



Open your mind. LUT.
Lappeenranta University of Technology

Bachelor's Thesis

The Effect of Firm's Ownership Structure on the Profitability, Cost of Capital and Availability of Capital

Anu Parikka

Lappeenranta University of Technology

School of Business

Finance

January 2011

Table of Contents

1	Introduction.....	3
1.1	Research questions.....	4
1.2	Data of this research	4
1.3	Structure	4
2	Ownership.....	6
2.1	Family ownership.....	6
2.2	Agency or entrenchment.....	8
2.3	Family CEO.....	8
2.4	Board size and proportion of family members employed	9
2.5	Cost of debt	9
2.6	Controversial discussion.....	10
3	Bank relations	12
4	Data and Methodology.....	14
4.1	Data and variables.....	14
4.2	Methodology	15
4.2.1	Non-parametric tests	15
4.2.2	Parametric tests.....	18
4.2.3	Multiple regression model	22
5	Results.....	24
5.1	Descriptive statistics	24
5.2	Ownership and profitability	24
5.2.1	Ownership concentration and profitability	25
5.2.2	Share of family ownership and profitability.....	27
5.2.3	Family CEO.....	28

5.2.4	Family control and profitability	29
5.3	Ownership, cost of capital and availability of capital	31
5.3.1	Ownership and cost of capital	32
5.3.2	Ownership concentration and cost of capital.....	33
5.3.3	Which variables have an effect on cost of capital?.....	34
5.3.4	Ownership and availability of capital	37
5.3.5	Number of creditors and availability of capital.....	38
6	Summary and conclusions	40
	References.....	42

Appendices

Appendix 1: The multiple regression model of cost of capital, assumptions

Appendix 2: The multiple regression model of five year average cost of capital, assumptions

1 Introduction

Most of Finnish small and medium-sized enterprises (hereafter referred to as SMEs) are family firms. According to Heinonen (2003) 86 per cent of Finnish firms are family firms and 75 per cent of Finnish SMEs' employees work in family firms. It is important to study whether there are any differences between the family and non-family firms' performances and which variables have an effect on the differences.

A large number of papers have studied the relation of ownership structure and profitability of the firm and the results have been quite controversial. Some research papers imply that the family ownership would have a positive effect on firm's profitability. According to Anderson and Reeb (2003) family firms are more profitable than non-family firms when measured with ROA and at least as profitable as non-family firms when measured with Tobin's Q. There are also papers that claim the opposite. Barth et al. (2005) do not find the family firms performing better than non-family firms. They also investigate the effect on management of the firm and find that firms with family managers seem to perform even worse. However, Hansson et al. (2009) find that the family CEO has a positive effect on ROA and ROI.

Also the differences in cost of capital between the family and non-family firms have been studied. Anderson et al. (2003) find that founding family ownership and lower cost of debt financing are related. The number of bank relations seems, as well, to have an effect on cost of capital and availability of capital. According to Petersen and Rajan (1994) multiple financing relationships seem to increase the cost and decrease the availability of credit.

Most of the previous empirical researches have been performed on large firms, e. g. S&P 500 firms or publicly traded firms. There have only been few empirical researches on Finnish SMEs and non-publicly traded firms. Therefore, it would be interesting to study differences between family and non-family firms and different effects of ownership structure or concentration on profitability, cost of capital or availability of capital within Finnish small and medium-sized enterprises, and also, whether or not the number of financing relations has an effect on cost of capital and availability of capital.

The main issue in this research is whether or not the family ownership is better than non-family ownership when focusing on profitability, cost of capital and availability of capital of the firm.

Also the effects of concentration of ownership, control of family owners and number of creditors are analyzed in this research.

1.1 Research questions

In this study, there are four research questions:

- Research question 1: Does the ownership structure or concentration of the firm have any effect on firm's profitability?
- Research question 2: Does the family control have an effect on firm's profitability?
- Research question 3: Does the ownership structure or concentration of the firm have an effect on firm's cost of capital or availability of capital?
- Research question 4: Is there any connection between the availability of capital and the number of creditors?

The questions concentrate on differences between the family and non-family firms, and also the variables that have an effect on those differences.

1.2 Data of this research

This research concentrates on the data collected in February 2009 from Finnish small and medium-sized enterprises. Part of data was collected with a survey, where 10 148 randomly selected Finnish SMEs was contacted via e-mail. The final response rate was 9.7 per cent with 982 respondent firms. Rest of the data is financial data (turnover, ROE, ROA) which could be matched with 852 respondent firms.

Out of the 852 respondent firms which could be matched with financial data could also be categorized as either family or non-family firms. Significant amount of the SMEs in the data are family firms and the research investigates differences in profitability, cost of capital and availability of capital between family and non-family firms.

1.3 Structure

The thesis is organized as follows. The Chapters 2 and 3 are focusing on the theory part of this research. Chapter 2 concentrates on ownership, especially on family ownership compared with non-family ownership and the profitability and a cost of capital between these two ownership

structures. Chapter 3 is focused on firms' bank relations, especially on availability and cost of capital.

Empirical part of this research is presented in Chapters 4 and 5. Chapter 4 presents the data and explains the methodology used in this research. Chapter 5 presents and discusses the results of the empirical analyses.

The final chapter, Chapter 6, summarizes and concludes the research. Also the future research ideas are discussed.

2 Ownership

Firms can be divided into categories in multiple different ways. One of the common categorization is family firms and non-family firms. Family firms have been and should be taken into account in academic research, because for example, in Finland, 86 per cent of firms are family firms and 75 per cent of SMEs' employees work in family firms. (Heinonen, 2003)

2.1 Family ownership

The research of family firms seems to have two totally distinct conclusions, but most of the differences can be explained with the differences in research methods, figures and data. There are differences inter alia in the amount of family ownership or the family connection of the CEO in different research data.

There are researches who claim that the family ownership is more profitable or in some other ways better to the firm than non-family ownership, and there are researches who claim the opposite. Both sides have their statements and explanations and some of them are analyzed in this research. The main issue in this research is, however, whether or not the family ownership is better than non-family ownership when focusing on profitability, cost of capital and availability of capital of the firm.

According to Perrini et al. (2008) concentrated ownership increases firm value. They use a data of all Italian publicly traded companies between the years of 2000-2003. The firms where ownership is concentrated to the five largest shareholders have higher Tobins' Q than firms with more diversified ownership. Tobins' Q is calculated as dividing the total market value of the firm by total asset value of the firm. However, the research also shows that, when the main shareholders are compared, there is no difference between the value of family firms and the value of non-family firms. In other words, there is no difference whether the ownership is concentrated to family owners or non-family owners, but the concentration of ownership leads to higher Tobin's Q values.

Demsetz and Lehn (1985) argue that, in corporate ownership, there is a systematic variation which is consistent with value maximization. They have a sample of 511 large US corporations and, although Demsetz and Lehn (1985) do not find any evidence that there would be a relationship between the accounting profit rates and the ownership concentration, they imply that

concentrated investors have economic incentives to maximize firm value by decreasing agency conflicts.

According to a research of Anderson and Reeb (2003) family firms are more profitable than non-family firms. They use data from S&P 500, which includes 500 largest firms from USA, and measure the firm performance with profitability-based return on assets (ROA) and market-based Tobin's Q. Their research shows, that the family firms perform better than non-family firms measured with ROA and at least as well than non-family firms measured with Tobin's Q. The higher ROA of family firms is related to family member serving as a CEO and highest Tobin's Qs seem to be found in firms with founder CEO or hired outsider CEO. However, they also find that the relationship between family ownership and performance is concave and only 30 per cent or less of family ownership seems to have a positive relation with the performance. When family ownership is greater than that, it has a negative effect on performance and family firms' performance is weaker than non-family firms' with more than 60 per cent of family ownership.

Barth et al. (2005) claim that family firms are less productive, when a family member is managing the firm, and equally productive as non-family firms, when the firm is managed by an outsider. Overall, they do not find a significant effect on ownership structure to the firm performance, but the difference is found by determining, who runs the firm. The result is sustainable with the notion of Perrini et al. (2008) that the ownership structure does not separate the performances of family and non-family firms but the decision rights and the management of the firm does. The professional managers are more efficient and there is also the advantage of choosing a manager from a bigger pool than with owner-managers within the family.

However, the argument of Barth et al. (2005) seems to be different from the ones presented earlier, because they do not find the family firms performing better than non-family firms and with family management the performance is even lower. That may be because Barth et al. (2005) use productivity as a measurement of firm performance when others use for example Tobin's Q or accounting profit rates. Barth et al. (2005) defend the use of total factor productivity (TFP) with the fact that accounting profit rates can be manipulated and Tobin's Q is an available measurement only for small group of listed firms. Also, their data explains the differences in conclusions at least between the research of Anderson and Reeb (2003). Most of family firms in the data of Barth et al. (2005) have more than 50 per cent family ownership and as many as 74

per cent of the family firms have 100 per cent family ownership. Anderson and Reeb (2003) find that firms with over 60 per cent of family ownership perform worse than non-family firms, which indicates that the Barth et al. (2005) study is actually consistent with the study of Anderson and Reeb (2003).

2.2 Agency or entrenchment

The agency theory argues that the overall firm performance is greater when the management is financially attached or has great degree of ownership in the firm. The entrenchment theory claims the opposite and argues that high degree of stock ownership leads to risk averse actions, hence slower growth and weaker efficiency. In family firms the security of employment leads to inefficient management actions.

Oswald et al. (2009) compare agency and entrenchment theories and find that the entrenchment theory seems to be consistent with their data. They use a sample of 2631 non-publicly traded family firms and firm performance is measured with sales revenue. Their results show that the sales growth is negatively related to percent of family control and there is also a negative relationship between the financial performance measures used in the research and the percent of family controlling the top management.

2.3 Family CEO

Villalonga and Amit (2006) find that the higher profitability of the family firm is bound to founder serving as the CEO or as the Chairman with a hired CEO. Their research shows that for family firm to perform better the founder has to be CEO or a Chairman with a hired CEO. Firm value is destroyed with descendant-CEO. Also Hansson et al. (2009) find the link between family CEO and the performance. The family CEO has positive effect on ROA and ROI. However, they do not find any difference between profitability of family and non-family firm in their research of Finnish SMEs.

Also, Martikainen and Nikkinen (2006) suggest that “family ownership is more profitable ownership structure” at least measured with ROA, but they do not find any particular difference in the performance of family managed or outsider managed family firms. Interestingly they find that actively involved owners in non-family firms provide as high returns as family firms, but

employee ownership does not lead to better performance. It may be that the agency conflict is mitigated, when owners are actively involved.

Barth et al. (2005) have evidence that indicates family managers to be less productive than professional managers which indicates to the entrenchment effect. However, their research lacks separation between founder and descendant management. It would be interesting to separate the efficiency of the founder manager and the descendant manager. They also include the argument that the ownership structure is an endogenous outcome to their research, but they do not find significant evidence that supports the allegation.

2.4 Board size and proportion of family members employed

Martikainen and Nikkinen (2006) find an interesting fact that the board size is negatively related to firm performance. Even in the data of the Finnish SMEs where the board sizes are relatively small, they find evidence that the smaller size is related to better performance.

According to Hansson et al. (2009) the proportion of family members employed by the firm and participating to firms' day-to-day operations has a negative effect especially for ROI.

2.5 Cost of debt

Anderson et al. (2003) imply that founding families reduce agency conflicts between the debt and equity claimants. They find that founding family ownership and lower cost of debt financing are related. They use sample of firms from Lehman Brothers bond database and the S&P 500. They note that shareholders with large undiversified ownership have incentives to avoid risky investment, hence firms with concentrated ownership are safer investments for bondholders and the cost of capital is lower for those firms. The agency problem between equity and debt claimants is mitigated when, in family firms, shareholders with undiversified portfolios do not try to expropriate bondholder wealth by risky investments.

Anderson et al. (2003) show that family CEO has some detrimental effect, especially descendant CEO, but overall, the cost of capital is lower for family firms than for non-family firms. The cost advantage is highest when the family owns less than 12 per cent of the firm's shares. Greater than 12 per cent of family ownership the cost of debt increases, but remains lower than in non-family firms. Also, it seems that cost of capital is independent from outside block holders.

2.6 Controversial discussion

Demsetz and Villalonga (2001) find no connection between firms' ownership structure and performance and they criticize the use of Tobin's Q as a measurement of firm performance. They highlight the fact that Tobin's Q is based on the future and is forward-looking, and it is affected by the psychology of investors who are constrained by their acumen, optimism or pessimism. They argue that more proper measurement for firm performance is accounting profit rate because of the standardized accounting practices. However, they admit that there are differences in accounting methods used for example valuations of tangibles and intangibles. They argue that the accounting profit has been ignored unsupported in favor of Tobin's Q.

Demsetz and Villalonga (2001) also note that the fraction of shares owned by a firm's management is not a reliable index measuring the strength of professional management in the firm's operations. They suggest that important shareholding families are represented on corporate boards and the board members, who represent or are large shareholders, share unlikely a common interest with the professional managers, and therefore the agency problems cannot be measured with that fraction. However, the fraction of shares owned by corporation's largest shareholder, used by Demsetz and Lehn (1985), seems to be a better index when measuring ownership structure, although it does not include information about the management ownership. They do not find many professional managers among the five largest shareholders. Hence, the figure does not contain information about the agency problem between managers and shareholders. They summarize that the fraction of shares owned by the largest shareholders contains information about the capability of shareholders to control the management and the fraction of shares owned by a firm's management contains information about the ability of professional management to bypass shareholders. Therefore, both of these figures should be used when measuring ownership structure and the agency problem between the professional management and the shareholders.

Demsetz and Lehn (1985) show and Demsetz and Villalonga (2001) confirm that the ownership structure is endogenous and diffusing over time. Firm performance affects ownership structure through insider information and market-based expectations because managers have an incentive to modify their holdings of stock in accordance with their expectations about the firm's performance. It seems that studies, that have found an effect of ownership structure on firm performance, have failed to take account of the fact that the ownership structure is endogenous.

However, Barth et al. (2005) do not find significant evidence that supports the endogeneity of ownership structure.

Demsetz and Villalonga (2001) basically claim that between ownership structure and firm performance, there cannot be any systematic relation which would be left undisturbed by investors. They do not find any evidence that changes in observed ownership structures would bring forth systematic changes in observed firm performances.

3 Bank relations

According to Weinstein and Yafeh (1998) the firms with close bank ties have the privilege to the increased availability of capital. In other words, it is easier to get bank finance.

The expectation is that the firms with closer bank ties and smaller amount of bank relationships have better access to bank finance. According to Steijvers et al. (2010) longer duration of bank relation reduces the probability that a family firm would need to pledge personal collateral to be able to get a loan, but they also find that the probability for family firm to have to pledge any kind of collateral is higher than for non-family firm when the loan amount is high, because “private family ownership increases potential shareholder-bondholder agency problems when obtaining high amount loans”. Likelihood of pledging collateral increases with growing amount of loan. However, when the loan amount is low, which is probable within small firms, there is a higher probability for a bank demanding collateral and utilizing the market power it has over the small firm.

The research of Berger and Udell (1995) shows that firms with longer bank relations have lower interest rates on credit and also has to pledge collateral on fewer contracts. They focus on small, untraded firms. Their theory is that longer bank-borrower relationship reduces asymmetric information problem because the bank gets private information about the firm. More information leads to more trustful relationship and the trust and knowledge reduces the interest rate pitched by the bank.

Petersen and Rajan (1994) find that within small firms the most important effect on close bank ties is the increased availability of finance. The price of credit is secondary and multiple financing relationships seem to increase the cost and decrease the availability of credit. They find solid evidence that the concentration and building a relationship to a lender by “expanding the number of financial services it buys from it” increases the availability of finance.

Cole (1998) argues the same: The pre-existing relationship between lender and borrower increases the probability that the lender would extend credit. He claims that the length of the relationship is unimportant and the probability to get extension to credit decreases for firms with multiple financial sources. Cole (1998) refers to the researchers of Berger and Udell (1995) and Petersen and Rajan (1994) and shows that role of close bank-firm relationships differs between

the availability of credit and the pricing of credit. The length of relationship is more important when pricing the credit.

Cole (1998) also finds that although the length of the relationship is not important the scope of the relationship is. The availability of credit increases, when a firm has centralized the use of different financial services, like savings account or financial management services, to the main bank. The notice differs from Petersen and Rajan (1994), who did not find a connection between the amount of the services and the interest rate. Cole (1998) also notes that the quality of firm-bank relationship is not affected by the firms' age or risk factors such as size, leverage, return and creditworthiness.

4 Data and Methodology

This chapter presents the data and explains the methodology used in this research. First the data and variables are presented, and after, the methodology is discussed.

4.1 Data and variables

Data of Finnish SME's was collected in February 2009. Part of the data was collected with a structured web based questionnaire. An introductory cover letter and link to a webropol-questionnaire was sent via e-mail to 10 148 randomly selected Finnish SMEs which employ at most 500 employees. The questionnaire included 63 questions in several different categories. The first e-mail round yielded 524 responses, and after the remainder letter all together 982 responses was collected. The remainder letter was sent two weeks after the first e-mail to those firms which had yet not answered the questionnaire. Response rate was 9.7 per cent. Out of the 982 responding firms 852 could be matched with key financial data, such as turnover, ROE and ROA. Out of those 852 firms, 418 were family firms and the rest of those were non-family firms.

In Table 1 is shown the variables that were used in this research. Credit rating is better when the observation value is smaller and dummy variables are formed in a way that the risk is present when the value is 1 and non-present when the value is 0.

Dummies 1 and 2 were formed from question 22 "what kind of customer structure your firm has". The customer risk is present, and marked as 1, when a firm has only few large customers and absent, and marked as 0, when a firm has lots of small customers. The industry risk is present when firm's customers are from one industry and absent when the customers are from several different industries. Dummy 3 is formed by multiplying Dummy 1 with Dummy 2. Dummy 4 is formed from question 24:"does your firm do business with foreign currencies". Internationality risk is present when a firm does business with foreign currencies and absent if it does not.

Question number	Question
Question 7	Ownership share of the largest owner (%)
Question 11	Is your company a family firm?
Question 12	Share of family ownership (%)
Question 13	Number of family representatives in board of directors
Question 14	Proportion of family members employed
Question 18	Is the CEO of the firm a family member?
Dummy 1 of question 22	Customer risk
Dummy 2 of question 22	Industry risk
Dummy 3 of question 22	Interaction from customer risk and industry risk
Dummy 4 of question 24	Internationality
Question 49	Credit rating
Question 50.1	Cost of capital
Question 50.2	Five year average cost of capital
Question 52	Have your firm applied finance or collateral during the last year?
Question 53 combined	Number of creditors
Question 54	Have your firm gotten the finance or collateral they have applied during the last year?

Table 1: The variables that were used in this research.

4.2 Methodology

Parametric tests two-sample t-test and one-way analysis of variance were mainly used in this research. Non-parametric tests were used mainly as a robustness check, when the normality of distribution was uncertain. The multiple regression analysis was used to clear the effect on different variables to the cost of capital of the firm.

4.2.1 Non-parametric tests

Non-parametric tests that are used in this research are chi-square test of independence, Mann-Whitney U-test and Kruskal-Wallis test.

Chi-square test of independence is used for testing independence between the two categorized variables. In other words, it tests whether the two categorized variables are associated with each other. The test is based to a two-way contingency table where observations are simultaneously

classified under two categorized variables to cell frequencies x_{ij} . The cell frequencies x_{ij} are compared to expected cell frequencies calculated as:

$$e_{ij} = \frac{x_i x_j}{n} \quad (1)$$

where x_i is the row marginal frequency, x_j is the column marginal reference and n is total sample size.

Test statistic is calculated with observed and expected cell frequencies:

$$\chi^2 = \sum_{i=1} \sum_{j=1} \frac{(x_{ij} - e_{ij})^2}{e_{ij}} \quad (2)$$

A p -value can be calculated as a probability of critical value being larger than test statistic:

$$p - value = P(\chi_{\alpha, v}^2 \geq \chi^2) \quad (3)$$

where degrees of freedom are

$$v = (r - 1)(c - 1) \quad (4)$$

where r stands for rows and c for columns of the contingency table.

If the critical value is larger than the test statistic, the two categorized variables are not associated with each other, and if the test statistic is larger than critical value, the two variables are not independent and are associated with each other. (Hayter, 2002)

Mann-Whitney U-test or Wilcoxon rank sum test is a non-parametric option for two-sample t-test. When two-sample t-test can only be used when there can be assumed that the test statistic is at least fairly normally distributed, Mann-Whitney U-test does not include assumptions about distribution and the sample sizes do not need to be equal. (Hayter, 2002)

It is a test procedure for comparing two distribution functions $F_A(x)$ and $F_B(x)$ which are assumed to be identical except for a difference in location, so that $F_A(x) = F_B(x - \delta)$. The location difference

δ can be either the difference between means of two populations, $\mu_B - \mu_A$, or the difference between two population medians. (Hayter, 2002)

The first step is to combine the two data samples x_1, \dots, x_n and y_1, \dots, y_m into one sample and rank the elements from 1 to $m + n$. If there are same observation values, they are assigned with the averages of corresponding rank values. The test statistic U_A is defined by

$$U_A = S_A - \frac{n_A(n_A + 1)}{2} \quad (5)$$

where statistic S_A is calculated as the sum of the ranks within the combined sample of the observations from the population A. The test statistic U_A should be somewhat equal to $mn/2$, if the two distribution functions $F_A(x)$ and $F_B(x)$ are identical. If the U_A is much larger than $mn/2$, the observations from population A are suggested to be larger than observations from population B, and vice versa. (Hayter, 2002)

With large sample sizes distribution gets closer to normal distribution and the p-value can be calculated by comparing the statistic

$$z = \frac{U_A - \frac{mn}{2}}{\sqrt{\frac{mn(m+n+1)}{12}}} \quad (6)$$

with the standard normal distribution. If $z < 0$ a two-sided p -value is $2 \times \Phi(z)$, and if $z > 0$ a two-sided p -value is $2 \times (1 - \Phi(z))$. The accuracy of these p -value calculations may be increased with a continuity correction of 0.5. It should be added to the numerator of negative z and subtracted from the numerator of positive z . (Hayter, 2002)

The nonparametric test for three or more populations is Kruskal-Wallis test. The assumption of normality with Kruskal-Wallis is not required, and if the assumption of normality is at least reasonable, the one-way analysis of variance is a better test. As the Mann-Whitney test, it tests

the equality of means ($\mu_1 = \dots = \mu_k$) or medians ($Md_1 = \dots = Md_k$) between three or more populations. (Hayter, 2002)

The first step is combining the k samples in to one large sample and ranking the observations from 1 to n_T . If there are same observation values, they are assigned with the averages of corresponding rank values. All data observations x_{ij} are ranked by r_{ij} . The average ranks within the k populations are

$$\bar{r}_i = \frac{r_{i1} + \dots + r_{in_i}}{n_i}, 1 \leq i \leq k \quad (7)$$

If the rank averages are close to the average rank value $(n_T + 1)/2$ it is more plausible that the means or the medians of the k populations are equal. The test statistic is calculated as

$$H = \frac{12}{n_T(n_T + 1)} \sum_{i=1}^k n_i \left(\bar{r}_i - \frac{n_T + 1}{2} \right)^2 = \frac{12}{n_T(n_T + 1)} \sum_{i=1}^k n_i \bar{r}_i^2 - 3(n_T + 1) \quad (8)$$

It is used to measure the variability of rank averages, and larger values of H imply more variability, hence the means or medians of the k populations would not be equal. A p -value is the probability of a random variable X , which has chi-square distribution with $k - 1$ degrees of freedom, being larger than the test statistic H . (Hayter, 2002)

4.2.2 Parametric tests

Parametric tests that are used in this research are two-sample t-test, one-way analysis of variance test and Welch's analysis of variance test.

Two-sample t-test assumes that the data is normally distributed. It tests a difference between means of two populations, $\mu_A - \mu_B$, the point estimate or the test statistic is $\bar{x} - \bar{y}$. There are three different procedures for the two-sample t-test: general procedure, pooled variance procedure and z-procedure. (Hayter, 2002)

SAS EG 4.2 uses only general and pooled variance procedure and therefore only those two procedures are used in this research. General procedure is applied when the population variances

are unknown and cannot be assumed to be similar. The standard error is estimated by

$$s.e.(\bar{x} - \bar{y}) = \sqrt{\frac{s_x^2}{n} + \frac{s_y^2}{m}} \quad (9)$$

where

- n sample size from population A
- \bar{x} sample mean from population A
- s_x sample standard deviation from population A
- m sample size from population B
- \bar{y} sample mean from population B
- s_y sample standard deviation from population B

A two-sided confidence interval of $1 - \alpha$ level for difference in population means $\mu_A - \mu_B$ is calculated as

$$\mu_A - \mu_B \in \left(\bar{x} - \bar{y} \pm t_{\frac{\alpha}{2}, v} \sqrt{\frac{s_x^2}{n} + \frac{s_y^2}{m}} \right) \quad (10)$$

where the degrees of freedom of the critical point are

$$v = \frac{\left(\frac{s_x^2}{n} + \frac{s_y^2}{m} \right)^2}{\frac{s_x^4}{n^2(n-1)} + \frac{s_y^4}{m^2(m-1)}} \quad (11)$$

The t -statistic is calculated as

$$t = \frac{\bar{x} - \bar{y} - \delta}{\sqrt{\frac{s_x^2}{n} + \frac{s_y^2}{m}}} \quad (12)$$

A two-sided p -value is calculated as two times the probability of random variable X which has a t -distribution with ν degrees of freedom being larger than $|t|$: $2 \times P(X > |t|)$. (Hayter, 2002)

Pooled variance procedure is used when the population variances can be assumed to be equal. The pooled variance estimate can be calculated as

$$s_p^2 = \frac{(n-1)s_x^2 + (m-1)s_y^2}{n+m-2} \quad (13)$$

when a sample of size from population A is n , sample mean is \bar{x} and sample standard deviation is s_x , and sample of size from population B is m , sample mean is \bar{y} and sample standard deviation is s_y . (Hayter, 2002)

A two-sided confidence interval of $1 - \alpha$ level for difference in population means $\mu_A - \mu_B$ is calculated as

$$\mu_A - \mu_B \in \left(\bar{x} - \bar{y} \pm t_{\frac{\alpha}{2}, n+m-2} s_p \sqrt{\frac{1}{n} + \frac{1}{m}} \right) \quad (14)$$

The t -statistic is calculated as

$$t = \frac{\bar{x} - \bar{y} - \delta}{s_p \sqrt{\frac{1}{n} + \frac{1}{m}}} \quad (15)$$

A two-sided p -value is calculated as two times the probability of random variable X which has a t -distribution with $n + m - 1$ degrees of freedom being larger than $|t|$: $p\text{-value} = 2 \times P(X > |t|)$. (Hayter, 2002)

When three or more (k) population means are compared, one-way analysis of variance can be used. There are k populations which are normally distributed and the observation x_{ij} represents

the j th observation of the i th population. The sample from population i has n_i observations and if the sample sizes n_1, \dots, n_k are equal, the data set is balanced, and unbalanced, if the sample sizes are unequal. The total sample size is $n_T = n_1 + \dots + n_k$. (Hayter, 2002)

The easiest way to calculate the variance ratio is partitioning the total sum of squares which is calculated as

$$SST = \sum_{i=1}^k \sum_{j=1}^{n_i} (x_{ij} - \bar{x}_{..})^2 = \sum_{i=1}^k \sum_{j=1}^{n_i} x_{ij}^2 - n_T \bar{x}_{..}^2 \quad (16)$$

with $n_T - 1$ degrees of freedom. (Hayter, 2002)

The total sum of squares can be partitioned into two components

$$SST = SSTr + SSE \quad (17)$$

A summary measure of the variability between the factor levels or treatments is known as the sum of squares for treatments and is calculated as

$$SSTr = \sum_{i=1}^k n_i (\bar{x}_{i.} - \bar{x}_{..})^2 = \sum_{i=1}^k n_i \bar{x}_{i.}^2 - n_T \bar{x}_{..}^2 \quad (18)$$

The sum of squares for error measures the variability within the factor levels and is calculated as

$$SSE = \sum_{i=1}^k \sum_{j=1}^{n_i} (x_{ij} - \bar{x}_{i.})^2 = \sum_{i=1}^k \sum_{j=1}^{n_i} x_{ij}^2 - \sum_{i=1}^k n_i \bar{x}_{i.}^2 \quad (19)$$

Mean squares are obtained by dividing a sum of squares by its degrees of freedom. Mean squares for treatments is

$$MSTr = \frac{SSTr}{\text{degrees of freedom}} = \frac{SSTr}{k-1} \quad (20)$$

and mean square error is

$$MSE = \frac{SSE}{\text{degrees of freedom}} = \frac{SSE}{n_T - k} \quad (21)$$

The F -statistic is calculated as

$$F = \frac{MSTr}{MSE} \quad (22)$$

A p -value is calculated as a probability of random variable X which has an $F_{k-1, nT-k}$ distribution:

$p\text{-value} = P(X \geq F)$. (Hayter, 2002)

If the variances are not homogenous Welch's ANOVA should be used. It suits also for heterogeneous variances unlike one-way ANOVA.

4.2.3 Multiple regression model

Regression model with more than one explanatory variables $x_{t2}, x_{t3}, \dots, x_{tK}$ is referred as multiple regression model. The linear equation can be written as

$$y_t = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \dots + \beta_K x_{tK} + e_t \quad (23)$$

The parameter β_1 is the intercept term and the coefficients $\beta_2, \beta_3, \dots, \beta_K$ are unknown parameters. The parameter β_K measures the effect of a change in the variable x_{tK} upon the expected value of y_t , $E(y_t)$, while the other variables hold constant. The parameter e_t is the random error term. (Hill et al., 2001)

The assumptions of the multiple regression model are

$$\text{MR1. } y_t = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \dots + \beta_K x_{tK} + e_t \quad t = 1, \dots, T$$

$$\text{MR2. } E(y_t) = \beta_1 + \beta_2 x_{t2} + \beta_3 x_{t3} + \dots + \beta_K x_{tK} + e_t \Leftrightarrow E(e_t) = 0$$

$$\text{MR3. } \text{var}(y_t) = \text{var}(e_t) = \sigma^2$$

$$\text{MR4. } \text{cov}(y_t, y_s) = \text{cov}(e_t, e_s) = 0$$

MR5. The values of x_{ik} are not random and are not exact linear functions of the other explanatory variables.

$$\text{MR6. } y_i \sim N\left[\left(\beta_1 + \beta_2 x_{i2} + \beta_3 x_{i3} + \dots + \beta_K x_{iK}\right), \sigma^2\right] \Leftrightarrow e_i \sim N\left(0, \sigma^2\right)$$

For estimating the unknown parameters, the least squares procedure is used. It means that the sum of squared differences between the observed values of y_i and their expected values $E[y_i] = \beta_1 + x_{i2}\beta_2 + x_{i3}\beta_3$ are minimized. (Hill et al., 2001)

R^2 measures the proportion of variation in dependent variable (y_i) which is explained by all the explanatory variables (x_{ik}) in the linear model. The t -test is used to test whether a particular explanatory variable x_k is related to the dependent variable y . If the absolute value of t is larger than or equal to the critical value from $t_{(T-K)}$ distribution where T is sample size and K is the amount of estimated parameters. If the p -value of t -test is larger than the risk level α , the coefficient of particular explanatory variable is not significant. (Hill et al., 2001)

One application of F -test tests the overall significance of the model. If at least one of the explanatory variable coefficient is nonzero, the F -value is larger than or equal to the critical value from the $F_{(K-1, T-K)}$ distribution. If the p -value of F -test is smaller than α , at least one of the explanatory variable coefficient is nonzero. (Hill et al., 2001)

5 Results

In this chapter the results of empirical analyses of this research are presented. The results of each research questions are presented: first of the ownership and profitability, followed by ownership, cost of capital and availability of capital.

5.1 Descriptive statistics

The main issue in this study is to compare differences between family and non-family firms. In Table 2 is shown descriptive statistics of family and non-family firms. The data was filtered by credit rating being larger than 0 and smaller than 16. That way the firms with no credit rating or firms which have not answered the question correctly were outlined. Also the cost of capital and five year average cost of capital were demarcated between 0.1 and 9 to exclude the outliers.

Variable:	Family firm		Non-family firm	
	Mean	Median	Mean	Median
Return on equity (ROE)	22.36	18.10	24.52	19.95
Return on assets (ROA)	15.34	13.00	15.43	13.60
Credit rating	4.54	4.00	4.01	4.00
Cost of capital (%)	3.93	4.00	4.14	4.00
Five year average cost of capital (%)	4.28	4.50	4.26	4.50
Number of creditors	1.29	1.00	1.59	1.00

Dummy variable:	Family firm		Non-family firm	
	Present	Absent	Present	Absent
Customer risk	45.83 %	54.17 %	55.56 %	44.44 %
Industry risk	35.00 %	65.00 %	34.57 %	65.43 %
Interaction of customer and industry risks	20.83 %	79.17 %	27.16 %	72.84 %
Internationality	28.57 %	71.43 %	22.83 %	77.17 %

Table 2: Descriptive statistics of family firms versus non-family firms.

5.2 Ownership and profitability

According to a research of Anderson and Reeb (2003) family firms are more profitable than non-family firms when family ownership is 30 per cent or less and family firms are less profitable than non-family firms when family ownership is more than 60 per cent. However, Demsetz and Villalonga (2001) found no connection between the firms' ownership structure and performance.

The connection between profitability and whether the firm is family owned or not, is investigated.

As profitability variables were used return on equity (ROE) and return on assets (ROA). Distribution analysis showed some outliers which were demarcated by filtering ROE values less than or equal to -100 and greater than or equal to 200 and ROA values less than or equal to -50 and greater than or equal to 90 from the data.

Association of ownership and profitability were first analyzed by investigating descriptive statistics. It seems that family firms are slightly less profitable than non-family firms measured with both variables. As shown in Table 2 mean ROE for family firms is 22.36 and median is 18.10 when mean ROE for non-family firms is 24.52 and median 19.95. Mean ROA for family firms is 15.34 and median 13.00 and mean ROA for non-family firms is 15.43 and median 13.60.

The statistical significance of the association of ownership and profitability is tested with two-sample t-test since the profitability variables are somewhat normally distributed after removing outliers from the data. General procedure was used in both, ROE and ROA, tests since the variances were unequal. Test statistic for ROE is -1.11 and p -value is 0.2687. For ROA, test statistic is -0.08 and p -value 0.9377.

Mann-Whitney U-test was used as a robustness check. U-test does not change the conclusion as test statistic z is -0.64 and p -value 0.5236 for ROE, and z -value for ROA is 0.23 and p -value 0.8210.

The results are consistent with the study of Demsetz and Villalonga (2001). At 5 per cent risk level the theory based in the study of Anderson and Reeb (2003), that ownership and profitability are associated with each other, is non-supported. In other words, no connection, at least measured with ROE and ROA, is found between the firm's profitability and whether the firm is family owned or not.

5.2.1 Ownership concentration and profitability

The connection between profitability and ownership concentration was studied since Perrini et al. (2008) claim that concentrated ownership increases firm value. Also Demsetz and Lehn (1985) argue that more concentrated investors have economic incentives to maximize firm value. Main

question is whether the share of ownership of the largest owner has any impact on profitability. The means and medians of ROE and ROA for different ownership shares are described in Table 3.

Ownership share of the largest owner (%)	Mean (ROE)	Median (ROE)	Mean (ROA)	Median (ROA)	N
Less than 10 %	19.31	11.8	12.88	6.4	29
10 – 19.9 %	14.05	9.9	10.30	4.2	25
20 – 49.9 %	22.36	20.6	14.89	13.9	175
At least 50 %	24.26	18.9	15.80	13.6	605

Table 3: Descriptive statistics for association of ownership concentration and profitability.

One-way analysis of variance (ANOVA) test shows that the differences in ROE and ROA between different shares of ownership of the largest owner are not statistically significant at 5 per cent risk level. Bartlett's test for homogeneity, with p -value 0.0254, shows that the variances for ROE are not equal, therefore one-way ANOVA does not work and Welch's ANOVA have to be used. Welch's ANOVA F -value for ROE is 1.54 and p -value is 0.2117. For ROA the one-way ANOVA can be used since the Bartlett's test for homogeneity p -value is 0.2267. F -value for ROA is 1.21 and p -value is 0.3938.

However, the Kruskal-Wallis test is used as a robustness check since the kurtosis of ROE (4.83) and ROA (2.34) are positive, hence they are not totally normally distributed. With Kruskal-Wallis test the conclusion is different from the ANOVA test: the difference in ROE between the different ownership shares of the largest owner is statistically significant at a 5 per cent risk level and the difference in ROA is statistically significant at a 10 per cent risk level. Since the kurtosis, the Kruskal-Wallis test is used for the analysis, however, with reservations the results support the theory based on researches of Perrini et al. (2008) and Demsetz and Lehn (1985) that more concentrated ownership is good for the profitability of the firm. The outcome indicates that more concentrated owners have more economic incentives for making the firm profitable, because they have, as said, more eggs in one basket.

As seen in Table 3 and proved with Kruskal-Wallis test, there is a distinct pattern in the connection of ownership concentration and profitability. It seems that the profitability is much higher when largest owner has a share of 20 per cent or more, and lower when the share of ownership of the largest owner is less than 20 per cent. The connection is tested again with a new variable where the share of ownership is divided into two categories: less than 20 per cent and greater than or equal to 20 per cent.

The two-sample t-test for ROE shows that at 10 per cent risk level the theory, based on earlier research and Table 3 that the profitability is better when the share of ownership of the largest owner is greater than or equal to 20 per cent, is supported. The variances are equal with p -value of 0.1313 therefore the pooled variance procedure is used. T -value for ROE is -1.75 and p -value is 0.0811. Same procedure is used for ROA since the variances are equal with p -value 0.5096. T -value for ROA is -1.70 and p -value is 0.0898. Mann-Whitney U-test is used as a robustness check and the theory is supported at 5 per cent risk level. Z -value for ROE is -2.94 and two-sided p -value is 0.0033, z -value for ROA is -2.71 and two-sided p -value is 0.0066.

The results support the hypothesis based on the studies of Perrini et al. (2008) and Demsetz and Lehn (1985) that the higher share of ownership of largest owner leads to more profitable firm. However, the higher profitability of the firm may lead to largest owner increasing the share of ownership. The causality cannot be analyzed with the research data.

5.2.2 Share of family ownership and profitability

The association between share of family ownership and profitability is tested within family firms. Most of family firms in the data are 100 per cent family owned as you can see on Table 4.

Share of family ownership (%)	Mean (ROE)	Median (ROE)	Mean (ROA)	Median (ROA)	N
0 %	13.45	13.45	8.65	8.65	2
Less than 25 %	7.10	7.10	6.50	6.50	2
Less than 50 %	21.34	12.10	13.82	9.10	11
Less than 75 %	21.68	20.05	14.58	14.45	48
100 %	22.30	18.00	15.39	13.00	348

Table 4: Descriptive statistics for family ownership concentration and profitability.

Although based on Table 4, one could think that the higher share of family ownership is related to higher profitability of the firm, the connection is not statistically significant. One-way ANOVA is working since the Bartlett's test of homogeneity shows that the variances are equal, for ROE F -value is 0.26 and p -value 0.9020, and for ROA F -value is 0.34 and p -value 0.8504. Based on one-way analysis of variances there is no difference in profitability between the different shares of family ownership.

Kruskal-Wallis test is performed as a robustness check, and the test values show no different conclusion than one-way ANOVA's. The connection is not found since the chi-square is 2.35 and p -value is 0.6714 for ROE and for ROA chi-square is 2.11 and p -value 0.7156.

The share of family ownership is also divided into categorized variable where the values are less than 50 per cent and greater than or equal to 50 per cent of family ownership. The difference of ROE and ROA between minority and majority of family ownership is tested with two-sample t -test. Both ROE and ROA variances are equal, and therefore the pooled variance procedure is used. For ROE t -value is -0.60 and p -value 0.5502, and for ROA t -value is -0.82 and p -value 0.4115. No support is found to the assumption based on Table 4 that there would be connection between the share of family ownership and firm profitability. The Mann-Whitney U-test confirms the conclusion by z -value of -0.84 and two-sided p -value of 0.4001 for ROE, and z -value of -1.13 and two-sided p -value of 0.2588 for ROA.

The share of family ownership variable was also divided into three categories of less than 25 per cent, less than 50 per cent and greater than or equal to 50 per cent, but no difference in profitability between these three groups was found with either one-way ANOVA or the Kruskal-Wallis test.

5.2.3 Family CEO

The claim of Villalonga and Amit (2006) that the higher ROA is related to family member serving as a CEO, seems consistent with the research data, because mean ROA is 15.59 and median 13.5 for family firms whose CEO is a family member, and for family firms whose CEO is an outsider, mean ROA is 13.45 and median 8.4. In ROE there was no distinct difference since mean is 22.17 and median 18.4 for firms with family CEO and mean is 23.14 and median is 15.9 for firms with outsider CEO.

The relation between ROA and the CEO of the firm is tested with a two-sample t-test. The variances are equal so the pooled variance procedure is used and test statistic is 1.02 and p -value 0.3067. As robustness check was used Mann-Whitney U-test, which z -value is -1.97 and two-sided p -value 0.0494.

Two-sample t-test does not support the theory based on research of Villalonga and Amit (2006) of higher ROA being related to family member serving as a CEO, but the Mann-Whitney U-test supports the theory at a 5 per cent risk level. The kurtosis of the variable ROA taken into account the Mann-Whitney U-test is analyzed. Hence, higher ROA and family member serving as a CEO are related and the result is consistent with the findings of Villalonga and Amit (2006). However, the causality cannot be tested with the research data and therefore there is no way of telling whether the family member serving as a CEO leads to higher profitability or the family members stay as CEOs when the profitability of the firm is higher.

Barth et al. (2005) claim that family firms are less productive, when a family member is managing the firm, and equally productive as non-family firms, when the firm is managed by an outsider. Therefore, also the a connection of ROA and ownership was tested in a way that first was tested whether there is any difference in ROA between family firms with family CEO and non-family firms, and the second between family firms with non-family CEO and non-family firms. No connection was found since, for the first test, two-sample t-test test statistic is 0.18 and p -value 0.8572 for general procedure and Mann-Whitney U-test z -value is 0.67 and two-sided p -value 0.5059. For the second test two-sample t-test test statistic is -0.66 and p -value 0.5071 for pooled variance procedure and Mann-Whitney U-test z -value is 0.12 and two-sided p -value 0.2479. The results are not consistent with the study of Barth et al. (2005) since although family member serving as a CEO leads to higher profitability, there is no difference in ROA between the family and non-family firms even when the effect of the family CEO is standardized.

5.2.4 Family control and profitability

Oswald et al. (2009) suggest that there would be a negative relationship between the financial performance measures and the percent of family controlling the top management. Therefore the effect of family control in board of directors to the firm's profitability is tested. The amount of family control is described with the variable question: "how many family representatives operate

in family firm's board of directors". Table 5 shows means and medians of ROE and ROA of the different numbers of family representatives in board of directors of family firms.

Number of family representatives in board of directors	Mean (ROE)	Median (ROE)	Mean (ROA)	Median (ROA)	N
None	18.98	21.80	9.40	7.80	5
One	25.33	20.60	16.90	14.40	105
2 – 3	21.75	17.55	15.06	12.65	252
4 – 5	19.13	15.60	13.60	11.80	47
More than 5	21.70	21.45	13.78	15.40	4

Table 5: Descriptive statistics for family control and profitability.

The connection was tested with one-way ANOVA test. Bartlett's test for homogeneity indicates that one-way ANOVA works as a test. F -value for ROE is 0.64 and p -value 0.6349 and F -value for ROA is 0.70 and p -value 0.5949. Kruskal-Wallis test was used as a robustness check and the conclusion is no different from one-way ANOVA's since chi-square is 5.0061 and p -value is 0.2867 for ROE and chi-square is 3.8935 and p -value is 0.4206 for ROA.

The results are not consistent with the findings of Oswald et al. (2009) since any connection between number of family representatives in board of directors and profitability was not found either with one-way ANOVA test or Kruskal-Wallis test. Therefore at least measured with ROE and ROA the amount of family control in board of directors does not have an impact on firm's profitability.

Also the connection between the proportion of family members employed and profitability was investigated since the Hansson et al. (2009) find that higher proportion of family members employed would have a negative effect on ROI. The findings are rather interesting when tested with ROE and ROA. At Table 6 can be seen that the most unprofitable firms are the ones with none family members employed and the most profitable firms seem to be the ones with more than 5 family employees. Based on Table 6 it seems that the proportion of family member employed have a positive effect on the profitability of the firm, although the firms with 4 – 5 family employees seem not to be consistent with the pattern, because their profitability values are somewhat the same as the firms' with one or none family employee.

Proportion of family members employed	Mean (ROE)	Median (ROE)	Mean (ROA)	Median (ROA)	N
None	18.57	7.35	7.98	5.85	26
One	21.49	18.00	14.55	12.20	101
2 – 3	23.85	19.30	16.72	14.40	221
4 – 5	18.63	14.30	13.14	12.60	59
More than 5	29.21	23.10	24.54	18.00	9

Table 6: Descriptive statistics of proportion of family members employed and profitability.

The statistical significance of the connection is tested with one-way ANOVA test. The Bartlett's test for homogeneity shows that the one-way ANOVA does not work for both ROE and ROA, so the Welch's ANOVA is used. The F -value for ROE is 1.28 and p -value is 0.2900, and for ROA Welch's ANOVA F -value is 4.36 and p -value is 0.0045. The theory based on Table 6 is non-supported when profitability is measured with ROE. However, measured with ROA, the profitability is affected by proportion of family member employed.

The Kruskal-Wallis test is used as a robustness check since the distributions of ROE and ROA are slightly kurtosis. The theory is supported with both profitability measures since chi-square is 8.7661 and p -value is 0.0672 for ROE, and chi-square is 16.5890 and p -value is 0.0023 for ROA. Since the kurtosis of the profitability variables, the Kruskal-Wallis test statistics are analyzed and used when making conclusions. The difference in profitability between different proportions of family members employed is statistically significant at 10 per cent risk level when measured with ROE and at 5 per cent risk level when measured with ROA. Therefore, the results are opposite of the results of Hansson et al. (2009) since higher proportion of family members employed seem to be connected to higher ROE and ROA.

5.3 Ownership, cost of capital and availability of capital

In this section is tested whether the cost of capital or availability of capital is different between the family and non-family firms, and whether the ownership concentration has an effect on cost of capital. Overall, there is also investigated which variables have an effect on cost of capital. Also the connection between the number of creditors and availability of capital is tested.

5.3.1 Ownership and cost of capital

As Anderson et al. (2003) suggest that the cost of capital would be lower for family firms, also the descriptive statistics show that in the sampling data, the cost of capital of family firms is somewhat lower than of non-family firms. Mean cost of capital for family firms is 4.211 per cent and median is 4.4 per cent when the mean cost of capital for non-family firms is 4.459 per cent and median 4.5 per cent. The data is filtered only by cost of capital being larger than 0 and smaller than 10 to exclude the outliers and therefore the statistics are somewhat different than in Table 2.

At a 5 per cent risk level there are no statistical significant difference in cost of capital between the family and non-family firms. This is analyzed with the two-sample t-test where the means of cost of capital of family and non-family firms are compared. The variances are not equal; therefore the two-sample t-test for general procedure is used. The t -value is -1.63 and the p -value 0.1033. However, the p -value is still small enough to almost support the theory at 10 per cent risk level. Therefore at 10 per cent risk level can be concluded that with Finnish SMEs the cost of capital of family firms is somewhat smaller than the cost of capital of non-family firms and also that the results are consistent with the study of Anderson et al. (2003).

Mann-Whitney U-test is used as a robustness check. The dependent variable is cost of capital and the independent variable is whether or not the observation firm is family firm or non-family firm. The z -value is -1.2177 and the p -value 0.2233, which indicates no statistical significant difference in cost of capital between the family and non-family firms. However, the cost of capital is normally distributed and therefore the two-sample t-test statistics are used in analysis and the Mann-Whitney U-test statistics are ignored.

Also, measured with five year average of cost of capital family firms seem to have lower cost of capital. The data is filtered only by five year average cost of capital being larger than 0 and smaller than 10 to exclude the outliers. Mean for family firms' five year average cost of capital is 4.26 per cent and median 4.5 per cent and for non-family firms mean is 4.48 per cent and median also 4.5 per cent.

However, the statistical significance of the association is not found. It is tested with two-sample t-test, general procedure since the variances are unequal. Test statistic is -1.44 and p -value 0.1517.

Hence, the theory based on earlier research of the connection between the ownership and the cost of debt is non-supported. Mann-Whitney U-test is used as a robustness check, but the conclusion remains the same since z -value is -0.9672 and two-sided p -value 0.3334.

5.3.2 Ownership concentration and cost of capital

Even though, based on Table 7, there seems to be a connection between the ownership concentration and the cost of capital, no statistical significant association is found.

Ownership share of the largest owner (%)	Mean cost of capital	Median cost of capital	N
Less than 10 %	4.13	4.00	18
10 – 19.9 %	4.21	3.75	14
20 – 49.9 %	4.49	4.90	91
At least 50 %	4.32	4.50	311

Table 7: Descriptive statistics of ownership concentration and cost of capital.

The association is tested with Welch's ANOVA test since the Bartlett's test for homogeneity indicates that the variances are unequal by p -value 0.0038. Welch's ANOVA F -value is 0.71 and p -value 0.5508. Kruskal-Wallis test does not change the conclusion since the chi-square is 2.54 and p -value 0.4686.

Table 7 also indicates that the cost of capital is smaller when the ownership share of the largest owner is less than 20 per cent and larger when the ownership share is greater than or equal to 20 per cent. However, two-sample t-test shows that the difference is not statistically significant, since the test statistic is -0.99 and p -value 0.3268. Mann-Whitney U-test could have a different result since it tests the equality of medians, but it also finds no connection between the ownership concentration and cost of capital. Mann-Whitney U-test z -value is -1.26 and two-sided p -value 0.2061.

Also the connection between five year average cost of capital and ownership concentration is investigated. Table 8 indicates that the share of ownership of the largest owner would have an effect on five year average cost of capital.

Ownership share of the largest owner (%)	Mean five year average cost of capital	Median five year average cost of capital	N
Less than 10 %	4.25	4.00	17
10 – 19.9 %	3.75	3.75	12
20 – 49.9 %	4.64	5.00	80
At least 50 %	4.33	4.50	289

Table 8: Descriptive statistics of ownership concentration and five year average cost of capital.

One-way ANOVA test does not support the theory based on Table 8 that there would be a connection between the ownership concentration and five year average cost of capital, since F -value is 1.51 and p -value 0.2110, but Kruskal-Wallis test almost supports the theory at a 10 per cent risk level since chi-square is 6.23 and p -value 0.1009. However, the five year average cost of capital is normally distributed and therefore the one-way ANOVA test would be more reliable, so there cannot be concluded that the ownership share of the largest owner would have an effect on five year average cost of capital.

The connection is also tested with the variable where ownership share of the largest owner is divided into two categories, less than 20 per cent and greater than or equal to 20 per cent. Two-sample t-test general procedure is used since the variables are unequal. Test statistic is -1.65 and p -value 0.1070, and therefore the theory is almost supported at a 10 per cent risk level. Mann-Whitney U-test is used as a robustness check and the results support the theory since z -value is -1.86 and p -value 0.0635. There can be concluded that the five year average cost of capital is somewhat smaller for the firms where the ownership share of the largest owner is less than 20 per cent.

5.3.3 Which variables have an effect on cost of capital?

The variables which have an effect on cost of capital and five years average cost of capital are analyzed with multiple regression model. The data is filtered by credit rating being larger than 0 and smaller than 16. That way the firms with no credit rating or firms which have not answered the question correctly are outlined. Also the cost of capital and five year average cost of capital are demarcated between 0.1 and 9 to exclude the outliers.

The results of the multiple regression model of the cost of capital are presented first. The assumptions of the multiple regression model are reviewed and residuals are normally

distributed, linear and do not have autocorrelation. Also, there is no heteroscedasticity or collinearity. Results of the assumption review are presented in Appendix 1.

In the model, the relationship between the cost of capital and several explanatory factors are estimated. The model is in its complete form as follows:

$$\begin{aligned} \text{Cost of capital}_t = & \beta_1 + \beta_2(\text{Credit rating}) + \beta_3(\text{Number of creditors}) + \beta_4(\text{Ownership}) + \\ & \beta_5(\text{Customer risk}) + \beta_6(\text{Industry risk}) + \beta_7(\text{Interaction of customer and industry risks}) + \\ & \beta_8(\text{Internationality}) \end{aligned} \quad (24)$$

In the model Cost of capital_t is firm's cost of capital at the moment of the questionnaire in per cents, Credit rating is marked with 1 when the rating is AAA and 15 when the rating is D and Number of creditors is the number of different creditors where a firm has applied finance from during the last year. Ownership is a dummy variable where family ownership is marked as 1 and non-family ownership as 0; Customer risk is a dummy variable where the customer risk is present, and marked as 1, when a firm has only few large customers and absent, and marked as 0, when a firm has lots of small customers. Industry risk is a dummy variable where the industry risk is present, and marked as 1, when firm's customers are from one industry and absent, and marked as 0, when the customers are from several different industries. Interaction from customer and industry risks is formed by multiplying Customer risk with Industry risk. Internationality is also a dummy variable where internationality risk is present, and marked as 1, when a firm does business with foreign currencies and absent, and marked as 0, if it does not.

In Table 9 is shown the results of the regression. Only intercept term and, as explanatory factors, credit rating and internationality are significant at 5 per cent risk level. Overall significance of the model is good since the *F*-value is 3.09 and *p*-value of the *F*-test is 0.0041. All explanatory variables explain 10.18 per cent of the variation in variable cost of capital since R^2 is 0.1018.

Variable	Parameter Estimate	t Value	Pr > t
Intercept	3.12637	10.03	<.0001
Credit rating	0.13939	3.49	0.0006
Number of creditors	0.12699	1.37	0.1719
Ownership	-0.18758	-0.80	0.4270
Customer risk	0.40768	1.44	0.1526
Industry risk	-0.11390	-0.29	0.7688
Interaction of customer and industry risks	-0.26016	-0.52	0.6047
Internationality	0.62150	2.17	0.0315

Table 9: Multiple regression model of the cost of capital

The results indicate that when the credit rating falls, the cost of capital rises, since the credit rating AAA is marked with value 1 and credit rating D with value 15. Also, the cost of capital is notably higher when the firm does business with foreign currencies.

Second, the results of the multiple regression model of five year average cost of capital are presented. Also the assumptions of the second regression model are reviewed and residuals are normally distributed, linear and do not have autocorrelation, and there is no heteroscedasticity or collinearity in the model. Results of the assumption review are presented in Appendix 2.

In the second model, five year average cost of capital is explained with the same variables as the cost of capital in the first model. The model is in its complete form as follows:

$$\text{Five year average cost of capital}_t = \beta_1 + \beta_2(\text{Credit rating}) + \beta_3(\text{Number of creditors}) + \beta_4(\text{Ownership}) + \beta_5(\text{Customer risk}) + \beta_6(\text{Industry risk}) + \beta_7(\text{Interaction of customer and industry risks}) + \beta_8(\text{Internationality}) \quad (25)$$

where Five year average cost of capital_t is the average cost of capital of the last five years in per cents, and the explanatory variables are the same as in the first model.

However, the significant explanatory variables in the second model are credit rating, as in the first model, but also number of creditors and customer risk. However, the internationality is not a

significant explanatory variable at the model of five year average cost of capital. The results are shown in Table 10. Overall significance of the model is good since the F -value is 2.32 and p -value of the F -test is 0.0272. All explanatory variables explain 7.83 per cent of the variation in variable five year average cost of capital since R^2 is 0.0783.

Variable	Parameter Estimate	t Value	Pr > $ t $
Intercept	3.37213	11.44	<.0001
Credit rating	0.10748	2.84	0.0049
Number of creditors	0.14910	1.70	0.0905
Ownership	0.10594	0.48	0.6353
Customer risk	0.43452	1.62	0.1074
Industry risk	0.16891	0.46	0.6452
Interaction of customer and industry risks	-0.46735	-0.98	0.3262
Internationality	0.27652	1.02	0.3097

Table 10: Multiple regression model of the five year average cost of capital

The results of the second regression model indicate that, as in the first model, the worse credit rating leads to higher five year average cost of capital. Also the larger number of different creditors raises the five year average cost of capital. Customer risk has the p -value of 0.1074, but it is close enough to 0.10 that it should be counted as significant explanatory variable. It is dummy variable and the five year average cost of capital seems to be higher within firms with only few large customers.

5.3.4 Ownership and availability of capital

The availability of capital is measured with variable whether or not the firm has gotten the finance they have applied in a last year. As shown in Table 11, from family firms 93.33 per cent and 94.65 per cent from non-family firms got the finance they applied. Data is filtered in a way that only firms which applied any finance during the last year were analyzed.

	Family firm		Non-family firm	
	Per cent	Frequency	Per cent	Frequency
Firms which did get the applied finance	93.33	224	94.65	230
Firms which did not get the applied finance	6.67	16	5.35	13

Table 11: The differences in availability of capital between family and non-family firms.

Although it seems that the non-family firms would get finance a little easier, the difference is not statistically significant. It is tested with chi-square test of independence which indicated that the theory is non-supported by test statistic of 0.37 and p -value of 0.5424.

5.3.5 Number of creditors and availability of capital

Cole (1998) claims that length of the firm bank relationship would not be important but the scope of the relationship would, and that the centralized use of different financial services would increase the availability of capital. Also Petersen and Rajan (1994) suggest that within small firms the most important effect on close bank ties is the increased availability of finance, and that multiple financing relationships seem to increase the cost and decrease the availability of credit. The length or quality of bank relationships cannot be analyzed with the data of this research, but the connection between the number of financial sources and the availability of capital can be analyzed. Therefore, there is tested whether the number of different creditors, where a firm has applied finance or collateral, has any effect on the availability of capital. The variable of number of different creditors is outlined by being less than 6 to exclude outliers. As shown in Table 12, firms which have gotten the applied finance have applied from in average 1.69 financial institutes and those firms which did not get the applied finance have applied from in average 2.21 financial institutes. Medians are 1.00 for the firms which got financed and 2.00 for firms which did not.

	Number of creditors	
	Mean	Median
Firms which did get the applied finance	1.69	1.00
Firms which did not get the applied finance	2.21	2.00

Table 12: The number of creditors whether the firm got the applied finance or not.

The results are in line with the study of Cole (1998) since the association is found between the number of different creditors and availability of capital. It is tested with two-sample t-test general procedure since the variances are unequal. Test statistic is -2.11 and p -value 0.0439, hence the

theory is supported at a 5 per cent risk level. Also the Mann-Whitney U-test statistics supported the theory at 5 per cent risk level since the z -value is 2.2388 and two-sided p -value 0.0252.

Although, the association between the availability of capital and number of different financial sources is found, there cannot be concluded that firms with smaller amount of bank relationships would get financed easier. The connection could be endogenous since it is logical that if the firm gets the finance it has applied, it will probably apply only from one financial institute and more, if is harder to get finance e. g. because of lower credit rating. The connection does not tell, at least directly, about the loyal firm-bank relationship and better availability of capital to those firms.

6 Summary and conclusions

In this thesis, there are analyzed the differences in profitability, cost of capital and availability of capital between the different ownership structures, different shares of ownership concentration and shares of family control. Also the connection between the availability of capital and the number of different creditors is tested, and the variables which have an effect on the cost of capital are analyzed.

No connection was found between the family ownership and profitability, at least measured with ROE and ROA. However, the ownership concentration seems to have a positive effect on firm's profitability. The higher share of ownership of largest owner leads to more profitable firm. Also, the higher profitability of the firm may lead to largest owner increasing the share of ownership. The causality could not be analyzed with the research data. The share of family ownership does not have any effect on the profitability of family firm.

Empirical results also show that higher ROA and family member serving as a CEO are related. Again, the causality cannot be tested with the research data and therefore there is no way of telling whether the family member serving as a CEO leads to higher profitability or the family members stay as CEOs when the profitability of the firm is higher. The number of family representatives in board of directors has no effect on firm's profitability, but the proportion of family members employed has. The higher proportion of family members employed has positive effect on profitability measured with both ROE and ROA, although firms with 4 – 5 family members employed were not consistent with the pattern, since they were almost as less profitable than firms with no family employees when measured with ROE and somewhat as profitable as firms with only one family employee when measured with ROA.

The cost of capital of family firms seem to be somewhat smaller than of non-family firms. However, no difference between the family and non-family firms in five year average cost of capital was found. The ownership concentration does not have an effect on cost of capital, but small difference is found in five year average cost of capital, which is somewhat smaller when the ownership share of the largest owner is less than 20 per cent. There is not any difference in availability of capital between the family and non-family firms, but the connection between the number of creditors and availability of capital is clear. The smaller number of creditors is related to better access to bank finance. However, there cannot be concluded that firms with smaller

amount of bank relationships would get financed easier. The connection could be endogenous since it is logical that if the firm gets the finance it has applied, it will probably apply only from one financial institute and more, if it is harder to get finance, for example, because of lower credit rating. The connection does not tell, at least directly, about the loyal firm-bank relationship and better availability of capital to those firms.

The multiple regression analysis from the variables which would have an effect on the cost of capital or five year average cost of capital showed some interesting results. Credit rating and internationality have an effect on cost of capital, and credit rating, number of creditors and customer risk have an effect on five year average cost of capital. The effect of internationality on cost of capital was notably high, and the connection is positive which indicates that firms which do business with foreign currencies have 0.62 per cent higher cost of capital than firms which do business only with euros. However, no connection is found between the internationality and the five year average cost of capital. Worse credit rating increases both the cost of capital and five year average cost of capital, and the firms with only few large customers and larger number of creditors have higher five year average cost of capital.

The length or quality of bank relations could not be analyzed in this research and therefore it would be interesting to study whether there is any differences in the length of bank relations between the family and non-family firms and also in the quality or depth of bank relations, and whether or not the length or quality has any effect on the cost or availability of capital.

Also, it would be interesting to study deeper the variables that have an effect on the lower cost of capital of family firms, since the credit rating was worse than in non-family firms and also family firms were more international than non-family firms, and they still have lower cost of capital than non-family firms. Are family firms more trustworthy clients to the creditors, and if so, which variables make family firms better or more trustworthy clients to the creditors? For example, whether the industries are differently represented between the family and non-family firms, and would the difference lead to different pledges on collateral. Also the reasons of the notably high effect of internationality on cost of capital would be an interesting subject to investigate.

References

- ANDERSON, R.C., MANSI, S.A. and REEB, D.M., 2003. Founding family ownership and the agency cost of debt. *Journal of Financial Economics*, **68**(2), 263-285.
- ANDERSON, R.C. and REEB, D.M., 2003. Founding-Family Ownership and Firm Performance: Evidence from the S&P 500. *Journal of Finance*, **58**(3), 1301-1328.
- BARTH, E., GULBRANDSEN, T. and SCHØNEA, P., 2005. Family ownership and productivity: the role of owner-management. *Journal of Corporate Finance*, **11**(1-2), 107-127.
- BERGER, A.N. and UDELL, G.F., 1995. Relationship lending and lines of credit in small firm finance. *Journal of Business*, **68**(3), 351.
- COLE, R.A., 1998. The importance of relationships to the availability of credit. *Journal of Banking & Finance*, **22**(6-8), 959-977.
- DEMSETZ, H. and LEHN, K., 1985. The Structure of Corporate Ownership: Causes and Consequences. *Journal of Political Economy*, **93**(6), 1155.
- DEMSETZ, H. and VILLALONGA, B., 2001. Ownership structure and corporate performance. *Journal of Corporate Finance*, **7**(3), 209-233.
- HANSSON, M., LILJEBLOM, E. and MARTIKAINEN, M., 2009. Corporate Governance and Profitability in Family SMEs. *Working paper, Hanken School of Economics and Lappeenranta University of Technology*.
- HAYTER, A.J., cop. 2002. *Probability and statistics for engineers and scientists* /. Duxbury, : Pacific Grove (CA) :.
- HEINONEN, J., 2003. *Quo vadis, suomalainen perheyryitys?* Turun kauppakorkeakoulu, PK-Instituutti, : Turku :.
- HILL, R.C., cop. 2001. *Undergraduate econometrics* /. Wiley, : Hoboken (NJ) :.

MARTIKAINEN, M. and NIKKINEN, J., 2006. Family ownership, owner involvement and performance of small and medium-sized enterprises: The golden touch of active owners. *Working paper, Lappeenranta University of Technology and University of Vaasa.*

OSWALD, S.L., MUSE, L.A. and RUTHERFORD, M.W., 2009. The Influence of Large Stake Family Control on Performance: Is It Agency or Entrenchment? *Journal of Small Business Management*, **47**(1), 116-135.

PERRINI, F., 2008. Does Ownership Structure Affect Performance? Evidence from the Italian Market. *Corporate Governance: An International Review*, **16**(4), 312-325.

PETERSEN, M.A. and RAJAN, R.G., 1994. The Benefits of Lending Relationships: Evidence from Small Business Data. *Journal of Finance*, **49**(1), 3-37.

STEIJVERS, T., VOORDECKERS, W. and VANHOOF, K., 2010. Collateral, relationship lending and family firms. *Small Business Economics*, **34**(3), 243-259.

VILLALONGA, B. and AMIT, R., 2006. How do family ownership, control and management affect firm value? *Journal of Financial Economics*, **80**(2), 385-417.

WEINSTEIN, D.E. and YAFEH, Y., 1998. On the Costs of a Bank-Centered Financial System: Evidence from the Changing Main Bank Relations in Japan. *The Journal of Finance*, **53**(2), 635-672.

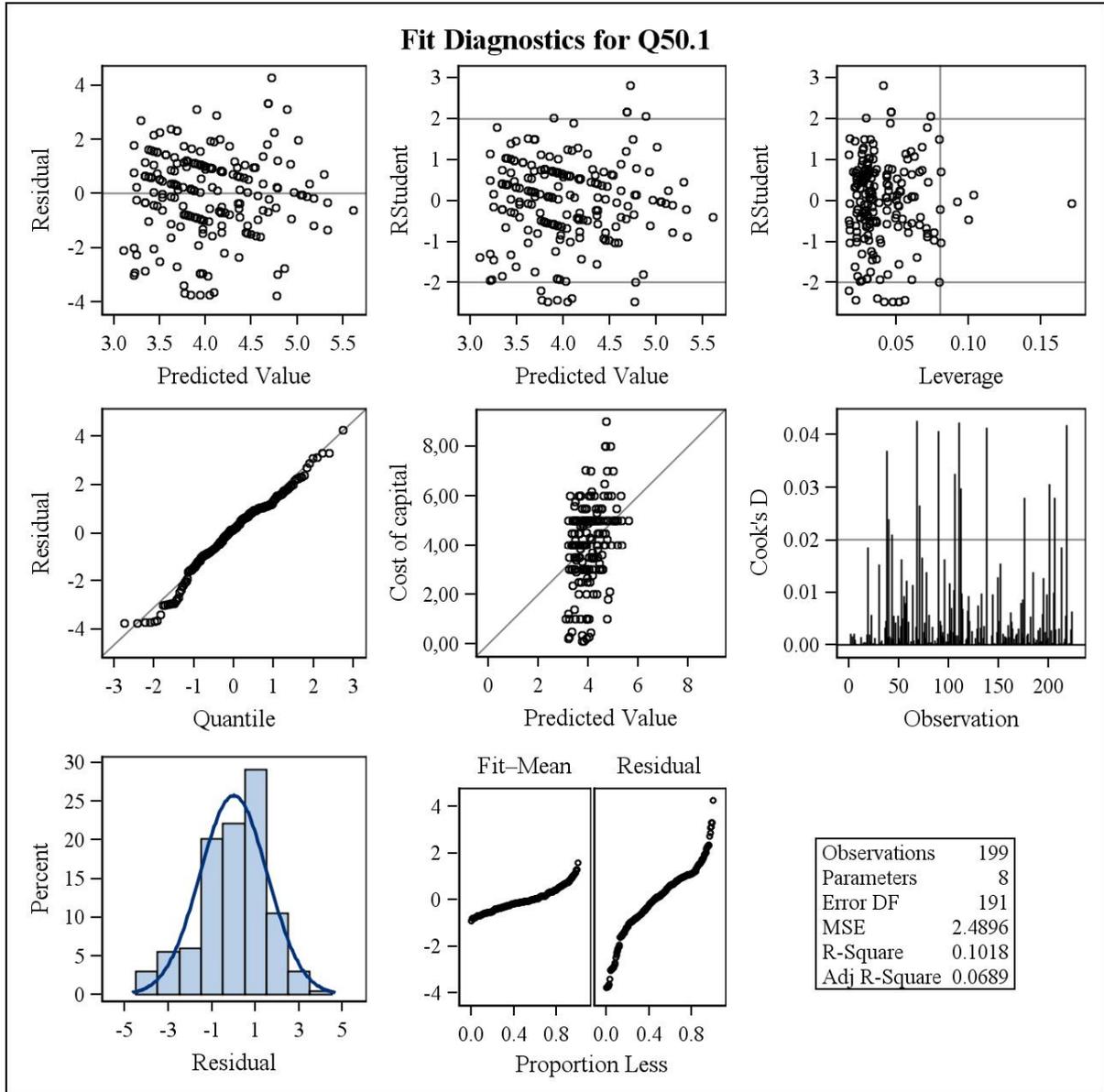
Appendices

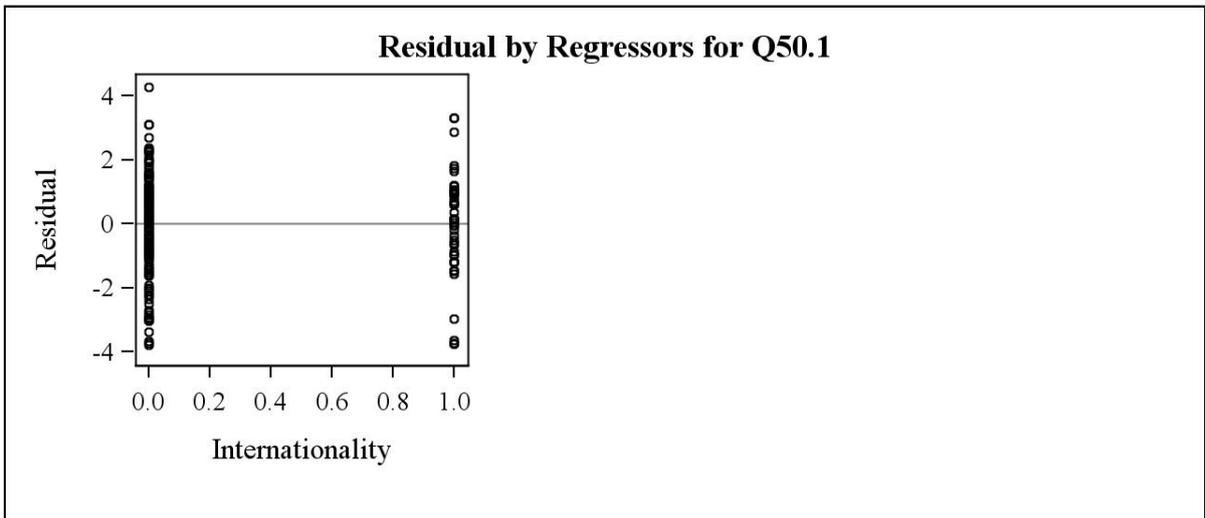
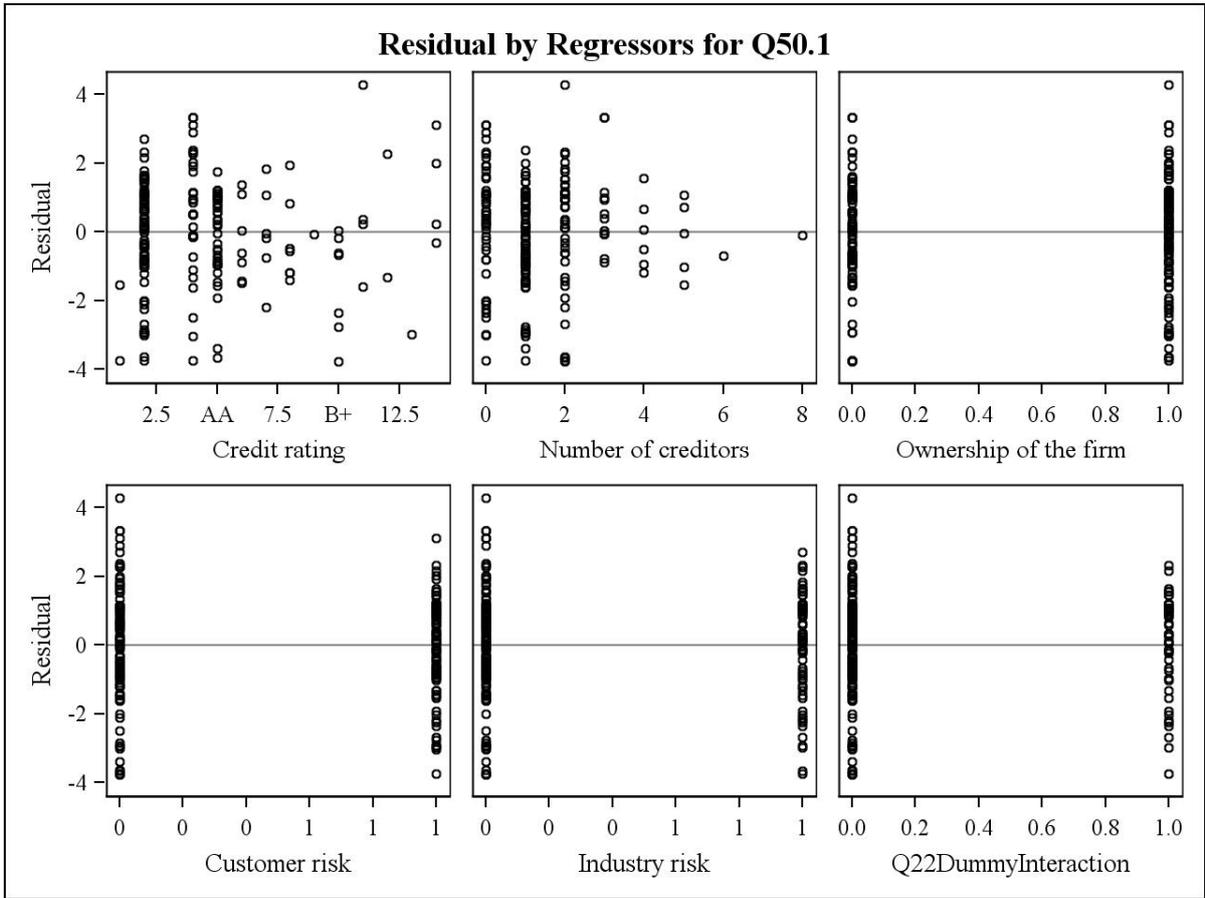
Appendix 1: The multiple regression model of cost of capital, assumptions

Parameter Estimates						
Variable	Label	DF	Squared Semi-partial Corr Type II	Squared Partial Corr Type II	Tolerance	Variance Inflation
Intercept	Intercept	1	.	.	.	0
Q49	Credit rating	1	0.05729	0.05996	0.93806	1.06603
Q53All	Number of creditors	1	0.00884	0.00975	0.90824	1.10103
Q11Dummy	Ownership of the firm	1	0.00298	0.00331	0.93726	1.06694
Q22Dummy1	Customer risk	1	0.00970	0.01068	0.62106	1.61015
Q22Dummy2	Industry risk	1	0.00040733	0.00045330	0.36880	2.71150
Q22DummyInteraction	Interaction from customer and industry risks	1	0.00126	0.00141	0.27551	3.62964
Q24Dummy	Internationality	1	0.02208	0.02399	0.86890	1.15088

Test of First and Second Moment Specification		
DF	Chi-Square	Pr > ChiSq
28	28.26	0.4506

Durbin-Watson D	2.045
Number of Observations	199
1st Order Autocorrelation	-0.025





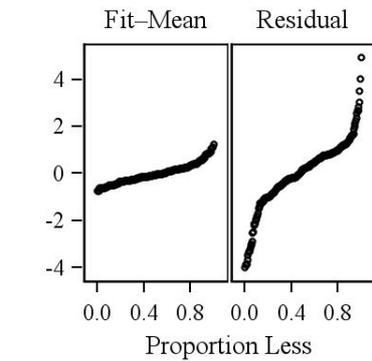
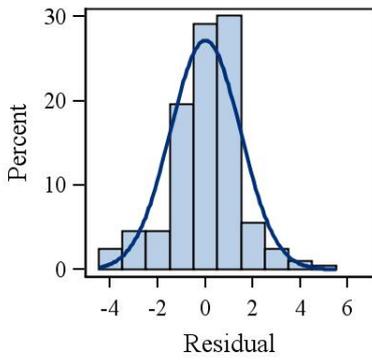
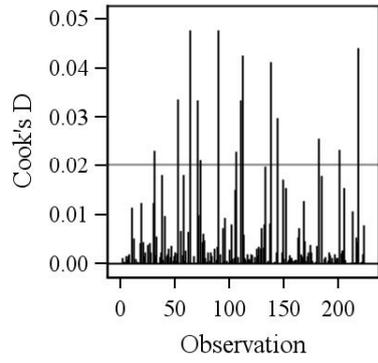
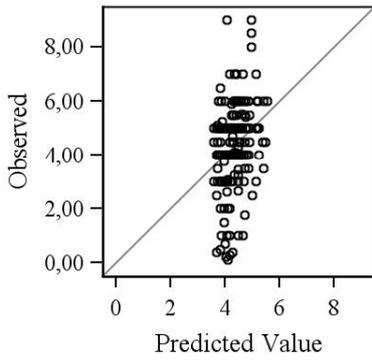
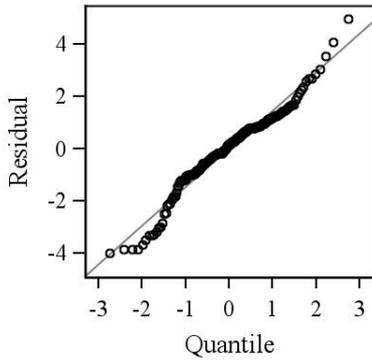
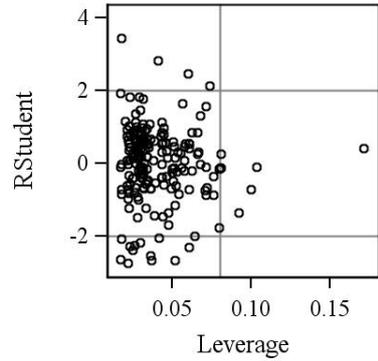
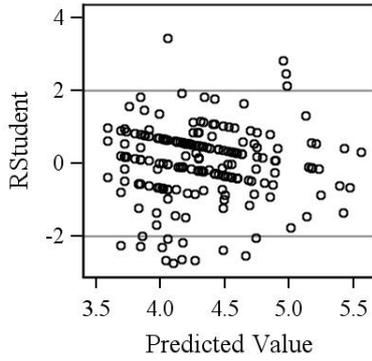
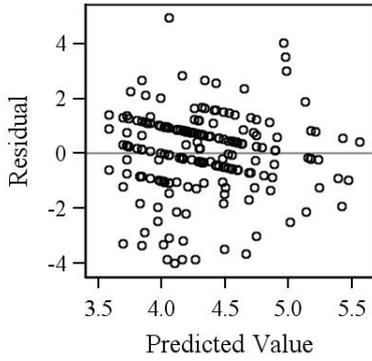
Appendix 2: The multiple regression model of five year average cost of capital, assumptions

Parameter Estimates						
Variable	Label	DF	Squared Semi-partial Corr Type II	Squared Partial Corr Type II	Tolerance	Variance Inflation
Intercept	Intercept	1	.	.	.	0
Q49	Credit rating	1	0.03903	0.04063	0.93806	1.06603
Q53All	Number of creditors	1	0.01397	0.01493	0.90824	1.10103
Q11Dummy	Ownership of the firm	1	0.00109	0.00118	0.93726	1.06694
Q22Dummy1	Customer risk	1	0.01262	0.01351	0.62106	1.61015
Q22Dummy2	Industry risk	1	0.00103	0.00111	0.36880	2.71150
Q22DummyInteraction	Interaction from customer and industry risks	1	0.00467	0.00505	0.27551	3.62964
Q24Dummy	Internationality	1	0.00501	0.00540	0.86890	1.15088

Test of First and Second Moment Specification		
DF	Chi-Square	Pr > ChiSq
27	24.86	0.5822

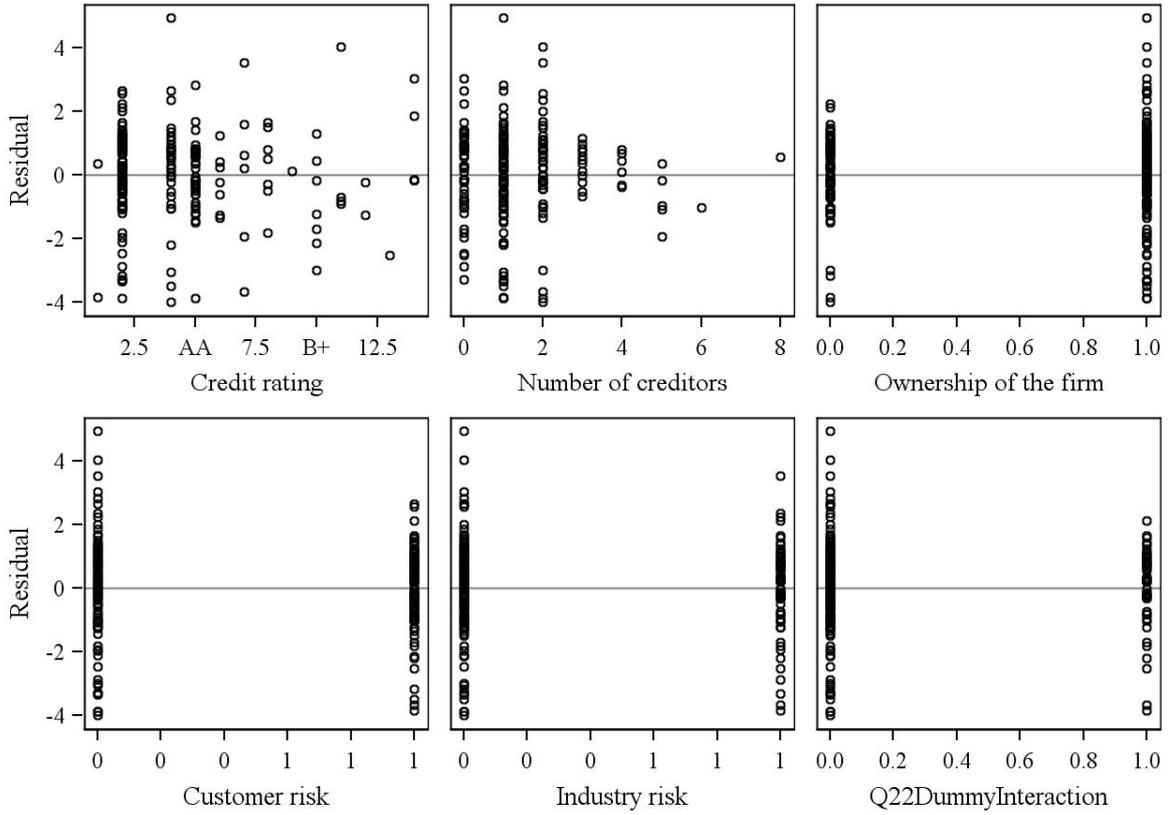
Durbin-Watson D	1.804
Number of Observations	199
1st Order Autocorrelation	0.095

Fit Diagnostics for Q50.2



Observations	199
Parameters	8
Error DF	191
MSE	2.2299
R-Square	0.0783
Adj R-Square	0.0446

Residual by Regressors for Q50.2



Residual by Regressors for Q50.2

