY	-0.000802	0.001244	-0.644947	0.5208
RETURN_ON_ASSETS	-0.001890	0.001154	-1.638105	0.1053
RATIO_OF_FIXED_ASSET	0.000873	0.000423	2.063125	0.0423
FIRM_AGE	-4.24E-06	1.73E-06	-2.449870	0.0164

R-squared	0.360198	Mean dependent var	0.000376
Adjusted R-squared	0.297008	S.D. dependent var	0.000695
S.E. of regression	0.000583	Akaike info criterion	-11.96367
Sum squared resid	2.75E-05	Schwarz criterion	-11.71369
Log likelihood	547.3652	Hannan-Quinn criter.	-11.86286
F-statistic	5.700216	Durbin-Watson stat	2.400063
Prob(F-statistic)	0.000010		

Appendix 9: Regressions on total Risk for the Observed American Companies

Table A 9.1 Results of Regression on Total Risk without any Fixed and Random Effects (American Companies).

Dependent Variable: TOTAL_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 15:10
Sample: 2001 2005
Periods included: 5
Cross-sections included: 24
Total panel (balanced) observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.017419	0.019226	0.906040	0.3669
GENDER	0.009872	0.012825	0.769725	0.4431
SIZE	-0.000885	0.001216	-0.727457	0.4685
EQUITY	0.014374	0.007387	1.945921	0.0542
DIVIDEND_TO_EQUITY	0.006150	0.021016	0.292639	0.7703
RETURN_ON_ASSETS	-0.056276	0.017016	-3.307262	0.0013
RATIO_OF_FIXED_ASSET	0.002468	0.005548	0.444851	0.6573
FIRM_AGE	-1.57E-05	2.02E-05	-0.776385	0.4392

R-squared	0.160583	Mean dependent var	0.015645
Adjusted R-squared	0.108119	S.D. dependent var	0.009320
S.E. of regression	0.008802	Akaike info criterion	-6.563447
Sum squared resid	0.008676	Schwarz criterion	-6.377615
Log likelihood	401.8068	Hannan-Quinn criter.	-6.487980
F-statistic	3.060840	Durbin-Watson stat	2.181193
Prob(F-statistic)	0.005497		

Appendix 10: Regressions on Idiosyncratic Risk for the Observed American Companies

Table A 10.1 Results of Regression on Idiosyncratic Risk with Period-Fixed Effects Adjusted with White Cross-Sectional Test (American Companies).

Dependent Variable: IDIOSYNCRATIK_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 15:12
Sample: 2001 2005
Periods included: 5
Cross-sections included: 24
Total panel (balanced) observations: 120
White cross-section standard errors & covariance (d.f. corrected)
WARNING: estimated coefficient covariance matrix is of reduced rank

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000493	0.000377	1.309405	0.1932
GENDER	9.57E-05	0.000147	0.650967	0.5165
SIZE	-2.63E-05	1.89E-05	-1.389032	0.1677
EQUITY	0.000589	0.000103	5.719935	0.0000
DIVIDEND_TO_EQUITY	0.000271	0.000100	2.710913	0.0078
RETURN_ON_ASSETS	-0.001584	0.000372	-4.255752	0.0000
RATIO_OF_FIXED_ASSET	-0.000133	9.70E-05	-1.368279	0.1741
FIRM_AGE	-4.56E-07	1.27E-07	-3.593627	0.0005

Effects Specification

Period fixed (dummy variables)

R-squared	0.681283	Mean dependent var	0.000227
Adjusted R-squared	0.648821	S.D. dependent var	0.000201
S.E. of regression	0.000119	Akaike info criterion	-15.13967
Sum squared resid	1.53E-06	Schwarz criterion	-14.86092
Log likelihood	920.3803	Hannan-Quinn criter.	-15.02647
F-statistic	20.98713	Durbin-Watson stat	1.321747
Prob(F-statistic)	0.000000		

Table A 10.2 Results of regression on Idiosyncratic Risk without any Adjustments for Fixed and Random Effects (American Companies).

Dependent Variable: IDIOSYNCRATIK_RISK
Method: Panel Least Squares
Date: 05/16/11 Time: 15:12
Sample: 2001 2005
Periods included: 5
Cross-sections included: 24
Total panel (balanced) observations: 120

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000878	0.000341	2.570551	0.0115
GENDER	0.000254	0.000228	1.114273	0.2675
SIZE	-6.34E-05	2.16E-05	-2.936679	0.0040
EQUITY	0.000593	0.000131	4.520132	0.0000
DIVIDEND_TO_EQUITY	0.000450	0.000373	1.204154	0.2311
RETURN_ON_ASSETS	-0.002034	0.000302	-6.729058	0.0000
RATIO_OF_FIXED_ASSET	-0.000233	9.85E-05	-2.365367	0.0197
FIRM_AGE	-5.51E-07	3.58E-07	-1.536919	0.1271

R-squared	0.429887	Mean dependent var	0.000227
Adjusted R-squared	0.394254	S.D. dependent var	0.000201
S.E. of regression	0.000156	Akaike info criterion	-14.62481
Sum squared resid	2.74E-06	Schwarz criterion	-14.43897
Log likelihood	885.4884	Hannan-Quinn criter.	-14.54934
F-statistic	12.06459	Durbin-Watson stat	1.095775
Prob(F-statistic)	0.000000		